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Five new species of *Henckelia* (Gesneriaceae) from Myanmar and Thailand

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ABSTRACT

Five new species of *Henckelia* are described, two from Myanmar: *Henckelia campanuliflora* and *H. candida*, and the others from Thailand: *H. amplexifolia*, *H. nakianensis* and *H. dasycalyx*. A key to the 1 to 2-leaved species of the genus is given, as well as photographs, ecology, and also IUCN conservation status for the new species.

KEYWORDS: Conservation assessments, Indo-China, limestone, South-East Asia

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INTRODUCTION

The genus *Henckelia* was described by Sprengel (1817) but was subsequently mostly included in synonymy of *Didymocarpus* Wall. until resurrected and greatly expanded by Weber & Burtt (1998). *Henckelia* was then extensively remodelled by the removal of all Malesian species and the inclusion of many *Chirita* species by Weber *et al.* (2011). A clarification of the consequent confusion of names and the current status of each was provided by Middleton *et al.* (2013).

The genus is now morphologically fairly diverse and formerly includes two species which develop only a single leaf: *Henckelia monophylla* (C.B.Clarke) D.J.Middleton & Mich.Möller from central Arunachal Pradesh, India (Clarke, 1884; Wood, 1974), and *H. pradeepiana* Nampy, Manudev & A.Weber, from the southern Western Ghats, India (Manudev *et al.*, 2012). Recent field surveys and the examination of herbarium materials have revealed additional new species of *Henckelia* which develop only one large leaf. Three are similar to *H. monophylla* and are described here as *H. campanuliflora* Sirim., *H. candida* Sirim. and *H. nakianensis* Sirim., J.Parn. & Hodk. A fourth new species, *H. amplexifolia* Sirim., is most similar to *H. bifolia* (D.Don) A.Dietr. (Royle, 1839; Wood, 1974). A caulescent plant from Northern Thailand was also found to be a new species and is here described as *H. dasycalyx* Sirim. & D.J.Middleton. This taxon is closely related to *H. oblongifolia* (Roxb.) D.J.Middleton & Mich.Möller.

These new taxa increase the number of known *Henckelia* species to 64 (Janeesha *et al.*, 2015; Manudev *et al.*, 2012; Middleton *et al.*, 2013; Rajakumar *et al.*, 2009; Ranasinghe *et al.*, 2016; Sukumaran & Kumar, 2014; Weber *et al.*, 2011). The genus is found in Sri Lanka, southern and north-eastern India, Nepal, Bhutan, southern China, northern Laos, northern Vietnam and northern Thailand (Weber *et al.*, 2011).

MATERIALS AND METHODS

The descriptions of new species are based on herbarium specimens and fresh materials. For the herbarium specimens, flowers were softened in water or 70% alcohol before measurements were taken. The conservation assessments were made following the IUCN criteria (IUCN, 2012).

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KEY TO THE SPECIES OF *HENCKELIA* WITH ONLY ONE OR TWO LEAVES

1. Mature plant developing one large leaf only
  2. Acaulescent herb, tuber present, capsule ovoid to subglobose **H. pradeepiana**
  2. Caulescent herb, tuber absent, capsule elongate
    3. Herb with long rhizome, scale-like leaves developed **H. monophylla**
    3. Herb without long rhizome, scale-like leaves incompletely developed
      4. Leaves petiolate, persistent calyx, capsule held in line with pedicel (orthocarpic) **1. H. campanuliflora**
      4. Leaves sessile, caducous calyx, capsule held ± horizontal to the pedicel (plagiocarpic)
        5. Leaf less than 7 cm long, surface densely covered in fine hairs, calyx tip not reflexed, staminodes 2 **2. H. candida**
        5. Leaf more than 7 cm long, surface with sparse stout hairs, calyx tip reflexed, staminodes 3 **3. H. nakianensis**
1. Mature plant developing one large leaf and one small leaf, rarely with some individuals in a population with 1, 3 or 4 leaves
  6. Perennial herb lacking stolons and tubers, flower infundibuliform, 1–2-flowered, corolla tube more than 3 cm long, capsule orthocarpic **H. bifolia**
  6. Perennial herb with stolons and tubers, flower campanulate, more than 2-flowered, corolla tube less than 1 cm long, capsule plagiocarpic **4. H. amplexifolia**

1. Henckelia campanuliflora Sirim. **sp. nov.** Type: Myanmar, Shan State, Htan San Gu, Taunggyi Township, evergreen forest, limestone karst and colluvial slopes down to stream on dark brown loam, 20°49′14″N, 97°20′12.4″E, alt. 1,234 m, fl., 21 Sept. 2015, *Baba, Kertsawang, Kilgour, Puglisi, Rodda, Srisanga, Thant Shin & Phyu Phyu Hnin 103582* (holotype **SING!**). Figs. 1–2.

Epilithic annual herb, up to 10 cm tall; stem 0.5–4.5 cm long, with dense multicellular and glandular hairs, 0.4–2.1 mm long. *Leaf* symmetrically orbicular (globose or rhombic), 4.2–7 by 4–6.5 cm, herbaceous, apex obtuse or acute, base cordate, margin remotely dentate, upper and lower surfaces hairy, lateral veins 4–6 ascending on each side of midrib; only one leaf developing. *Petiole* terete, 0.5–3.1 cm long, hairy. *Inflorescence* terminal, 3.8–6.2 cm long, inserted at the junction of the petiole and the stem, single or compound cymes, 2–9-flowered; peduncles terete, greenish or purplish, 3–3.7 cm long, hairy; bracts 2, free, sessile, lanceolate, 1.5–2 by 0.2–0.5 mm, apex acute, hairy, margin entire; pedicels terete, greenish or purplish, 3–3.7 cm long, with a dense indumentum of multicellular hairs, sometimes glandular, sometimes simple. *Calyx* 5-partite, lobes narrowly triangular, basally connate, pinkish green, ca 3.4 by ca 0.6 mm, hairy, margin entire, apex acuminate, not reflexed, persistent. *Corolla* white, tube campanulate, ca 5 mm long, sparsely hairy; lobes 4 by 3 mm, glabrous. *Stamens* 2: filaments inserted at the base of the corolla tube, 3 mm long, curved; anthers reniform, adaxial surfaces coherent, ca 1.2 by ca 1 mm; staminodes 3, inserted 2 mm from the base of the corolla tube, 0.4 mm long, glabrous. *Gynoecium* 9 mm long; ovary 1 mm across, hairy; stigma subpeltate, dark purple, ca 0.4 by ca 0.2 mm. *Infructescence* 4.5–5 cm long, ¾–1 time the length of the subtending leaf. *Fruit* held in line with the pedicel (orthocarpic), capsule elongate, green, 1–1.2 cm long by 2–2.1 mm wide, with eglandular hairs and few glandular hairs. *Seeds* prolate, brown, ca 0.3 by ca 0.2 mm.

Myanmar.— Shan State: Maopan Taung, Taunggyi Township, 20°48′47.51″N, 97°16′18.7″E, alt. 1,454 m, fr., 23 Sept. 2015, *Kilgour et al. m-633* (**SING**). Lomkok mountain and pagoda, roadside, Taunggyi Township, 20°49′2.4″ N, 97°13′26.6″ E, alt. 1,106 m, fl., 20 Sept. 2015, *Puglisi et al. 103541* [**MBK** (MBK0272469), the left-hand side herb)].

Distribution.— Only known from Shan State (Fig. 10).

Ecology.— Edge of open semi-evergreen forest in the shade, evergreen forest or limestone karst and colluvial slopes above streams, dark brown loam, alt. 1,100–1,450 m, flowering and fruiting in September.

Etymology.— The name of this species refers to the corolla shape.

Provisional conservation assessment.— Endangered (EN B1ab(iii), B2ab(iii)). The EOO and AOO are both well within the threshold of Critically Endangered but it is known from three populations which are fairly close together and could not be described as fragmented. At each site the species is fairly common. None of the populations are in a protected area and there has been extensive deforestation in the area, coupled with microclimate changes due to surrounding agricultural land.

Notes.— This species is similar to *Henckelia monophylla*, *H. pradeepiana*, *H. candida* Sirim., and

Figure 1. Holotype of *Henckelia campanuliflora* Sirim. Photograph: Derek Liew.

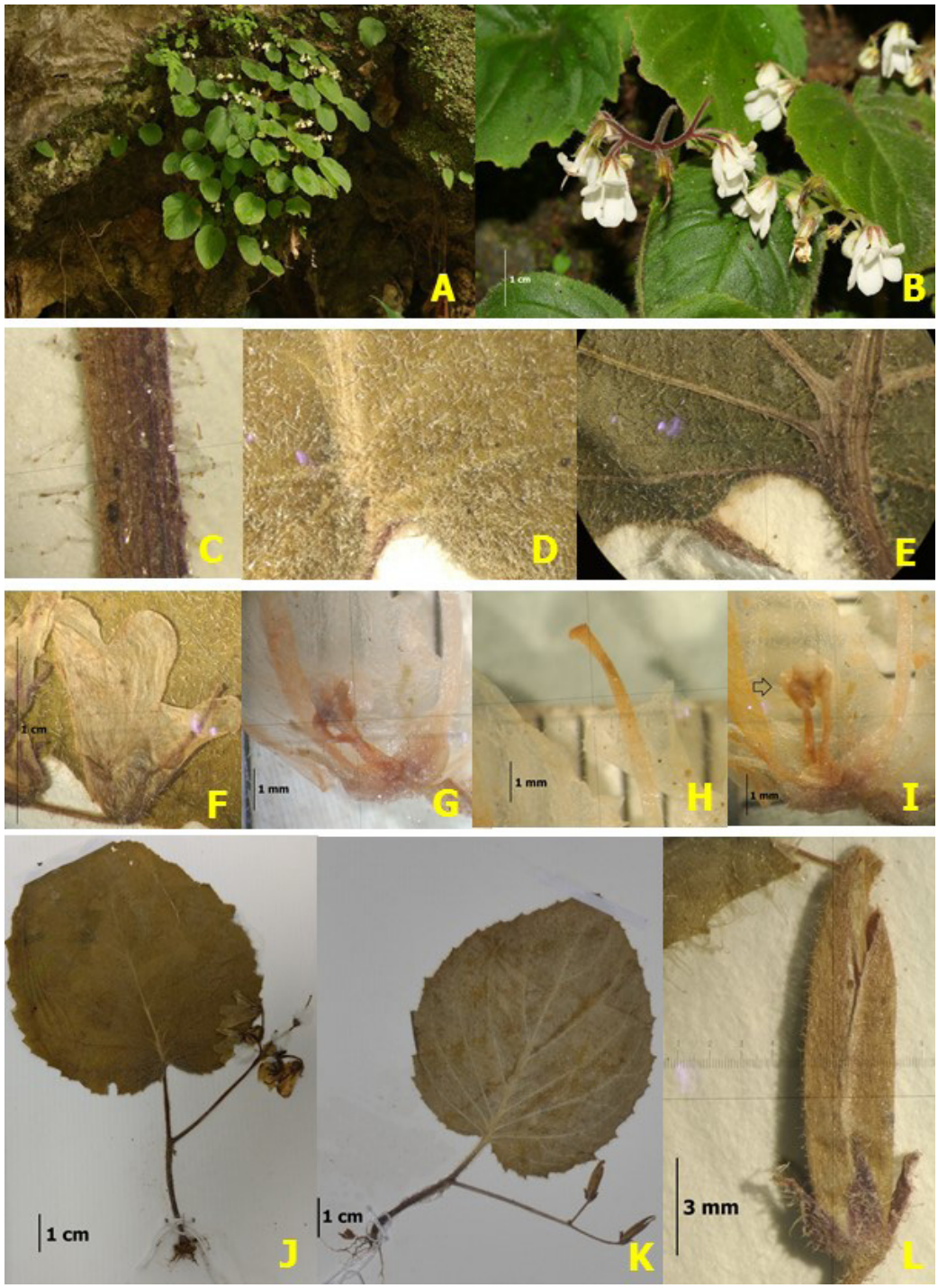

Figure 2. *Henckelia campanuliflora* Sirim.: A. Habitat; B. Inflorescences; C. Glandular hair on pedicels; D. Upper leaf surface; E. Lower leaf surface; F. Flower; G. Ovary; H. Gynoecium, I. Anthers; J–K. Habit; L. Fruit. Photographs: A–B. by Michele Rodda; C–L. by Sukontip Sirimongkol.

H. nakianensis Sirim., J.Parn. & Hodk. in having only one large leaf but differs from *H. monophylla* in lacking a long rhizome character (vs present), scale-like leaf incompletely developed (vs fully developed), inflorescences mostly more than 2-flowered (vs strictly 2-flowered), broadly campanulate corolla tube, 5 mm long (vs infundibuliform, 50–60 mm long). It is similar to *H. pradeepiana* in the petiolate leaf, campanulate flower, reniform anthers and persistent calyx, but differs in absence of a tuber (vs present), being caulescent (vs acaulescent), the hairy upper leaf surface (vs glabrous), the inflorescence ½–¾ times the leaf length (vs 1–1 ½ times), the elongate capsule (vs ovoid to subglobose). This species is also similar to *H. candida* and *H. nakianensis* but differs in the petiolate leaf and persistent calyx (Table 1).

2. Henckelia candida Sirim. **sp. nov.** Type: Myanmar, Shan State, Kyauk Gu Taung, Paunglang Reserve Forest, Pinglong Township, 19°57′04.1″N, 96°38′40.3″E, alt. 395 m, fl. & fr., 12 Sept. 2015, *Baba, Kertsawang, Kilgour, Puglisi, Rodda, Srisanga, Thant Shin & Phyu Phyu Hnin 103111* (holotype **SING!**). Figs. 3–4.

Epilithic annual herb, 2.5–10 cm tall; stem sparsely multicellular and glandular hairs. *Leaf* symmetrically orbicular, elliptic or ovate, 4.3–8.5 by 3.4–6 cm, apex acute, obtuse or rounded, base cordate, margin dentate, upper and lower surfaces densely hairy, lateral veins 4–6 on each side of midrib; only one leaf developing, sessile. *Inflorescence* terminal, inserted at the junction of the leaf blade and stem, single or compound cymes, 1–17-flowered; peduncles terete, green, 1.2–2.5 cm long, with multicellular hairs and few glandular hairs; bracts 2, free, sessile, elliptic, 5.5 by 2.5 mm, apex acute, sparsely hairy, margin ciliate; pedicels terete, green, 1.1–3 cm long, with multicellular hairs and few glandular hairs. *Calyx* 5-partite, lobes narrowly triangular, basally connate, light green, 5 by 1.1 mm, hairy, margin entire, apex acuminate, not reflexed, caducous. *Corolla* white; tube campanulate, 5 mm long, sparsely hairy, corolla lobes 4 by 3 mm, glabrous. *Stamens* 2: filaments inserted 2 mm from the base of the corolla tube, 1 mm long, curved; anthers reniform, yellow, adaxial surfaces coherent, ca 1 by ca 0.8 mm; staminodes 3, inserted 2 mm from the base of the corolla tube, 0.2 mm long, glabrous. *Gynoecium* ca 6.5 mm; ovary 1.3 mm across, hairy; style terete, slender; stigma subpeltate, greenish, ca 0.5 by ca 0.4 mm. *Fruit* plagiocarpic, capsule elongate, green, 1.2–1.8 cm long, sparsely hairy. *Seeds* prolate, brown, 0.6 by 0.2 mm.

Myanmar.— Shan State: Lomkok mountain and pagoda, roadside, Taunggyi Township, 20°49′2.4″ N 97°13′26.6″ E, alt. 1,106 m, fl. & fr. 20 Sept. 2015, *Puglisi et al. 103541* [**MBK** (MBK0272469), the two herbs on the right-hand side].

Distribution.— Only known from Shan State (Fig. 10).

Ecology.— Damp gully with karst limestone boulders along the edge of stream, shaded tall bamboo forest with dense layers of cryptogams and lithophytic plants or open semi-evergreen forest, on limestone, alt. 400–1,100 m, flowering & fruiting in September.

Etymology.— The name of this species refers to the white flower colour.

Provisional conservation assessment.— Endangered (EN B2ab(iii)). This species is known from two populations, only one of which is in a protected area. Another population is in a small patch of forest surrounded by agricultural land with very high risk of disturbance.

Notes.— This species is similar to *Henckelia monophylla*, *H. pradeepiana* and *H. nakianensis* but differs from *H. monophylla* in lacking a long rhizome (vs present), having inflorescences mostly more than 2-flowered (vs always 2-flowered), the campanulate corolla tube ca 5 mm long (vs infundibuliform, 50–60 mm long), reniform anthers (vs elliptic), and horizontally held fruit (plagiocarpic) (vs in line with the pedicel). It is also similar to *H. pradeepiana* in the campanulate flower and reniform anthers but differs in absence of a tuber (vs present), being caulescent (vs acaulescent), the leaf being sessile (vs petiolate), upper leaf surface densely hairy (vs glabrous), inflorescence ½–¾ times the subtending leaf length (vs 1–1½ times the leaf length), calyx caducous (vs persistent), capsule plagiocarpic (vs orthocarpic) and capsule elongated (vs ovoid to subglobose). This species is also similar to *H. nakianensis* in having an inflorescence that is about ½ times the subtending leaf length but differs, particularly, in the calyx that lacks of a strongly reflexed tip and in having 3 staminodes (vs 2) (Table 1).

Figure 3. Holotype of *Henckelia candida* Sirim. Photograph: Derek Liew.

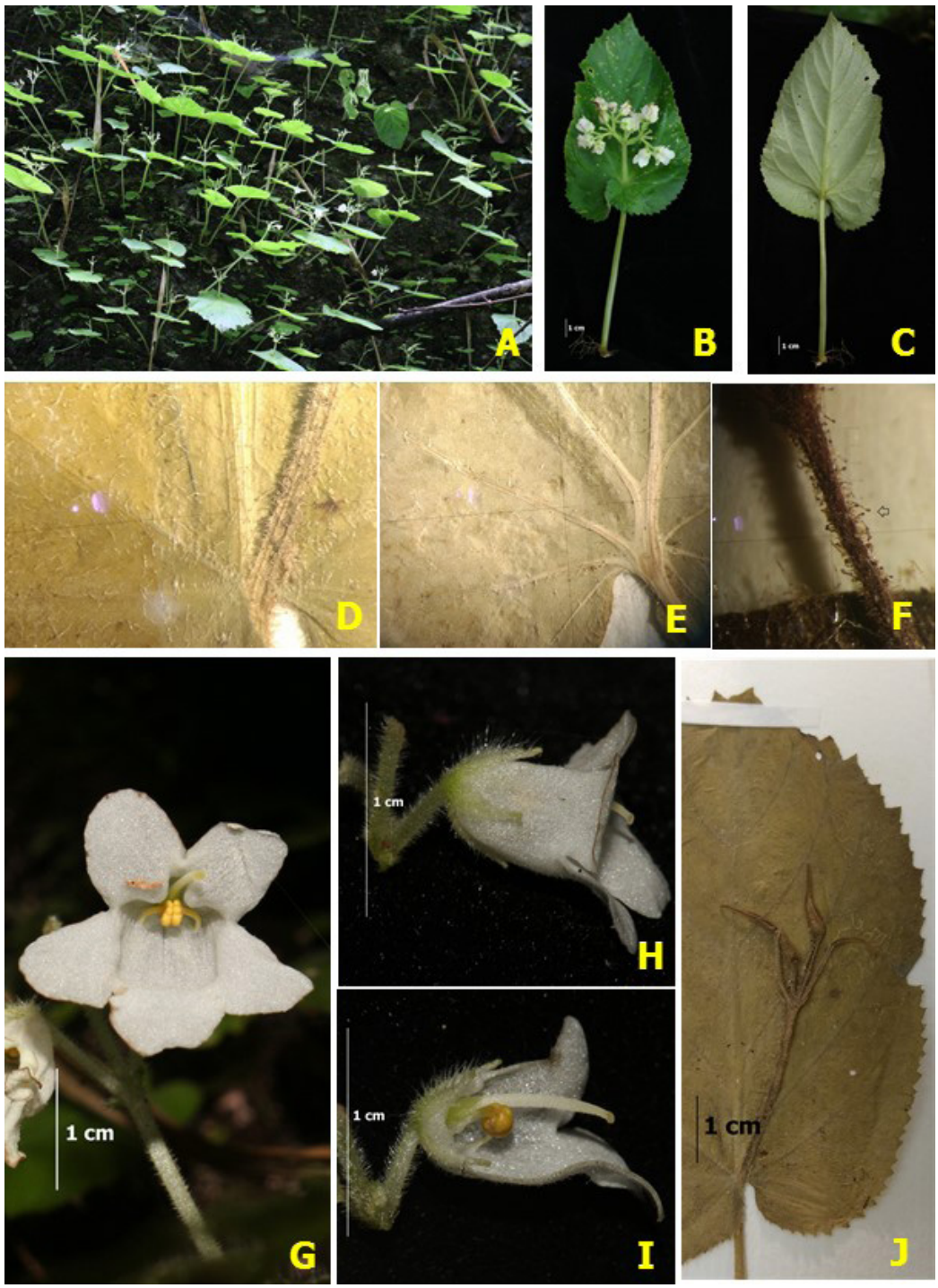

Figure 4. *Henckelia candida* Sirim.: A. Habitat; B–C. Habit; D. Upper leaf surface; E. Lower leaf surface; F. Glandular hairs on pedicels; G–I. Flowers; J. Fruits. Photographs: A–C. & G–I. by Michele Rodda; D–F. & J. by Sukontip Sirimongkol.

Two doubtful specimens, *Srisanga et al. 103884* (**SING**) and *Srisanga et al. 103882* [**MBK** (MBK0272475)], are similar to this species in having one large sessile leaf. However, both specimens are in fruiting stage and differ slightly from *H. candida* in their indumentum and plant size, making them hard to confirm their identities. Further field study is necessary to assess such variation.

3. Henckelia nakianensis Sirim., J.Parn. & Hodk., **sp. nov.** Type: Thailand, Chiang Mai, Om Koi District, Tambon Na Kian, Ban Mae Kong, north of the village near stream, alt. 950 m, fl. & fr. 27 Aug. 2015, *Pongamornkul et al. 5110* [holotype **QBG!** (QBG85771), isotype **BKF!**]. Figs. 5–6.

Epiphytic herb, up to 15 cm tall; stem glabrous. *Leaf* symmetrically orbicular or cordate, 9–12 by 6–10 cm, herbaceous, apex acute, base cordate, margin remotely dentate, upper and lower surfaces nearly glabrous, but with sparse stout hairs on upper surface, up to 0.7 mm long, lateral veins 4–6 on each side of midrib; only one leaf developing, sessile. *Inflorescence* terminal, inserted at the junction of the leaf blade and stem, single or compound cymes, 2–10-flowered; peduncles terete, 1.8–3.5 cm long, with eglandular hairs; bracts 2, free, sessile, lanceolate, 5–17 by 0.1–6 mm, apex acute, hairy, margin dentate; pedicels terete, 1.2–3.5 cm long, multicellular and sparsely glandular hairs. *Calyx* 5-partite, lobes triangular, basally connate, 4.5 by 1.2–1.5 mm, apex acuminate, tip reflexed, hairy, margin entire, caducous. *Corolla* white-purplish, tube campanulate, 7 mm long, glabrous, corolla lobes purple, glabrous, 5 by 3–4 mm. *Stamens* 2: filaments inserted 3 mm from the base of the corolla tube, 1.5 mm long, straight; anthers reniform, adaxial surfaces coherent, yellow, glabrous, ca 1.4 by ca 1 mm; staminodes 2, inserted 3 mm from the base of the corolla tube, 0.2 mm long, glabrous. *Gynoecium* ca 9.5 mm, ovary 1 mm across, hairy; style terete, slender; stigma subpeltate, yellow. *Fruit* a plagiocarpic, elongate capsule, green, 1–2.5 by 0.1–0.2 cm, sparsely hairy. *Seeds* not seen.

Distribution.— Only known from the type locality (Fig. 10).

Ecology.— On trees in dry evergreen forest, moist places near stream, ca 950 m alt., flowering & fruiting in August.

Vernacular.— Dao noi (ดาวน้อย).

Etymology.— The name of this species refers to the type locality.

Provisional conservation assessment.— Data Deficient (DD). This species is only known from the type collection from a rather remote and inaccessible site. The EOO and AOO are unknown.

Notes.— This species is similar to *Henckelia monophylla* and *H. pradeepiana* in having only one leaf, but differs from *H. monophylla* in lacking a long rhizome (vs present), in having the inflorescences being mostly more than 2-flowered (vs always 2-flowered), campanulate corolla tubes, ca 7 mm long (vs infundibuliform, 50–60 mm long), and the subpeltate stigma (vs bilobed). It differs from *H. pradeepiana* in being caulescent (*vs* acaulescent), lacking a tuber (present), having sessile leaf (vs petiolate), inflorescence shorter than the leaf length (vs longer than), caducous calyx (vs persistent), plagiocarpic capsule (vs orthocarpic) and elongate (vs ovoid or subglobose). This species is also similar to *H. candida* in its inflorescence that is shorter than the subtending leaf but differs in the leaf length being more than 7 cm long (vs less than 7 cm long), reflexed calyx tip (vs not reflexed) and 3 staminodes (vs 2) (Table 1).

4. Henckelia amplexifolia Sirim., **sp. nov.** Type: Thailand, Mae Hong Son, Muang District, Ban Nam Hu, road no 1–0003, km 20–21, 19°11′22.7″N, 98°04′12″E, alt. 800 m, fl., 12 July 2017, *Sirimongkol, Sapniyomphong & Phongsasat 714* (holotype **BKF!** (BKF194734); isotypes **E!**, **K!**, **L!**, **M!**, **P!**, **SING!**, **TCD!**). Figs. 7–8.

Epilithic or terrestrial, succulent annual herb, up to 15 cm tall; stem light green, 0.2–0.5 cm diam. with hispid white hairs; bulbils subglobose up to 1 cm diam., light brown; stolon white, terete, up to 0.1 cm diam. with lanceolate scale leaves up to 0.2 cm long. *Leaves* symmetrically cordate or orbicular, 6.2–16 by 6–14 cm, herbaceous, base cordate and sometimes amplexicaul, apex obtuse or rounded, margin serrate, upper surface hairy, lower surface glabrous, lateral veins 4–10 on each side of midrib, only the first lateral vein ascending perpendicular to the midrib; usually two pairs of opposite leaves present, but some reduced such that there are only 1 or 2, rarely 3 or 4, full-sized leaves, sessile. *Inflorescence* terminal, single or compound cymes, rarely axillary, up to 2

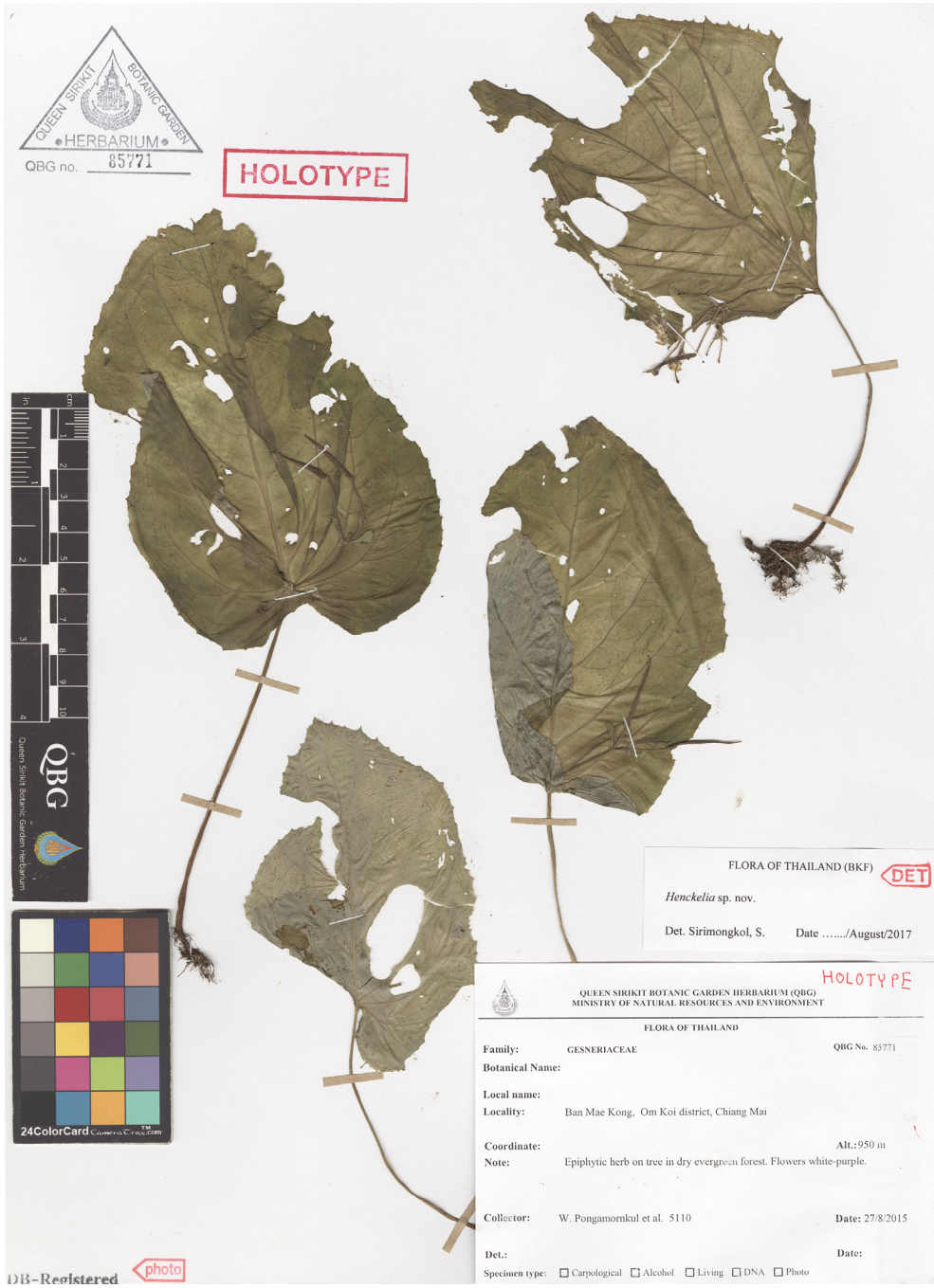

Figure 5. Holotype of *Henckelia nakianensis* Sirim. Photograph: Susee Daoh.

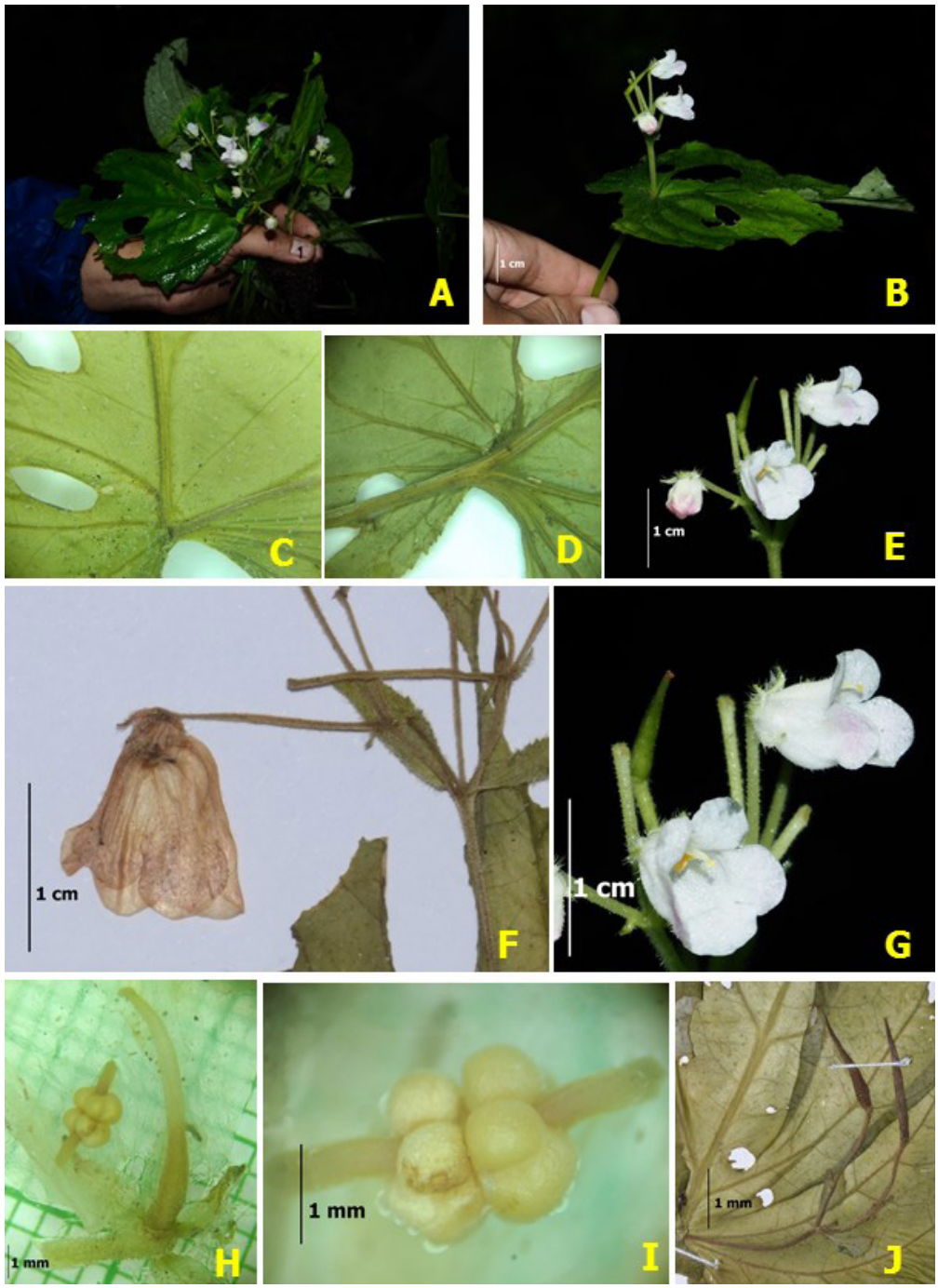

Figure 6. *Henckelia nakianensis* Sirim., J. Parn. & Hodk.: A–B. Habit; C. Upper leaf surface; D. Lower leaf surface; E. Inflorescence; F–G. Flowers; H. Gynoecium; I. Anthers; J. Fruits. Photographs: A–B., E. & G. by Wittaya Pongamornkul; C–D., F. & H–J. by Sukontip Sirimongkol.

Figure 7. Holotype of *Henckelia amplexifolia* Sirim. Photograph: Torsakul Nawanil.

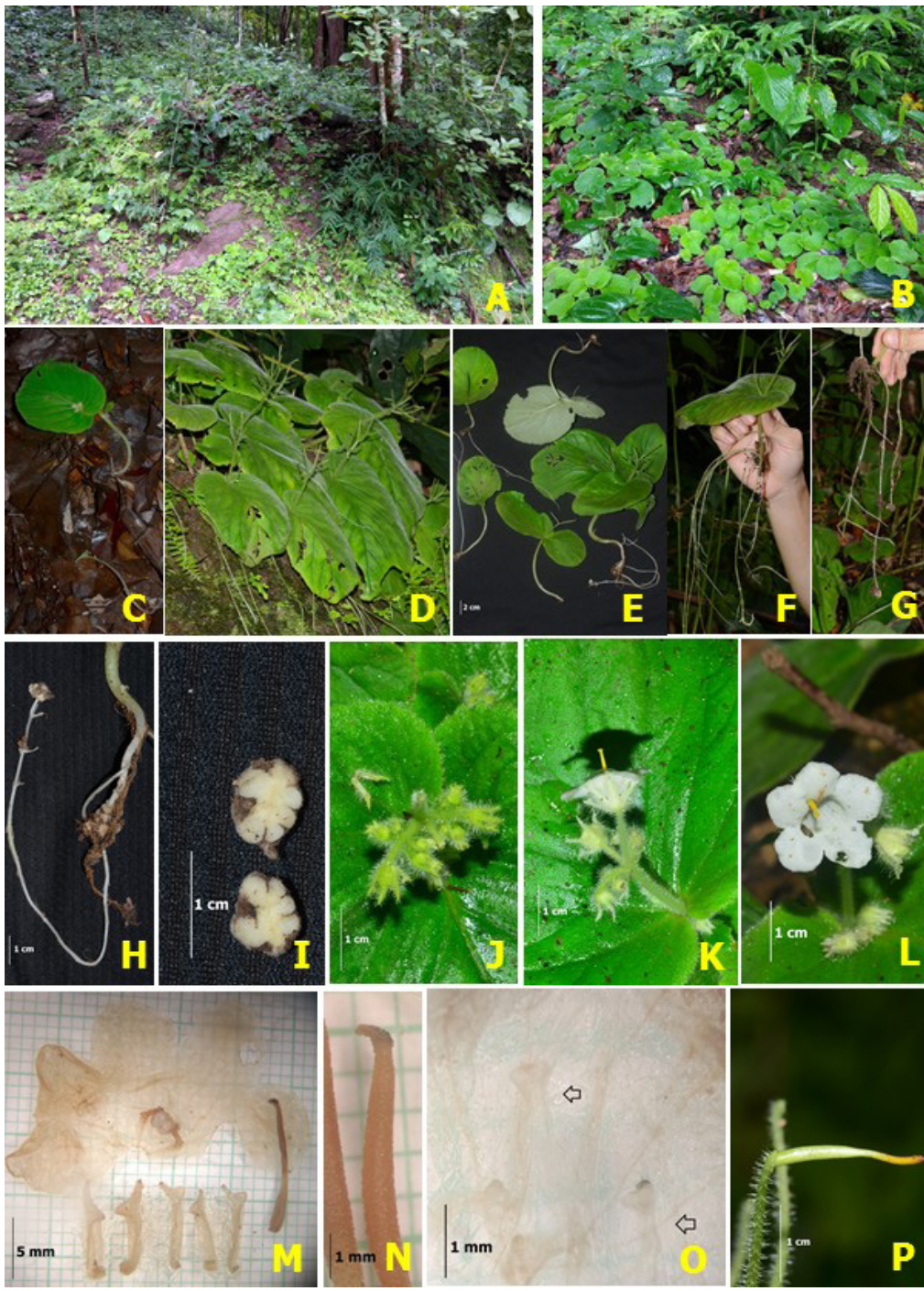

Figure 8. *Henckelia amplexifolia* Sirim.: A–B. Habitat; C–E. Habit; F–G. Stolons; H–I. Bulbils; J–L. Inflorescences; M. Flower dissection; N. Gynoecium; O. Staminodes; P. Fruit. Photographs: Sukontip Sirimongkol.

Table 1. Morphological differences between five *Henckelia* species; *H. monophylla*, *H. pradeepiana*, *H. campanuliflora*, *H. candida* and *H. nakianensis*. Data for *H. monophylla* and *H. pradeepiana* are adopted from Wood (1974) and Manudev *et al.* (2012), respectively.

Character	*H. monophylla*	*H. pradeepiana*	*H. campanuliflora*	*H. candida*	*H. nakianensis*
Rhizome	present	absent	absent	absent	absent
Tuber	absent	present	absent	absent	absent
Habit	perennial	perennial	annual	annual	annual
Stem	caulescent	acaulescent	caulescent	caulescent	caulescent
Petiole	sessile	petiolate	petiolate	sessile	sessile
Leaf shape	ovate	broadly ovate, oblong-ovate, elliptic	orbicular	elliptic or ovate	remotely dentate
Leaf margin	serrate	serrulate	remotely dentate	dentate	remotely dentate
Upper leaf surface	glabrous	glabrous	hairy	densely hairy	sparsely stout hairs
Inflorescence	2-flowered	1–20-flowered	2–9-flowered	1–17-flowered	2–10-flowered
Calyx	caducous, tip not reflexed	persistent, tip not reflexed	persistent, tip not reflexed	caducous, tip not reflexed	caducous, tip reflexed
Corolla tube	infundibuliform	campanulate	campanulate	campanulate	campanulate
Tube length	50–60 mm	4–5 mm	ca 5 mm	ca 5 mm	ca 7 mm
Filament attachment	base of corolla tube	base of corolla tube	base of corolla tube	middle of corolla tube	middle of corolla tube
Filament length	ca 13 mm, geniculate	ca 4 mm, curved	ca 3 mm, curved	ca 1 mm, curved	ca 1.5 mm, curved
Anthers	elliptic	reniform	reniform	reniform	reniform
Staminodes	present, 2, 3 mm long, hairy	absent	present, 3, 0.4 mm long, glabrous	present, 3, 0.2 mm long, glabrous	present, 2, 0.2 mm long, glabrous
Infructescence length	about half of the leaf length	1–1½ times the length of subtending leaf	½–¾ times the length of subtending leaf	½–¾ times the length of subtending leaf	1/3–½ times the length of subtending leaf
Fruit (long)	ca 90 mm, elongate, orthocarpic	6–8 mm, ovoid or subglobose, orthocarpic	10–12 mm, elongate, orthocarpic	12–18 mm, elongate, plagiocarpic	10–25 mm, elongate, plagiocarpic

Table 2. Morphological comparison between *Henckelia bifolia* (from Wood, 1974) and *H. amplexifolia*.

Characters	*H. bifolia*	*H. amplexifolia*
Stolon	absent	present
Inflorescence	1, 1–2 (rarely 3)-flowered,	1–2, 3–9-flowered,
Calyx tip	without claw	with claw, 2–3 mm long
Corolla tube	infundibuliform, purple	campanulate, white
Tube length	30–50 mm	ca 5 mm
Filament inserted	nearly at the corolla tube base,	middle of the corolla tube
Filament length	10–12 mm, long hairs at the top	1.5 mm, short hairs at the top
Staminode	ca 3 mm long, hairy	ca 1 mm long, glabrous
Fruit	young fruit 2.7 cm long	mature fruit 1.2–2 cm long

inflorescences, 3–9-flowered; peduncles terete, light green, 2.3–5 by 0.2–0.3 cm, glandular hairs; bracts 2, free, sessile or linear, 0.5–7 by 1–15 mm, apex acute, hairy, margin ciliate. *Pedicels* terete, light green, 0.7–2 by 0.1 cm, with multicellular and glandular hairs. *Calyx* 5-partite, lobes triangular, basally connate, light green, 6–6.3 by 1–1.4 mm, with multicellular and glandular hairs, margin entire, apex acute with acumen 2–3 mm long, caducous. *Corolla* white; tube campanulate, ca 5 mm long, hairy outside, corolla lobes 5–6 by 7–8 mm. *Stamens* 2: filaments inserted 2 mm from the base of the corolla tube, 3 mm long (appressed part 1.5 mm long), geniculate in the middle of the filament, hairy at the top; anthers reniform, yellow, adaxial surfaces coherent, 2.5 by 1.5 mm; staminodes 3, inserted 2 mm from the base of the corolla tube, 1 mm long, glabrous. *Gynoecium* ca 12–13 mm; ovary 1–1.5 mm across, with glandular hairs; style terete, slender; stigma subpeltate, greenish. *Fruit* plagiocarpic, green, 1.2–2 by 0.1 cm. *Seeds* not seen.

Thailand.— NORTHERN: Mae Hong Son: Muang District, Ban Nam Hu, road no 1–0003, km 20–21, 19°11′22.7″N, 98°04′12″E, alt. 800 m, fr. 21 Sept. 2016, *Sirimongkol et al. 701* (**BKF**, **E**, **K**, **P**, **TCD**); ibid., km 19–20, 19°11′23.2″N, 98°03′56.3″E, alt. 859 m, sterile, 12 July 2017, *Sirimongkol et al. 713* (**BKF**, **TCD**); Muang District, Mae Surin National Park, Road to Doi Pui, 19°11′22°N, 98°04′11″E, alt. 842 m, fl. & fr. absent, 21 Oct. 2014, *Middleton et al. 5813* [**BKF**, **E** (E00726602), **SING**].

Distribution.— Only known from Nam Tok Mae Surin, a national park of Thanon Thong Chai Mountain Range (Fig. 10).

Ecology.— Mixed deciduous forest on limestone or bamboo forest, near streams, moist areas over conglomerate rocks or on muddy rocky bank, alt. 800–850 m, flowering in July, fruiting in September.

Vernacular.— Dao pradap (ดาวประดับ).

Etymology.— The name of this species refers to its amplexicaul leaf base.

Provisional conservation assessment.— Endangered (EN B1ab(iii), B2ab(iii)). This species is known from a small number of collections along a short stretch road in the National Park. However, this known population could be easily disturbed by any roadworks.

Notes.— This new species is similar to *H. bifolia* in having one large and one small leaves but differs in its distinct stolon (vs absent), the campanulate flowers (vs infundibuliform), the calyx apex with an acumen (vs without acumen), filaments inserted in the middle of the corolla tube (vs filament inserted near the base of the corolla tube), the apex of the filament with short hairs (vs with long hairs), glabrous staminodes (vs sparsely hairy), and the white flowers (vs purple) (Table 2); the most distinctive character is the stolon with bulbils. Field observations showed extremely high flower predation by insects such that fruit set was very low.

5. Henckelia dasycalyx Sirim. & D.J.Middleton, **sp. nov.** Type: Thailand, Phitsanulok, Chat Trakan District, Namchuang, Phu Miang-Phu Thong Wildlife Sanctuary, 17 July 2012, alt. 782 m, fl. & fr., 15 July 2012, *Romklao Botanical Garden 0560/2555, leg. Navin s.n.* [holotype **QBG!** (QBG62273)]. Fig 9.

Terrestrial annual herb, 30 cm tall; stem with dense white multicellular hairs. *Leaves* opposite, symmetrically elliptic or ovate, each pair unequal in size, 11–14.4 by 5.2–9 cm, apex acute, base cuneate or sub-oblique, margin crenate (sometimes dentate), upper and lower surfaces densely hairy, lateral veins 8–9 on each side of midrib. *Petiole* terete, 3–8 cm long, densely hairy. *Inflorescences* axillary, 7 on a plant, single or compound cymes, 1–9-flowered; peduncles terete, 3–6.3 cm long, densely hairy; bracts 2, free, sessile, elliptic, 5.5 by 2.5 mm, apex acute, sparsely hairy, margin ciliate; pedicels terete, 0.5–1.8 cm long, densely hairy. *Calyx* 5-partite, lobes narrowly triangular, basally connate, ca 11 by 1 mm, densely hairy, margin entire, apex acuminate, persistent. *Corolla* purple; tube infundibuliform, 40 mm long, with glandular hairs. *Stamens* 2: filaments inserted at 1.5–1.9 cm from the base of the corolla tube, 1.5 cm long, geniculate; anthers elliptic, adaxial surfaces coherent, 2 mm long; staminodes 2, inserted 1.5 cm from the base of the corolla tube, 3 mm long, glabrous. *Gynoecium* ca 3.6 cm long; ovary 1 mm across, hairy; style terete, slender; stigma bilobed. *Fruit* orthocarpic, fusiform, 3.5–5.5 cm long, densely hairy. *Seeds* not seen.

Distribution.— Only known from the type locality (Fig. 10).

Ecology.— In deciduous forest, flowering & fruiting in July

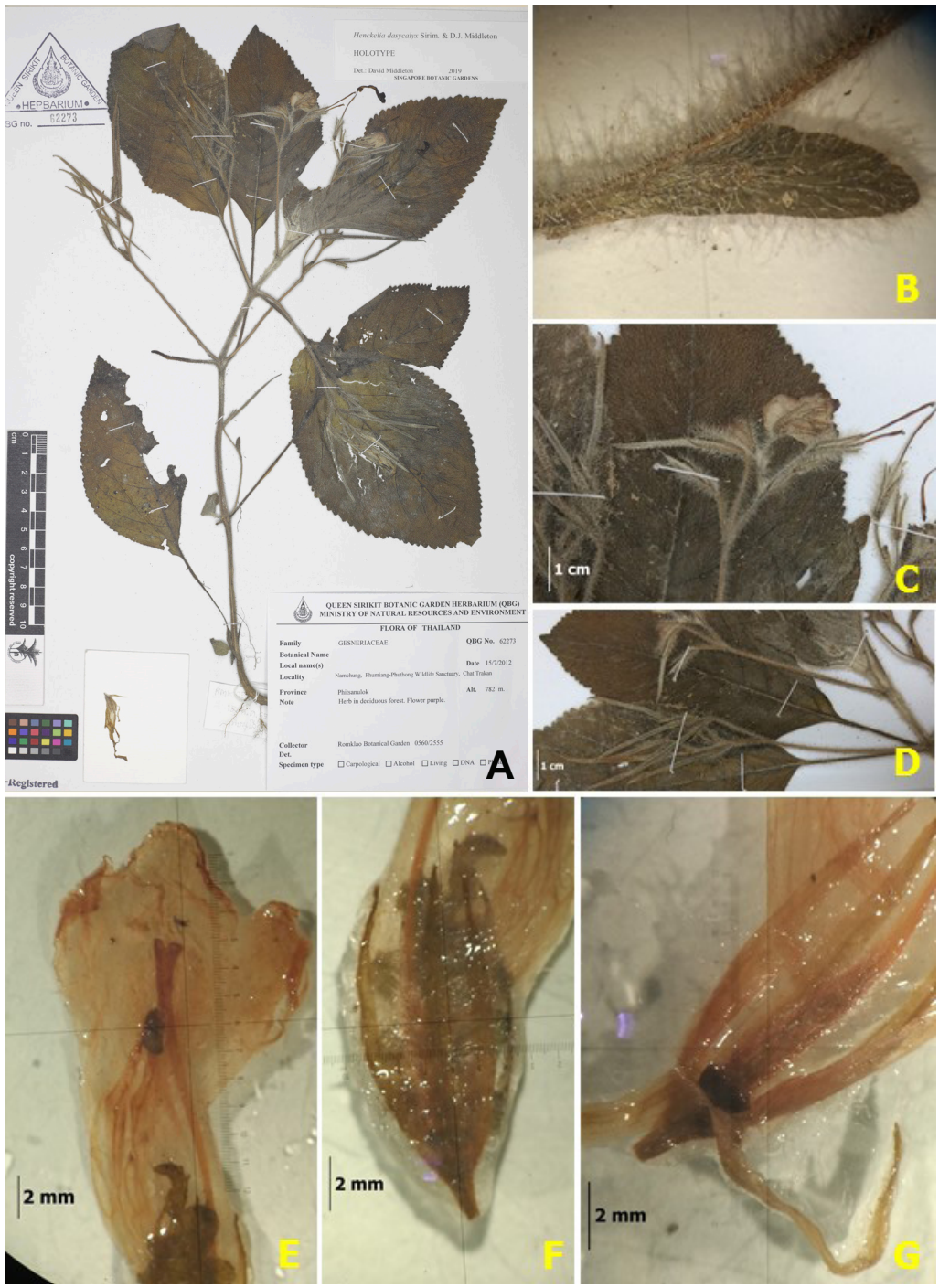

Figure 9. *Henckelia dasycalyx* Sirim. & D.J. Middleton.: A. Habit; B. Hairs on bract; C–D. Infructescences; E. Flower; F–G. Calyx. Photographs: A. by Derek Liew.; B–G. by Sukontip Sirimongkol.

Vernacular.— Muang tra kan (ม่วงตระการ).

Etymology.— The name of this species refers to its hairy calyx.

Provisional conservation assessment.— Data Deficient (DD). This species is only known from the type collection which is located within a protected area. The size of the population, the EOO and AOO are all unknown.

Notes.— This species is similar to *H. oblongifolia* in the distinct axillary inflorescence with 2–4 pairs, and the persistent calyx but differs in the annual habit (vs perennial), the compact flower arrangement (vs loosely arranged), calyx tube basally connate (vs campanulate), the lanceolate calyx lobes (vs triangular), the persistent calyx covered with long hairs (vs short hairs), and slender fusiform fruit (vs oblong) (Table 3).

Table 3. Morphological comparison between *Henckelia oblongifolia* (from Wood, 1974) and *H. dasycalyx*.

Characters	*H. oblongifolia*	*H. dasycalyx*
Habit	perennial herb, up to 90 cm tall.	annual herb, up to 30 cm tall.
Leaf	ovate, base strongly oblique, leaf covered with small brown glands.	elliptic or ovate, base weakly oblique, leaf without brown glands.
Inflorescence	loose, up to 12-flowered.	dense, up to 9-flowered.
Calyx	tube campanulate, lobes triangular, hairs shorter than calyx lobe	basally connate, lobes lanceolate, hairs equal or longer than calyx lobe.
Fruit	up to 9 cm long, oblong	up to 5.5 cm long, fusiform

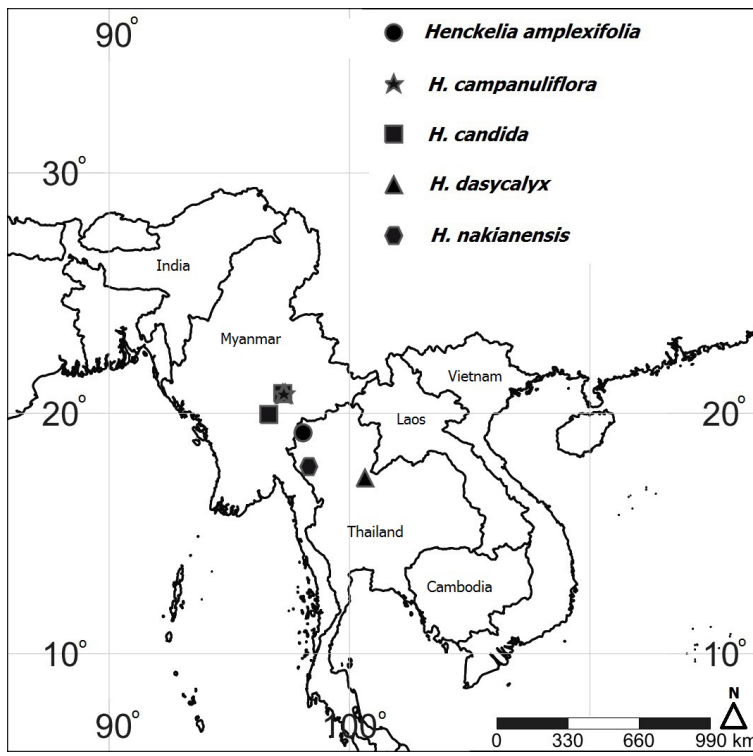

Figure 10. Distribution of the new species of *Henckelia* from Myanmar and Thailand. Map from https://www.simplemappr.net

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