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Author(s): Somran Suddee and Alan Paton

Source: *Kew Bulletin*, Vol. 64, No. 2 (2009), pp. 235-257

Published by: Springer on behalf of Royal Botanic Gardens, Kew

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A revision of *Anisochilus* Wall. ex Benth. (Lamiaceae)Somran Suddee<sup>1</sup> & Alan Paton<sup>2</sup>

**Summary.** Sixteen species of *Anisochilus* are reviewed. Full synonymy, information about types, distributions, and a key to species are given. The type of the little known *A. adenanthus* Dalzell has been found and the widely used *A. verticillatus* is a synonym. *A. sericeus* and *A. dysophylloides* var. *purpureus* are synonyms of *A. dysophylloides*. *A. henryi*, a recently published name is a synonym of *A. robustus*. Nine names are lectotypified. The genus occurs in South Asia, from the East Himalaya, North Thailand, and South China in the North to Sri Lanka and Peninsular Thailand in the South.

**Key Words.** *Anisochilus*, Lamiaceae, lectotypes, *Leocus*, *Plectranthus*, taxonomy.

### Introduction

*Anisochilus* (Lamiaceae) is an Asian genus of herbs and shrubs. It was first described by Bentham (1830a), the generic name referring to the unequal lips of the calyx. The genus belongs to subtribe Plectranthinae in tribe Ocimeae (Harley *et al.* 2004). It is characterised by the spike-like head, the sessile or subsessile fruiting calyx with posterior lobes decurved or deflexed and concealing the throat after anthesis, the decurved corolla tube, and the declinate stamens with confluent anthers. Bentham (1848) divided the genus into 2 sections, *Anisochilus* Benth. and *Stiptanthus* Benth., based on calyx characters. At present, the genus contains 16 species and is chiefly distributed in India, Sri Lanka, Himalaya, Burma, south China, Thailand and Indo-China. The southernmost distribution known so far is Peninsular Thailand (Trang Province). Fourteen species occur in India and Sri Lanka. Eight are endemic to the Deccan Peninsula (see Table 1).

The genus *Leocus* A. Chev. is recognised by Harley *et al.* (2004). This is superficially similar to *Anisochilus* but it differs in having fused, rather than free stamens and a variety of different calyx structures. It is also restricted to Africa, whereas true *Anisochilus* is Asian. Preparatory work done for *Flora of East Tropical Africa* has revealed that the type of *Leocus*, *L. lyratus* A. Chev. is a synonym of *Plectranthus betonicifolius* Baker and that *Leocus* is better subsumed into *Plectranthus*. The names *Anisochilus africanus* Scott-Elliot, *Leocus africanus* (Scott-

Elliot) J. K. Morton and *A. erlangii* Briq. should be considered synonyms of *Plectranthus africanus* (Scott-Elliot) A. J. Paton.

***Plectranthus africanus*** (Baker in Scott-Elliot) A. J. Paton (Paton *et al.* 2009: 308)

*Anisochilus africanus* Baker in Scott-Elliot, *J. Linn. Soc., Bot.* 30: 94 (1894). Type: Sierra Leone, Freetown, Scott-Elliot 5033 (holotype K!)

*A. engleri* Briq. (1894: 190). Type: Dem. Rep. Congo, between Nyangwe and Kibundo, Pogge 1019 (lectotype K!, **chosen here**).

*Leocus africanus* (Baker in Scott-Elliot) J. K. Morton (1962: 270).

*Anisochilus* can be distinguished from *Plectranthus* by a combination of a spike-like head and a deflexed posterior lip of the calyx (Harley *et al.* 2004). A phylogeny of *Plectranthus* and related genera is presented in Paton *et al.* (2004). *Anisochilus* nests within the 'Coleus' clade but better resolution and support are required before further changes to the generic circumscription within the Plectranthinae are made.

### Habitats

*Anisochilus* species are most common in the rather dry and open habitats, including open rocky places,

Accepted for publication July 2008.

<sup>1</sup> The Forest Herbarium (BKF), National Park, Wildlife & Plant Conservation Department, Chatuchak, Bangkok 10900, Thailand.

<sup>2</sup> Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK.

**Table 1.** Distribution of *Anisochilus* in Asia.

Taxa	SRI	IN	NE	BU	BR	SC	TH	CA	LA	VN
<i>A. pallidus</i>		x	x	x	x	x	x		x	x
<i>A. polystachyus</i>		x	x	x						
<i>A. mitis</i>		x		x						
<i>A. carnosus</i>	x	x	x		x	x	x			
<i>A. paniculatus</i>	x	x								
<i>A. velutinus</i>	x									
<i>A. wightii</i>		x								
<i>A. scaber</i>		x								
<i>A. robustus</i>		x								
<i>A. suffruticosus</i>		x								
<i>A. plantagineus</i>		x								
<i>A. dysophylloides</i>		x								
<i>A. argenteus</i>		x								
<i>A. adenanthus</i>		x								
<i>A. harmandii</i>							x	x	x	
<i>A. cambodianus</i>							x	x		

SRI Sri Lanka, IN India, NE Nepal, BU Bhutan, BR Burma, SC South China, TH Thailand, LA Laos, VN Vietnam, CA Cambodia

highland grasslands, edge of forests, open stream banks, roadsides or path-sides in forest. The majority of the species occur on exposed rocky places and mostly confined to the plateaus in the Deccan Peninsula, south India. Some species have a shrubby habit, thick stem and thick rootstock. This is probably an adaptation to the shallow soil habitat and the long dry season. No ecological data have been recorded for *A. plantagineus*, but from the very thick rootstock it probably grows in a similar rocky habitat.

### Calyces

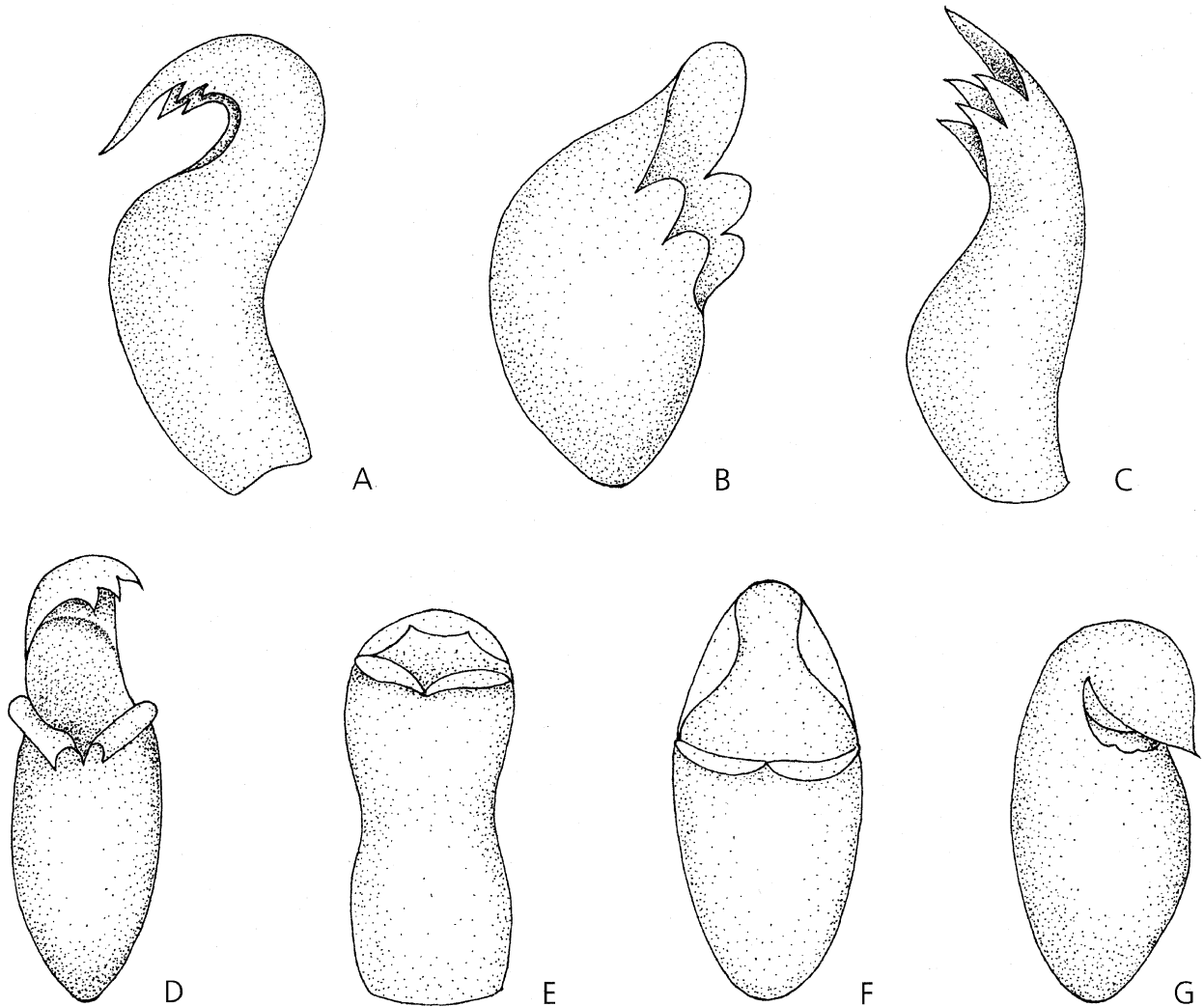
The calyx characters are of great taxonomic importance. The calyces are gamosepalous and consist of 5 lobes or teeth at the top of calyx tube. The lobes are bilabiate in which the upper lip and the lower lip are called 'posterior' and 'anterior' respectively. The arrangement of lobes on posterior and anterior is either in the formula of  $\frac{1}{4}$  (1 posterior/4 anterior) or  $\frac{3}{2}$  (3 posterior, 2 anterior), depending on the taxon. In the  $\frac{1}{4}$  case, the posterior lip is clearly 1-lobed, the anterior lip either obscurely 4-toothed or the 4 teeth may be much reduced and giving an appearance of a truncate lip, e.g., as found in *A. carnosus*, *A. mitis*, *A. paniculatus*, *A. scaber*, *A. velutinus* and *A. wightii* (Fig. 1G). In the  $\frac{3}{2}$  cases can be divided into 2 groups. Group I: Posterior lip can be prominently 3-lobed or lobes may be much reduced giving the appearance of a single, slightly toothed lobe and the anterior can be prominently 2-lobed or more or less entire. The throat of the calyx in either case is truncate, e.g., as found in *A. adenanthus* (Fig. 1E), *A. argenteus*, *A. dysophylloides*, *A. plantagineus* (Fig. 1F), *A. robustus* (Fig. 1D) and *A. suffruticosus*. Group II: Unlike

group I the throat of the fruiting calyx is oblique. This is caused by a large sinus between the 2 teeth of the anterior lip. Thus, although the lobe arrangement is  $\frac{3}{2}$ , 4 of the lobes are arranged obliquely at the base of the uppermost lobe, e.g., as found in *A. cambodianus*, *A. harmandii* (Fig. 1B), *A. pallidus* (Fig. 1A) and *A. polystachyus* (Fig. 1C) (see Fig. 1).

Bentham (1848) divided *Anisochilus* into 2 sections using calyx characters. Section *Anisochilus* has posterior lip of calyx ovate and deflexed, anterior lip truncate. Section *Stiptanthus* has 5-toothed calyx, teeth incurved and oblique, the uppermost tooth elongate and incumbent. This classification is not followed here as it does not reflect the homology of calyx lobes, placing species with both the  $\frac{1}{4}$  arrangement and  $\frac{3}{2}$  arrangement in section *Anisochilus*.

**Anisochilus** Wall. ex Benth. (1830a: sub t. 1300); Benth. (1830b: 18), as '*Anisochilos*'; Benth. (1832: 59; 1848: 80; 1876: 1177); Hook. f. 1885: 627); Briq. (1897: 350); Kudô (1929: 141); Doan (1936: 941); Mukerjee (1940: 56); Hsuan (1977: 411); Li & Hedge (1994: 268); Suddee *et al.* (2004: 379). Type species: *Anisochilus carnosus* (L. f.) Wall. ex Benth. [*Lavandula carnosus* L. f.].

Erect herbs or undershrubs. Stems quadrangular or round-quadrangular, often fleshy. Leaves sessile, subsessile or petiolate, opposite decussate or whorled. Inflorescence terminal or axillary, simple, or opposite and decussately branched and paniculate; adjacent verticils arranged close together and forming a dense tetragonal or cylindrical spike-like head; cymes sessile, unbranched, few to many-flowered; bracts arranged in 4 rows, caducous, often forming a coma on the top of



**Fig. 1.** Arrangement of fruiting calyx lobes on posterior and anterior in *Anisochilus*. Formula of  $\frac{1}{2}$ . A *A. pallidus*; B *A. harmandii*; C *A. polystachyus*; D *A. robustus*; E *A. adenanthus*; F *A. platagineus*; Formula of  $\frac{1}{4}$ . G *A. carnosus*. DRAWN BY ORATHAI KERDKAEW.

the inflorescence; pedicels 0 (sessile). Calyx ovoid or tubular in flower, oblique-tubular in fruit, suberect, clearly bilabiate or obliquely 5-toothed; posterior lip 1- or 3-lobed, decurved, or deflexed and concealing throat after anthesis; anterior lip 2- or 4-lobed, short, sometimes appearing truncate, minutely toothed, or absent, with or without a sinus between lobes; tube oblique, usually constricted at throat and ventrally saccate around the middle, with 10 – 12 longitudinal veins, prominent inside. Corolla exserted from calyx tube; posterior lip shortly 3 – 4-lobed, equal or the median lobes larger; anterior lip entire, elongate, concave, longer than posterior; tube gradually dilated towards throat and decurved above or around midpoint, or abruptly expanded around midpoint with

narrow slender base. Stamens 4, didynamous, declinate, slightly exserted, not exceeding the anterior corolla lip, inappendiculate, anterior pair slightly longer; posterior and anterior pairs attached on corolla throat at the base of anterior corolla lobe; filaments free; anther reniform, synthecous, back usually with sessile glands. Ovary glabrous. Style declinate, shortly bifid with subequal branches. Disc lobed, anterior side well developed, exceeding the ovary. Nutlets orbicular, ovoid, ellipsoid, or oblong and slightly flattened, smooth, shining, basal scar small, mature nutlets usually producing mucilage when wetted. Chromosome numbers of  $2x = 26, 28, 32$  and  $34$  have been reported in the *Index to Plant Chromosome Numbers*

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**Key to species of *Anisochilus***

1. Fruiting calyx with 1-lobed entire upper lip and 4-lobed lower lip; throat truncate with no anterior sinus (Fig. 1G)
  2. Stem pubescent to villous; leaves membranous, densely and softly pubescent, velvety to touch . . . . . **1. *A. mitis***
  2. Stem glabrescent to densely pubescent but not villous; leaves rather thick, often fleshy, not velvety to touch
    3. Leaves glabrous, pubescent to tomentose, with tertiary reticulate venation usually obscure beneath, secondary veins prominent; posterior lip of fruiting calyx large, conspicuous . . . . . **2. *A. carnosus***
    3. Leaves pubescent to tomentose, with both secondary veins and tertiary reticulate venation prominent beneath; posterior lip of fruiting calyx conspicuous or not
      4. Spike-like heads short, ovoid, less than 20 mm long
        5. Inflorescences corymbose-like in appearance, top of branches almost arranged at the same level; posterior lip of fruiting calyx conspicuous; leaves obovate or obovate-oblong . . . . . **3. *A. velutinus***
        5. Inflorescences racemose or paniculate-like in appearance, top of lateral branches usually arranged much lower than the top of the median branch; posterior lip of fruiting calyx inconspicuous; leaves orbicular, ovate, or elliptic-obovate . . . . . **4. *A. paniculatus***
      4. Spike-like heads long, ovoid to cylindrical, usually more than 20 mm long, if less than 20 mm long then spike-like head black in appearance when dry
        6. Spike-like head ovoid to ovoid-cylindrical, less than 3 times as long as broad, purplish in appearance when dry; axis usually simple, rarely 2 – 3-branched; fruiting calyx tube purplish-brown villous . . . . . **5. *A. scaber***
        6. Spike-like head long and narrow cylindrical, more than 3 times as long as broad, black in appearance when dry; axis usually with 3 – 6 branches; fruiting calyx tube white villous . . . . . **6. *A. wightii***
1. Fruiting calyx with 3- or 1-lobed upper lip, lower lip 2-lobed, sometimes obscure; throat truncate or oblique, with or without a sinus (Fig. 1A – F)
  7. Fruiting calyx throat more or less truncate; anterior lip 2-lobed to ± entire, with no large sinus between anterior lobes (Fig. 1D – F)
    8. Leaves opposite decussate only
      9. Leaves broadly ovate or orbicular-ovate, very large, more than 40 mm wide . . . . . **7. *A. robustus***
      9. Leaves narrower, ovate, elliptic to obovate, less than 25 mm wide
        10. Leaves congested at top of branch, secondary veins prominently raised beneath
          11. Erect undershrub; with prominent broad circular leaf scars on stem; with several slender peduncle inflorescences congested at top of branch; leaves ovate-lanceolate . . . . . **8. *A. suffruticosus***
          11. Dwarf undershrub with stem erect or ascending; without broad circular leaf scars on stem; inflorescence usually simple; leaves oblong-obovate or obovate . . . . . **9. *A. plantagineus***
        10. Leaves well-arranged along stem, secondary veins stout but not prominently raised beneath . . . . . **10. *A. dysophylloides***
    8. Leaves whorled, occasionally opposite decussate at stem base
      12. Stem longitudinally grooved; leaves more than 25 mm long, silky-tomentose . . . . . **11. *A. adenantus***
      12. Stem not longitudinally grooved; leaves up to 20 mm long, tawny tomentose . . . . . **12. *A. argenteus***
  7. Fruiting calyx throat oblique; anterior lip 2-lobed but lobes separated by a large sinus, giving the appearance of 5 obliquely arranged lobes (Fig. 1A – C)
    13. Uppermost tooth oblong or elliptic-oblong, slightly decurved
      14. Stem hoary pubescent; tube of fruiting calyx more than twice as long as uppermost tooth; inflorescence much branched; corolla 8 – 10 mm long . . . . . **13. *A. harmandii***
      14. Stem densely brownish pubescent; tube of fruiting calyx up to twice as long as uppermost tooth; inflorescence rarely branched; corolla 6 – 8 mm long . . . . . **14. *A. cambodianus***
    13. Uppermost tooth subulate, beak-like or dentate and decurved
      15. Uppermost tooth of fruiting calyx subulate, beak-like, deflexed after anthesis and concealing throat; leaves elliptic-oblong or oblong-lanceolate . . . . . **15. *A. pallidus***
      15. Uppermost tooth of fruiting calyx dentate, decurved but not concealing throat; leaves lanceolate . . . . . **16. *A. polystachyus***

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**1. *Anisochilus mitis*** R. A. Clement (1993: 35, 1999: 991). Type: Bhutan, Khoma, 27°39'N 91°12'E, open spaces, 1219 m, 21 July 1949, Ludlow, Sherriff & Hicks 20927 (holotype BM!).

Erect annual herbs, up to 1.20 m tall. *Stems* quadrangular, pubescent to villous, with or without sessile glands, base of stem often sulcate when dry. *Leaves* petiolate, opposite decussate, ovate or ovate-elliptic,

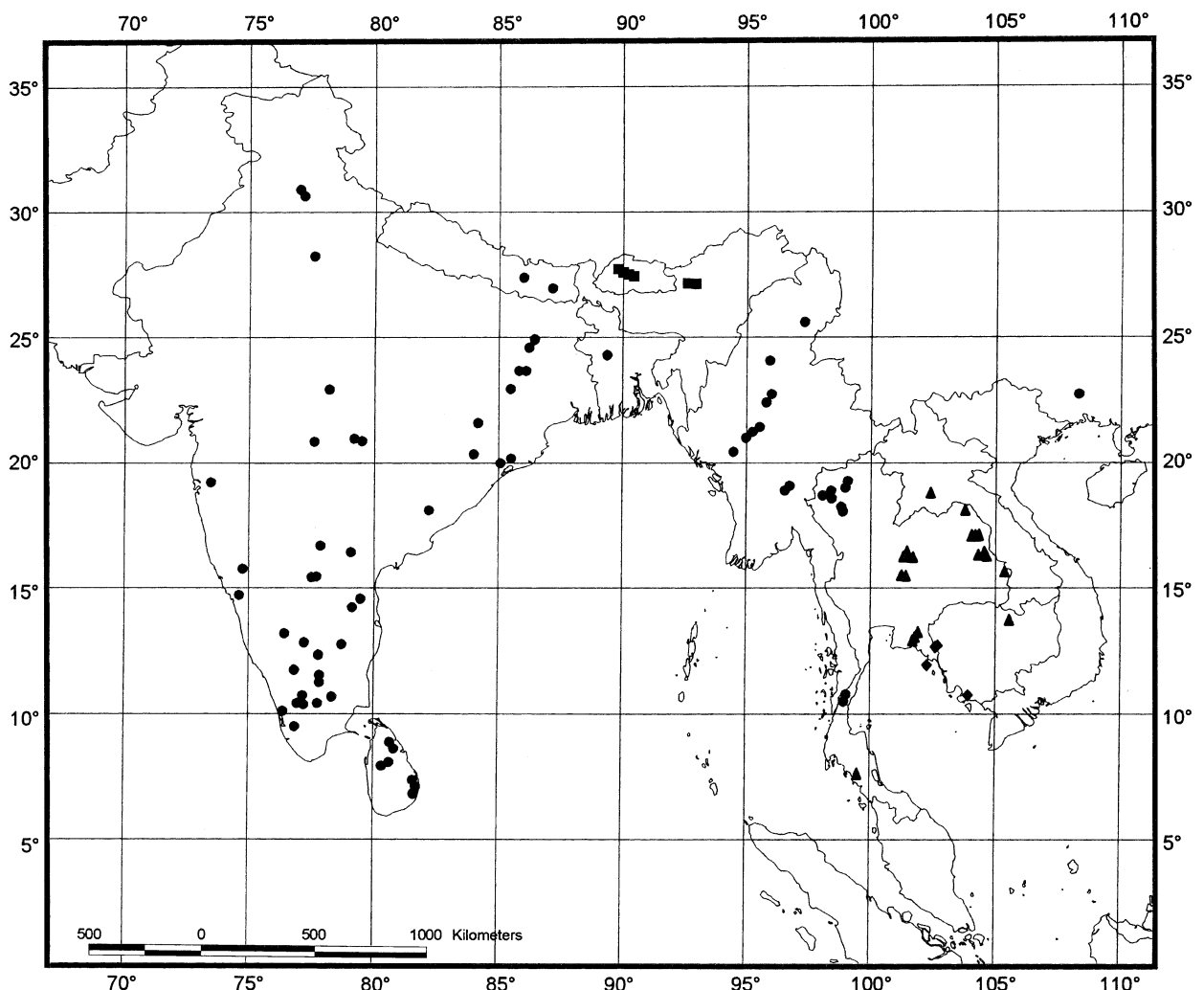
40 – 110 × 35 – 75 mm, apex acute or obtuse, base rounded or shortly cuneate, margin crenate-dentate, membranous, densely and softly pubescent, velvety to touch, with red sessile glands on both sides, lateral veins 6 – 9; petiole slender, up to 50 mm long, pubescent to villous, with red sessile glands. *Inflorescence* terminal and axillary, branched; spike-like head often tetragonal with rows of bracts in bud and becoming cylindric after anthesis, up to 70 mm long and 12 mm wide; bracts ovate or lanceolate, pubescent. *Calyx* ovoid, 2 – 3 mm long at anthesis, pubescent; fruiting calyx 3.5 – 4.5 mm long; posterior lip 1-lobed, ovate, deflexed and concealing throat, pubescent; anterior lip truncate or obscurely toothed, membranous, adpressed on tube; tube ventrally saccate around the middle, constricted at throat, villous. *Corolla* pale purple, 8 – 10 mm long, pubescent to villous, with red sessile glands. *Nutlets* dark brown, ellipsoid, 0.6 – 0.8 mm in diameter. Map 1.

**DISTRIBUTION.** India (Assam), Bhutan.

**BHUTAN:** ngduphorang, 1500 m, 7 Sept. 1914, *Cooper* 2017 (BM, E); Lingtsi Purted, 1350 m, 5 Aug. 1915, *Cooper* 4363 (BM); Lingtsi, 1650 m, 24 July 1935, *Ludlow & Sherriff* 320 (BM); Wangdipotrang, 1500 m, 25 Aug. 1949, *Ludlow, Sherriff & Hicks* 19645 (BM); Khoma, 27°39'N 91°12'E, 1219 m, 21 July 1949, *Ludlow, Sherriff & Hicks* 20927 (holotype BM); Ghunkarah, 27°23'N 91°35'E, 1050 m, 6 Nov. 1938, *Ludlow, Sherriff & Taylor* 6280 (BM). **INDIA:** Assam, Oct. 1899, *Haines* 232 (K); Assam, Dirang Dzong, 1500 – 1800 m, 14 Oct. 1935, *Kingdon-Ward* 12432 (BM); idem., 29 July 1938, *Kingdon-Ward* 14019 (BM).

**ECOLOGY.** On limestone rocks in open areas; alt. 1000 – 1800 m. Flowering July – October, fruiting November – January.

**CONSERVATION STATUS.** Only recorded from 5 localities, more or less linearly arranged, the extent of



**Map 1.** Distribution of *Anisochilus mitis* (■); *A. carnosus* (●); *A. harmandii* (▲) and *A. cambodianus* (◆).

occurrence being around 500 km<sup>2</sup>. The species is likely to be threatened by habitat destruction in the east of the range at least. A VU D2 assessment is given and a more threatened category is possible given the small extent of occurrence. Further data gathering is necessary to establish the extent of habitat reduction.

**NOTE.** Close to *Anisochilus carnosus*. The major difference is the long soft hairs on stems and leaves.

**2. *Anisochilus carnosus* (L. f.) Wall. ex Benth.** (1830b: 18, as '*carnosum*', 1832: 59, 1848: 81); Wight (1850: *t.* 176b, *f.* 1); Hook. f. (1885: 627); Collet & Hemsley (1890: 113); Gamble (1924a: 1126); Mukerjee (1940: 58); Murata (1966: 271, 1976: 178); Hsuan (1977: 411); Cramer (1981: 152); Press (1982: 150); Li & Hedge (1994: 268); Suddee *et al.* (2004: 382). Type: India, *Koenig* s.n., *Linnean Herbarium* 727.7 [lectotype LINN (microfiche!)]. *Lavandula carnosus* L. f. (1781: 273). Type: as above.

*Plectranthus dubius* Spreng. (1825: 691), nom. illeg.

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *purpurascens* Benth. (1830b: 18, 1832: 60, 1848: 81); Hook. f. (1885: 627). Type: Burma, in monte Taong Dong Ava, 24 Nov. 1826, *Wall. Cat.* 2753A [K! (Herb. Benthamianum), lectotype **chosen here**; isoelectotypes G-DC (microfiche!), K-W!].

*Plectranthus strobiliferus* Roxb. (1814: 45, 1832: 23). Type: *Katu-Kurka*, Illustration in Rheede, *Hort. Malab.* 10: 179, *t.* 90 (1690), (holotype illustration!).

*Anisochilus glaber* Schrad. (1833: 1, 1836: 69). Type: India, W Himalaya, to 2400 m, *Edgworth* 14 [neotype K! (Herb. Benthamianum), chosen by Suddee *et al.* 2004].

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *glabrus* (Schrad.) Benth. (1835: 711), as '*glabrum*'. Type: as for *A. glaber*.

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *glabrior* (Schrad.) Benth. (1848: 81); Hook. f. (1885: 627). Type: as for *A. glaber*.

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *villosior* Benth. (1848: 81); Hook. f. (1885: 627). Type: Deccan Peninsula, *Herb. Wight* 2516 [K! (Herb. Benthamianum), lectotype **chosen here**].

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *viridis* Benth. (1848: 81); Hook. f. (1885: 627). Type: Deccan Peninsula, *Herb. Wight* 2521, [holotype K! (Herb. Benthamianum, with *A. rupestris* Wight MSS)].

*Anisochilus crassus* Benth. (1848: 81). Type: Deccan Peninsula, *Herb. Wight* 2517 [K! (Herb. Benthamianum), lectotype **chosen here**; isoelectotypes E].

*Anisochilus eriocephalus* Benth. (1848: 81); Hook. f. (1885: 627); Gamble (1924a: 1127); Mukerjee (1940: 58). Type: Deccan Peninsula, Bellary, *Herb. Wight* 2518 [K! (Herb. Benthamianum), lectotype

**chosen here**; isoelectotypes E, 2 sht. K! (Ex Herb. Wight Propr.)].

*Anisochilus decussatus* Dalzell in Dalzell & Gibson (1861: 206). Type: India, Concan, on the Highest Ghauts opposite Bombay, *Dalzell* s.n. (holotype K!).

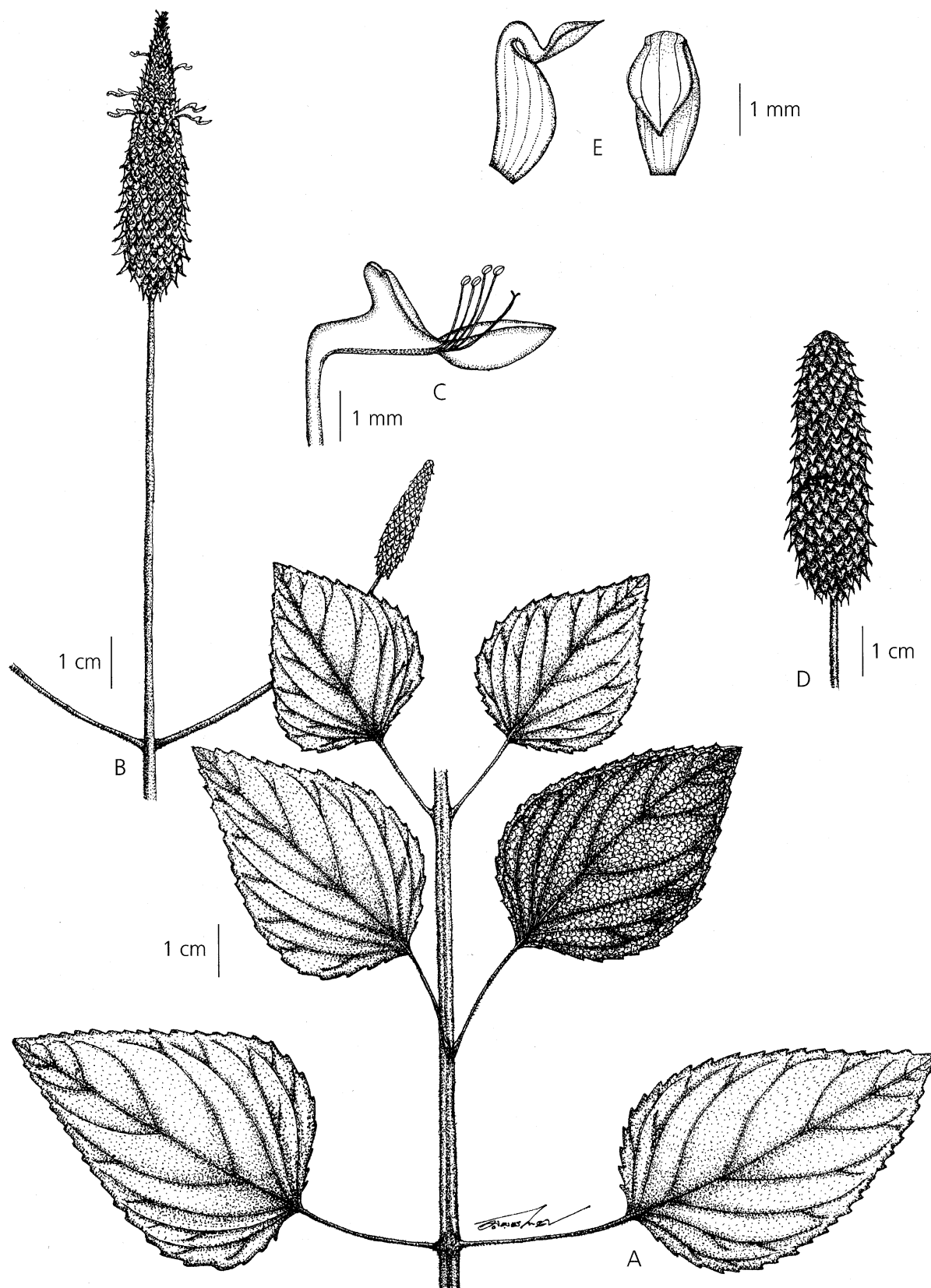
*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *eriocephalus* (Benth.) Cooke (1906: 450). Type: as for *A. eriocephalus* Benth.

*Anisochilus carnosus* (L. f.) Wall. ex Benth. var. *eriocephalus* (Benth.) S. R. Paul (1979: 45). Type: as for *A. eriocephalus* Benth.

Erect or ascending annual or short-lived perennial herbs, up to 0.80 m tall. *Stems* pinkish-purple, rounded or round-quadrangular, pubescent. *Leaves* petiolate, opposite decussate, often with axillary young leaves, ovate, broadly ovate, or orbicular, 15 – 105 × 10 – 60 mm, apex acute or obtuse, base cordate, truncate or shortly cuneate, margin crenate, dentate or serrate, often fleshy, pubescent to densely pubescent above, tomentose beneath, red sessile glands prominent on both sides, lateral veins 4 – 8; petiole 5 – 80 mm long, pubescent. *Inflorescence* terminal and axillary, simple or branched; spike-like head often tetragonal with rows of bracts in bud and becoming cylindrical after anthesis, 8 – 55 × 8 – 10 mm; bracts broadly ovate to lanceolate, pubescent, with red sessile glands. *Calyx* tubular, 3 – 4 mm long at anthesis, pubescent; fruiting calyx 5 – 7 mm long; posterior lip 1-lobed, ovate or ovate-lanceolate, deflexed and concealing throat, apex acute or acuminate, base constricted, ciliate or not, sparsely pubescent, with dense or spare red sessile glands; anterior lip truncate or obscurely 4-toothed, membranous, usually adpressed on tube; tube ventrally saccate around the middle, glabrescent to pubescent. *Corolla* pale purple, 8 – 12 mm long, glabrous or pubescent, with spare red sessile glands. *Nutlets* dark brown to black, orbicular, 0.8 – 1 mm long. Fig. 2 & Map 1.

**DISTRIBUTION.** Nepal, India (Deccan Peninsula, Sikkim, Assam), Sri Lanka, Burma, South China and Thailand.

**SELECTED COLLECTIONS. BURMA:** Upper Burma, near Kasikan, 900 m, 1 Nov. 1887, *Collett* 67 (K); Katha Distr., Mòkwa Reserve, 21 Nov. 1908, *Lace* 4418 (E, K); Meiktila Distr., Popa Taungkalat, 750 m, 24 Oct. 1936, *Smith* 13726 (K). **INDIA:** Madras, Salem, Yercad, Yercad Ghat Road, 1200 m, 14 Dec. 1977, *Acrokiasamy* RHT 1007 (K); South India, Vengambakkam Hills, Feb. 1936, *Barnes* 1468 (K); Madras, Anamallays Hills, 900 m, *Beddome* s.n. (BM); Madras, Godavery Gorge, 6 Jan. 1902, *Bournes* 3501 (K); Bangalore, Bangalore – Nandi Hills Road, 20 Jan. 1973, *Burt*, *Townsend & Saldanha* 18354 (K); Chota Nagpur, Parasnath, 1290 m, 3 Oct. 1873, *Clarke* 21393 (BM); Punjab, between Simla and Ghur Mt, Sept. 1884, *Drummond* 1897 (E, K); NW India, Tihri-Garhwal, Gangle Valley,



**Fig. 2.** *Anisochilus carnosus*. A habit; B inflorescence; C corolla; D infructescence; E fruiting calyx. (A, B & C from Maxwell 96-1322, BKF; D & E from Bunchuai 1355, BKF). DRAWN BY BOONYAKRI BUTCHAYA.



900 – 1200 m, Sept. 1881, *Duthie* 1916 (BM); Bandellkhan, *Edgeworth* 2030 (K); South Damuda Ghat, 600 m, Nov. 1880, *Gamble* 8657 (K); Madhya Pradesh, Balaghat, *Haines* 3482 (K); Karnataka, Mangalor, *Hohenacker* 361 (K); Behar, Kymore Hills, *Hooker* 463 (K); Mysore, Hassan Distr., 27 Oct. 1970, *Jarrett & Ramamoorthy* HFP 1075 (K); Bihar, Canary Hills, 9 Nov. 1964, *Kanodia* 1018 (CAL); Bihar, Nakta Hills near Deli, 21 Nov. 1964, *Kanodia* 1362 (CAL); Chota Nagpur, Hazaribagh Distr., Base of Gibraltar Hill, 25 Sept. 1951, *F. H. W. Kerr* 2131 (BM); Gangle North, base of Sitagarha Hill, 11 Dec. 1951, *F. H. W. Kerr* 2131A (BM); Andhra Pradesh, Akbar Villa, Banjara Hills, 5 Oct. 1975, *Maesen* 2256 (K); Karnataka, Nandi Hills, 1200 m, 19 Dec. 1977, *Maesen* 3024 (K); Andhra Pradesh, Kurnool, 6 km E of Srisailam on Dornala Road, 600 m, 12 Dec. 1979, *Maesen* 3982 (K); Hyderabad, Jubilee Hills, 1 Oct. 1983, *Maesen* 4958 (K); Madras, Palni, Dindigul, Kodaikanal, Tandigudi Ghat Road, 400 m, 2 Jan. 1986, *Matthew* RHT 43721 (K); Coimbatore, Yangavaram Hill, 3 Dec. 1983, *Mohan* 320 (CAL); Orissa, Nayagarh, 5 Nov. 1937, 150 m, *Mooney* 607 (K); Orissa, Sundargarh Distr., Chandiposh, 7 March 1988, *Mukherjee & Namhata* MN3194 (CAL); Nagpur, Khindsi, 2 Oct. 1962, *Nafday* 152 (K); Madhya Pradesh, Dhulia Distr., Dhadgeon, 16 km to Shahada, 2 Oct. 1979, *Resmanandan* 4584 (K); Kerala, Port Cochin, 1 Nov. 1972, *Rao* 9677 (CAL); Thigurda Coal Field, 28 Nov. 1983, *Roy & Shukle* 38005 (CAL); Chhattisgarh, Chota Nagpur, Jashpur, Chota-Pipar, 600 – 750 m, 22 Nov. 1890, *Wood* 23 (K); Bombay Presidency, Southern Maratha Country and Canara, Ecova near Savandah, 9 Nov. 1879, *Young* s.n. (BM). **SRI LANKA:** Jaffna Distr., Karaveddy, 15 Jan. 1970, *Balakrishnan* NBK 639 (K); Kurunegala Distr., Hiripitiya, c 110 m, 19 Jan. 1972, *Cramer* 3576 (K); Amparai Distr., Sashtaveli, sea level, 12 Jan. 1978, *Cramer* 5060 (3 shts. K); Trincomalee Distr., Gantalawa, 7 March 1971, *Jayasuriya* 106 (K); Trincomalee Distr., 81°16'N 8°25'E, 5 Feb. 1972, *Jayasuriya, Dassanayake & Balasubramaniam* 674 (K). **THAILAND:** Mae Hong Son, 19°15'N 98°00'E, 500 – 600 m, 9 Sept. 1974, *Larsen & S. Larsen* 34291 (AAU, BKF, K, KYO, L, MO, P, TI); Prachuap Khiri Khan, Hui Yang, 4 Oct. 1930, *Put* 3204 (ABD, BK, 2 shts. BM, L, P, SING).

**ECOLOGY.** Open rocky places in deciduous forest, evergreen forest; 150 – 2400 m. Flowering September – January, fruiting October – March.

**CONSERVATION STATUS.** Widespread, Least Concern.

**VERNACULAR NAME.** **Indian** (Malayalam): Karpooora valli, Kurkka, Pattukurkka; (Marati) Kaapurli; (Tamil) Poochenthira pattai; (Telugu) Adusapundlaaku. **Thai:** Huu suea khao (Prachuap Khiri Khan Province).

**3. *Anisochilus velutinus*** *Trimen* (1895: 377); *Cramer* (1981: 153). Type: Sri Lanka, Gunner's Quoin, in the Batticaloa Distr., *C.P.* 3573 (holotype PDA; isotypes BM!, K!).

*Anisochilus suffruticosus sensu* Thwaites (1860: 238) non Wight (1849).

Erect annual or short lived perennial herb, sometimes with shrubby habitat, up to 3 m tall. *Stems* branched above or much branched from base, round-quadrangular, glabrescent to pubescent with red sessile glands, old stem glabrous. *Leaves* petiolate, opposite decussate, obovate or obovate-oblong, 25 – 50 × 12 – 30 mm, apex rounded or obtuse, base obtuse or shortly cuneate, margin crenate, fleshy, faintly aromatic when crushed, scaberulous above, velvety-hoary tomentose with secondary veins and tertiary reticulate venation prominent beneath, red sessile glands present on both sides, lateral veins 7 – 10; petiole up to 20 mm long, pubescent. *Inflorescence* terminal, branched, usually corymbose-like in appearance; spike-like head mostly ovoid in bud and fruit, occasionally ovoid-cylindric, up to 20 mm long and 8 mm wide; bracts ovate, minute, pubescent. *Calyx* ovoid, c. 1 mm long at anthesis, villous; fruiting calyx 2 – 4 mm long; posterior lip 1-lobed, ovate, deflexed after anthesis and concealing throat, pubescent; anterior lip truncate or obscurely toothed, membranous, adpressed to tube; tube ventrally saccate around the middle, constricted at throat, pubescent to villous. *Corolla* white or pale purple, 5 – 7 mm long, villous with red sessile glands, anterior lip with lilac spots. *Nutlets* dark brown to black, globose or ellipsoid, c 0.6 – 0.8 mm in diameter. Map 2.

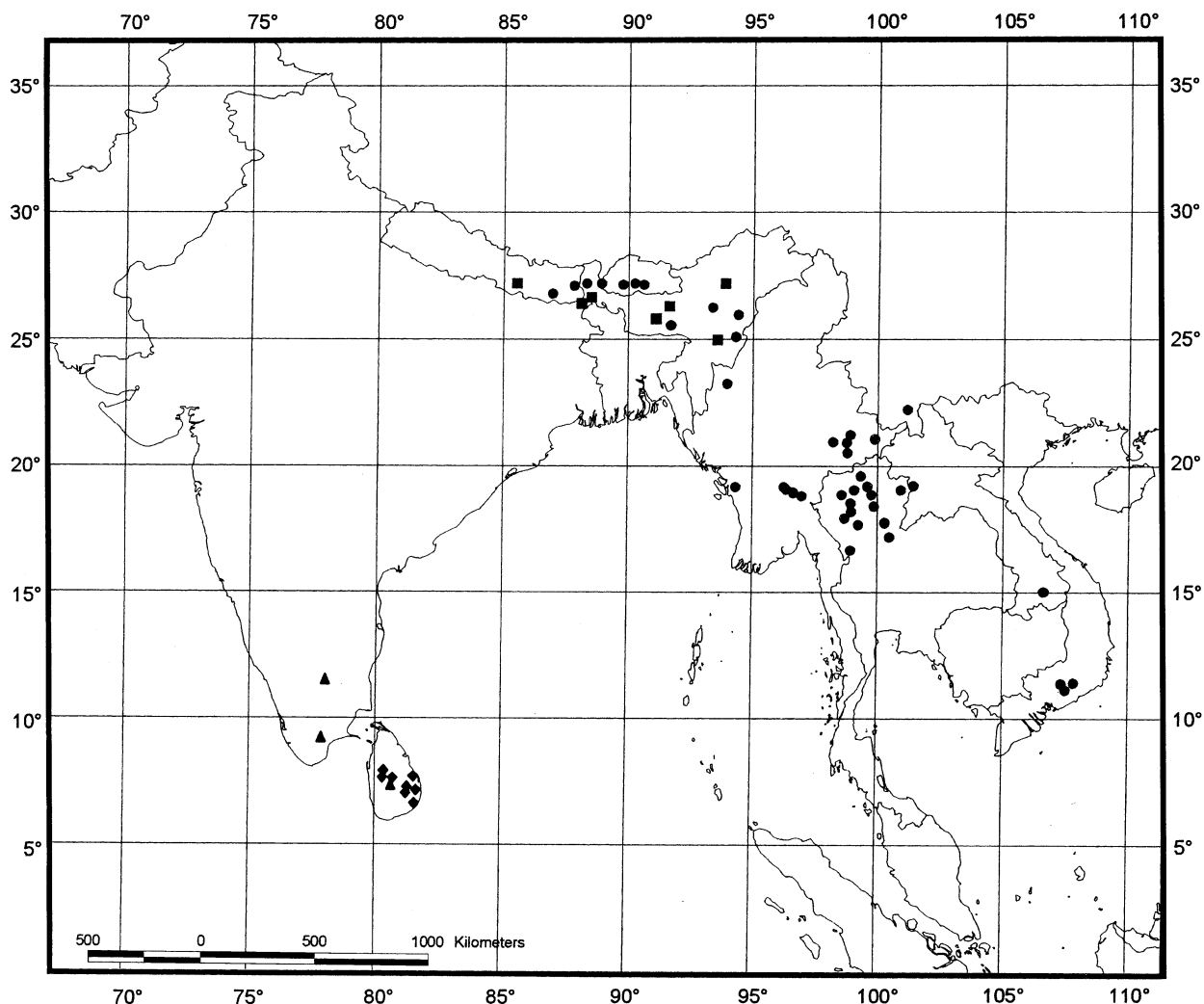
**DISTRIBUTION.** Sri Lanka (endemic).

**SRI LANKA:** Gunner's Quoin, Batticaloa Distr., *C.P.* 3573 (isotypes BM, K); Batticaloa Distr., Amparai, beside Hingurana – Amparai Road, sea level, 15 Sept. 1977, *Cramer & Balasubramaniam* 4981 (K); Monaragala Distr., c. 25 miles W of Pottuvil along road to Wellawaya, 100 m, 2 Dec. 1974, *Davidse & Sumithraarachchi* 8946 (K); Monaragala Distr., Nilgala, 1 May 1975, *Jayasuriya* 1955 (2 shts. K); Monaragala Distr., Inginiyagala, 4 May 1975, *Jayasuriya* 2056 (K); Amparai Distr., Road to Damane, 2 June 1971, *Kostermans* 24378 (E, K); Kandy, 2 April 1819, *Moon* 604 (BM); Kurunegala Distr., July 1881, *Herb. H. Bot. Perad.* s.n. (K); Polonnaruwa Distr., Uradiwetti, Kandakaduwa, 8 June 1974, *Waes* 622 (K).

**ECOLOGY.** On exposed rocks with shallow soil; alt. from near sea level to 100 m. Flowering March – July, fruiting July – September.

**CONSERVATION STATUS.** Described in *Cramer* (1981) as "rather rare". The extent of occurrence would appear to be less than 500 km<sup>2</sup> from the collections seen. The species can be considered vulnerable under VU D2 and a more threatened assessment may be possible, but further data gathering is necessary to establish the extent of habitat reduction.

**NOTE.** Thwaites (1860) listed '*Anisochilus suffruticosus* Wight, Ic. t. 1437' under *Anisochilus* and cited specimen *C.P.* 3573 from Gunner's Quoin, in the Batticaloa



**Map 2.** Distribution of *Anisochilus pallidus* (●); *A. polystachyus* (■); *A. paniculatus* (▲) and *A. velutinus* (◆).

Distr. This specimen is the type of *A. velutinus*. The name *A. suffruticosus* was later published by Hooker (1885) for a different taxon.

**4. *Anisochilus paniculatus* Benth.** (1848: 82); Hook. f. (1885: 628) Gamble (1924a: 1127); Mukerjee (1940: 59); Cramer (1981: 153). Type: Sri Lanka, unknown locality, *Walker* 52 (holotype K!).

Erect annual or short-lived perennial herbs, sometimes with shrubby habit, up to 2.8 m tall. *Stems* round-quadrangular, base stout, glabrescent to pubescent, with or without sessile glands, old stem glabrous. *Leaves* petiolate, opposite decussate, orbicular, ovate, or elliptic-obovate, 30 – 70 × 15 – 60 mm, apex rounded, base rounded or shortly cuneate, margin coarsely crenate, fleshy, scabrous or pubescent above, densely brownish to hoary tomentose beneath, sessile glands sometimes present on both sides, lateral veins

5 – 6, usually with 2 – 3 basal veins on each side of midrib; petiole short, up to 10 mm long, pubescent. *Inflorescence* terminal, branched; spike-like head numerous, small, ovoid in bud and in fruit, up to 20 mm long and 8 mm wide; bracts minute, ovate, pubescent. *Calyx* ovoid, c. 2 mm long at anthesis, pubescent; fruiting calyx small, c. 3 mm long; posterior lip 1-lobed, ovate, ciliate, deflexed and concealing throat, glabrescent to pubescent with or without red sessile glands; anterior lip truncate or obscurely toothed; tube ventrally saccate around the middle, constricted at throat, pubescent. *Corolla* white or light purple, 3 – 6 mm long, glabrescent to pubescent with or without sessile glands. *Nutlets* brown, ovoid or ellipsoid, c 0.8 × 0.6 mm. Map 2.

**DISTRIBUTION.** South India, Sri Lanka.

**INDIA:** Salem, Namakkal Distr., Kolli Hills, Solakkadu, Kottamottu Paruthai, 1200 m, 19 Oct. 1978, *Matthew* RHT18522 (K); Tinnevely Distr., way to Kanni Katti,

400 m, 26 Feb. 1960, *Sebastine* 9955 (CAL); Mysore, *Thomson* 97 (K). **SRI LANKA:** Kandy Distr., Kadugannawa, close to Pala Kadugannawa main road, c. 500 m, 28 Aug. 1972, *Cramer* 3839 (2 shts. K); Unknown locality, *Walker* 52 (holotype K).

**ECOLOGY.** On exposed rocks; alt. 400 – 1200 m. Flowering & fruiting August – February.

**CONSERVATION STATUS.** The species is known from less than 5 localities and is described as “rare” in *Cramer* (1981). The species can be considered vulnerable under VU D2 and a more threatened assessment may be possible, but further data gathering is necessary to establish the extent of habitat reduction.

**NOTE.** Close to *Anisochilus scaber* in leaf characters but differs in having smaller numerous spike-like heads, the shrubby and sometimes clump habit. The type is an immature flowering specimen. The only fruiting specimens studied (*Cramer* 3829, 2 shts.) are very immature. More specimens involve *A. paniculatus* and *A. scaber* are needed for more study.

**5. *Anisochilus scaber* Benth.** (1848: 81); Hook. f. (1885: 627); Gamble (1924a: 1127); Mukerjee (1940: 59). Type: India, Deccan Peninsula, Courtallum, *Herb. Wight* 2520 [holotype K! (Herb. Benthamianum); isotypes E, K!].

Erect or ascending annual or short-lived perennial herb, sometimes rooting at nodes, up to 0.5 m tall. *Stems* round-quadrangular, glabrescent to pubescent, with red sessile glands, old stem glabrous. *Leaves* petiolate, opposite decussate, ovate, orbicular, orbicular-obovate or obovate, 20 – 50 × 10 – 35 mm, apex acute or rounded, base rounded or obtuse, margin crenate, fleshy, scabrous-pubescent above, densely hoary tomentose with secondary veins and tertiary reticulate venation prominent, with red sessile glands beneath, lateral veins 4 – 6; petiole slender, up to 20 mm long, pubescent. *Inflorescence* terminal, mostly simple, occasionally branched; spike-like head ovoid to ovoid-cylindric in bud and fruit, 10 – 45 × 10 – 12 mm, purplish when dry; peduncles long and slender, (5) 150 – 250 mm long, puberulous; bracts ovate, minute, pubescent. *Calyx* ovoid, 2 – 3 mm long at anthesis, densely villous; fruiting calyx 5 – 6 mm long; posterior lip 1-lobed, ovate, deflexed after anthesis and concealing throat, prominently reticulate, glabrous or sparsely pubescent, margin ciliate; anterior lip truncate or obscurely toothed; tube ventrally saccate around the middle, constricted at throat, purplish-brown villous. *Corolla* white or purplish-white, 10 – 12 mm long, pubescent with sparse red sessile glands. *Nutlets* dark brown, ovoid or ellipsoid, 0.6 – 0.7 mm in diameter. Map 3.

**DISTRIBUTION.** India (Deccan Peninsula).

**INDIA:** Deccan Peninsula, Sengalateri, Tinnevely, 26 Sept. 1916, *Herb. Madr.* 13653 (K); Deccan Peninsula, Courtallum, *Herb. Wight* 2520 [holotype K (Herb. Benthamianum); isotype E, K]; Deccan Peninsula, *Herb. Wight* 2111 (K).

**ECOLOGY.** On exposed rocks; alt. 300 – 1000 m. Flowering & fruiting September – February.

**CONSERVATION STATUS.** Vajravelu (1990) reports the species as common in Palghat District, Kerala whereas Mohanan & Sivadasan (2002) report the species as rare in SW Ghats. However, few collections have been seen by us. Many more may well exist in regional herbaria.

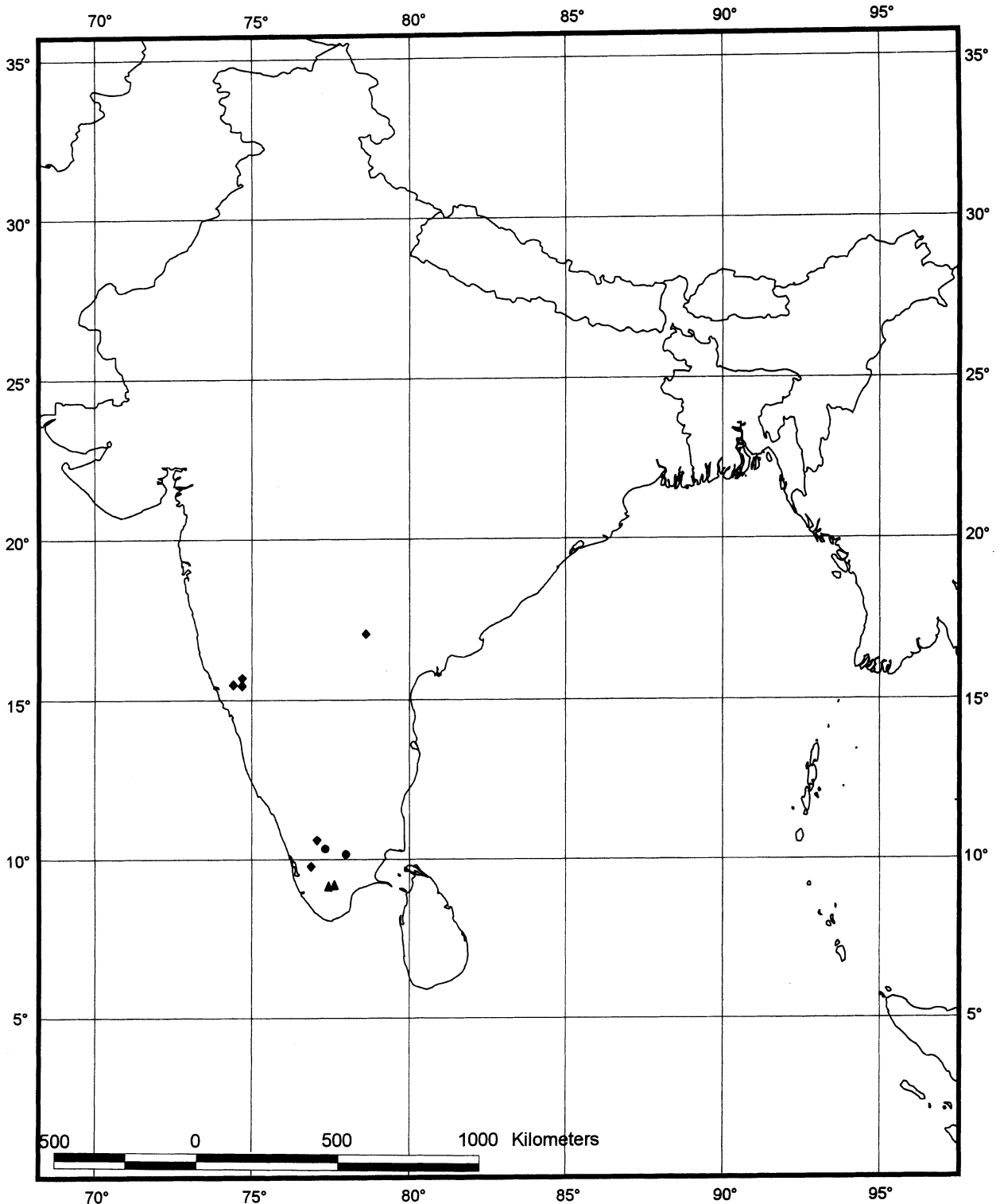
**NOTE.** Close to *Anisochilus wightii* as both have similar leaf characters and have fruiting calyx with dark colour when dry but differs in having larger fruiting calyx posterior lip.

**6. *Anisochilus wightii* Hook. f.** (1885: 628); Gamble (1924a: 1127); Mukerjee (1940: 59). Type: India, Deccan Peninsula, Anamallay Mts, July 1851, *Herb. Wight* 2132/1 (holotype K!; isotype L!).

Erect annual herb, sometimes with shrubby habit, height not recorded. *Stems* branched above, round-quadrangular, glabrescent to pubescent, with or without sessile glands, old stem glabrous. *Leaves* petiolate, opposite decussate, orbicular or elliptic-orbicular, 25 – 60 × 15 – 45 mm, apex rounded, base rounded, obtuse, or shortly cuneate, margin crenate, fleshy, scabrous above, densely hoary tomentose with secondary veins and tertiary reticulate venation prominent, with scattered yellow sessile glands beneath, lateral veins 6 – 8; petiole up to 20 mm long, pubescent. *Inflorescence* terminal, usually 3 – 6 branched; spike-like head often narrowed toward apex in bud and becoming long narrow cylindrical after anthesis, 20 – 80 × 7 – 8 mm, black in appearance when dry; peduncles long and slender, 50 – 200 mm long, puberulous; bracts ovate, minute, pubescent. *Calyx* ovoid, c. 1.5 mm long at anthesis, densely villous; fruiting calyx 3 – 4 mm long; posterior lip 1-lobed, ovate, deflexed after anthesis and concealing throat, pubescent; anterior lip truncate or obscurely toothed, membranous and adpressed on tube; tube ventrally saccate around the middle, constricted at throat, white villous. *Corolla* purple, 7 – 10 mm long, pubescent with or without sessile glands. *Nutlets* dark brown to black, ovoid or ellipsoid, oblong, c. 7 – 8 mm in diameter. Map 3.

**DISTRIBUTION.** India (Deccan Peninsula).

**INDIA:** Madras, Dindigul, Kodaikanal Distr., Puthur – Kavalapatty path, 500 m, 2 May 1988, *Matthew* RHT 52871 (K); Deccan Peninsula, Anamallay Mts, July 1851, *Herb. Wight* 2132/1 (holotype K; isotype L).



**Map 3.** Distribution of *Anisochilus wightii* (●); *A. scaber* (▲) and *A. adenanthus* (◆).

**ECOLOGY.** On exposed rocks; alt. 500 – 1000 m. Flowering & fruiting May – February.

**CONSERVATION STATUS.** One recent collection has been seen, although more may well exist in regional herbaria. Henry *et al.* (1987), in *Flora of Tamil Nadu* ser.

I: Analysis Vol. 2, record this species as rare. Manickam *et al.* (2003), in *Checklist of the Flora of Tirunelveli Hills*, suggest a small extent of occurrence for this species. An assessment of threatened plants of the Kerala Forest ([www.keralaforest.org](http://www.keralaforest.org)) cites this species as endangered.

**7. *Anisochilus robustus* Hook. f.** (1885: 629); Gamble (1924a: 1128); Mukerjee (1940: 61). Type: India, Deccan Peninsula, Courtallum, *Herb. Wight* 625 [holotype K! (Ex Herb. Wight Propr.); isotype E].

*Anisochilus henryi* K. Ravik. & V. Lakshm. in Ravikumar (1999: 72, f. 7). Type: India, Tamil Nadu, Theni Distr., near Varaiyaatumottai peak, Venniar Estate, Pachakumatchi hills, 1800 m, 28 May 1989, *Lakshmanan & Ravikumar* 91078 (holotype CAL; isotype K!, MH), **synon. nov.**

Erect robust shrub, up to 3.5 m tall. *Stems* round-quadrangular, rusty pubescent to tomentose, with prominent broad circular leaf scars and red sessile glands. *Leaves* petiolate, opposite decussate, broadly ovate or orbicular-ovate, very large, 60 – 175 × 50 – 120 mm, apex acute or obtuse, base obtuse or rounded, margin crenate, fleshy, scabrous-pubescent to velvety tomentose above, densely velvety-tomentose and prominently reticulate beneath, red sessile glands present on both sides but denser beneath, lateral veins 8 – 12; petiole stout, up to 35 mm long, pubescent to densely tomentose, with red sessile glands. *Inflouescence* mostly terminal, rarely axillary, branched; spike-like head slender, interrupted or continuous, up to 200 mm long and 7 mm wide; bracts lanceolate, minute, pubescent. *Calyx* ovoid, 1 – 1.5 mm long at anthesis, densely pubescent; fruiting calyx 2.5 – 4 mm long; posterior lip oblong, erect or slightly decurved, shortly 3-toothed at apex, pubescent; anterior lip with 2 oblique lobes, reflexed; tube ventrally saccate around the middle, slightly constricted at throat, pubescent, with red sessile glands. *Corolla* light yellow, 4 – 7 mm long, upper lobes incurved, pubescent with sessile glands; tube ventrally slightly saccate. *Nutlets* brown, oblong, 0.6 – 0.7 × 1 mm, pointed at apex. Map 4.

**DISTRIBUTION.** India (Deccan Peninsula).

**INDIA:** South India, Tinnevely Distr., Kanni Katti, 12 June 1899, *Barber* 421 (K); South India, Panpanassum Hills, *Beddome* s.n. (K); South India, Courtallum, *Herb. Wight* 625 [holotype of *A. robustus*, K (Ex Herb. Wight Propr.); isotype E]; Madras, *Herb. Wight* s.n. (K); South India, Tamil Nadu, Theni Distr., near Varaiyaatumottai peak, Venniar Estate, Pachakumatchi hills, 1800 m, 28 May 1989, *Lakshmanan & Ravikumar* 91078 (isotype of *A. henryi*, K).

**ECOLOGY.** On exposed rocks, slopes, river sides; alt. 600 – 1800 m. Flowering February – June, fruiting May – October.

**CONSERVATION STATUS.** Critically Endangered (Gopalan & Henry 2000).

**NOTE.** The isotype at K, the description and the line drawings of *Anisochilus henryi* provided in the original publication (Ravikumar 1999) clearly match the type

and collections of *A. robustus* held at K. The nutlet in the description and figure label is actually fruiting calyx, and the seeds are actually nutlets.

**8. *Anisochilus suffruticosus* Wight** (1849: 8, t. 1437), as '*suffruticosum*'; (1851: 91), as '*suffruticosum*'; Hook. f. (1885: 628); Gamble (1924a: 1128); Mukerjee (1940: 60); Noltie (2005: 299). Type: India, Deccan Peninsula, Western Ghats, Nilghiri Hills, western slopes at Sisparah, Ex Herb. Wight Propr., *Wight Ic. t. 1437*. (holotype K!).

Erect stout undershrub, up to 1 m tall. *Stems* woody, branched, round-quadrangular or quadrangular, glabrescent to rusty densely tomentose with prominent broad circular leaf scars. *Leaves* petiolate, opposite decussate, congested at the end of branches, ovate-lanceolate, 20 – 40 × 7 – 15 mm, apex acute, base obtuse or cuneate, margin entire or obscurely crenulate, thick, brownish tomentose above, densely brownish-yellow velvety-tomentose and deeply reticulate between veins beneath, lateral veins 5 – 7, stout and raised beneath; petiole short and stout, up to 10 mm long, tomentose. *Inflouescence* terminal and axillary, simple or branched, often congested at the end of branches; spike-like head narrow cylindrical, up to 70 mm long and 6 mm wide; peduncles long and slender, 50 – 70 mm long, rusty pubescent; bracts minute, early caducous. *Calyx* ovoid, c. 1 mm long at anthesis, pubescent; fruiting calyx 2.5 – 3 mm long; posterior lip shortly oblong, truncate, rounded or obscurely 3-toothed at apex, slightly deflexed after anthesis but not concealing throat, pubescent; anterior lip truncate or obscurely 2-lobed, membranous and adpressed on tube; tube ventrally saccate around the middle, slightly constricted at throat, pubescent. *Corolla* white to pale purple, 5 – 6 mm long, pubescent; tube tubular, deflexed from above the base. *Nutlets* dark brown, ovoid or ellipsoid, 0.7 – 0.8 × 0.5 – 0.6 mm. Map 5.

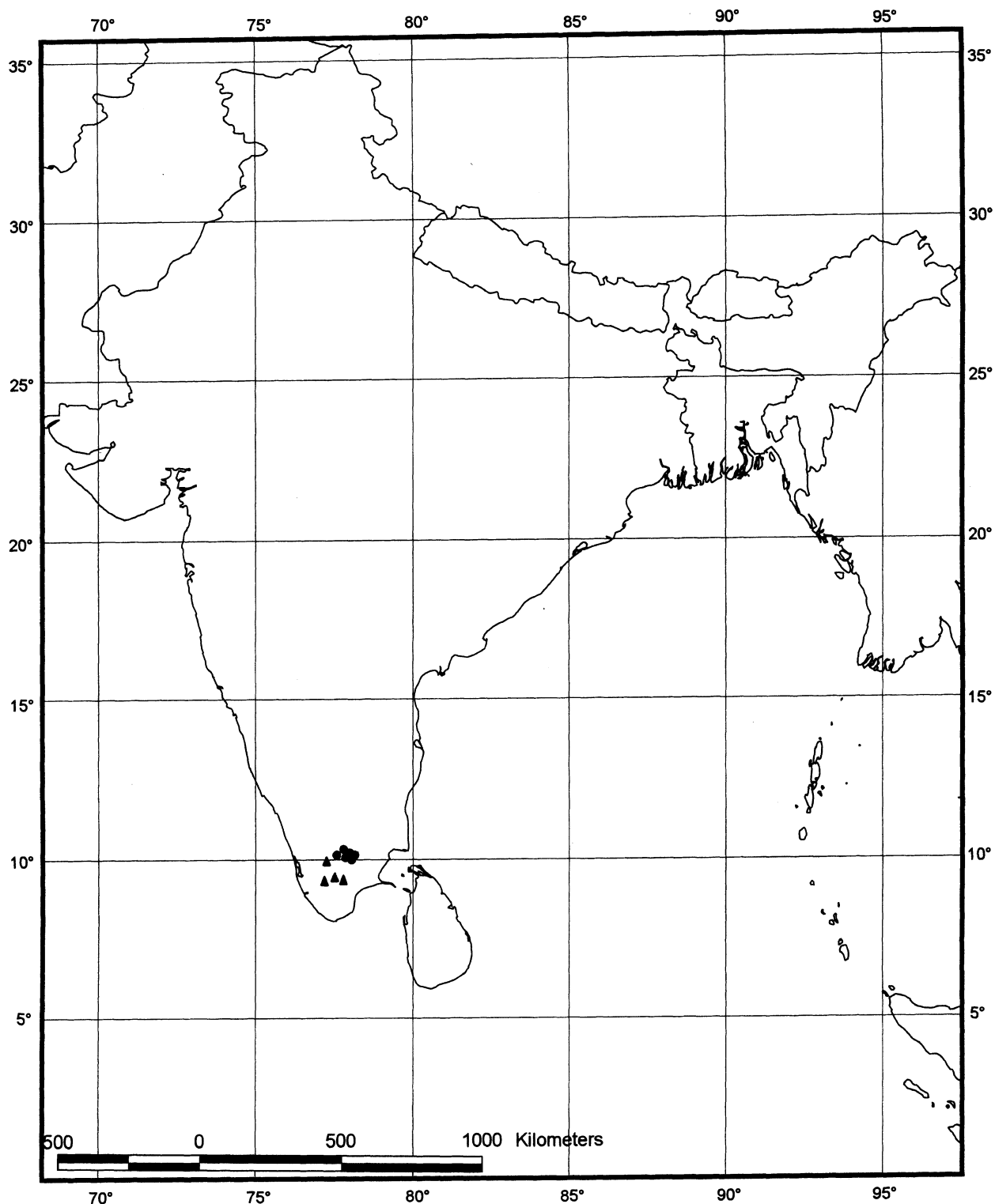
**DISTRIBUTION.** India (Deccan Peninsula).

**INDIA:** Deccan Peninsula, Nilghiri Hills, *Gardner* s.n. (K); Deccan Peninsula, Western Ghats, Nilghiri Hills, western slopes at Sisparah, Ex Herb. Wight Propr., *Wight Ic. t. 1437* (holotype K); Deccan Peninsula, Nilghiri Hills, *Herb. Wight* 2115 (K).

**ECOLOGY.** On exposed rocks or rocky cliffs; alt. unknown. Flowering & fruiting December – February.

**CONSERVATION STATUS.** Endemic to the Nilghiri Hills.

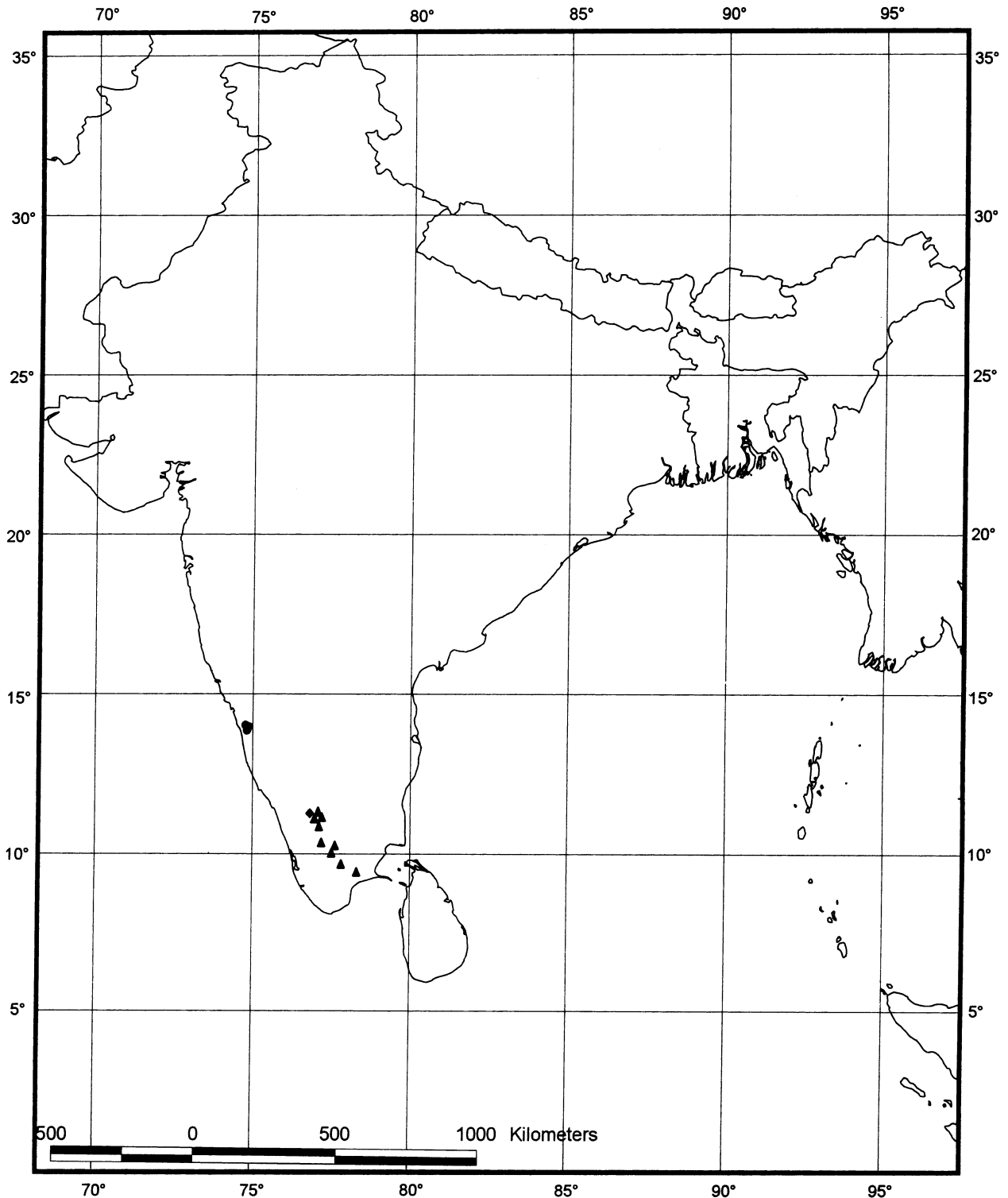
The extent of occurrence would appear to be less than 100 km<sup>2</sup> from the collections seen. The species can be considered vulnerable under VU D2 and a more threatened assessment may be possible, but further data gathering is necessary to establish the degree of habitat loss.



Map 4. Distribution of *Anisochilus argenteus* (●) and *A. robustus* (▲).

9. *Anisochilus plantagineus* Hook. f. (1885: 628); Gamble (1924a: 1127); Mukerjee (1940: 61). Type: India, Deccan Peninsula, Mysore, Bababoodan Hills, *Dakzell* s.n. (K!), lectotype **chosen here**; isolectotype (K!).

Erect or ascending dwarf undershrub, up to 25 cm tall. *Stems* round-quadrangular or quadrangular, glabrescent to rusty pubescent, rootstock thick. *Leaves* sessile or subsessile, opposite decussate, congested at the base of



**Map 5.** Distribution of *Anisochilus dysophylloides* (▲); *A. suffruticosus* (◆) and *A. plantagineus* (●).

peduncle, oblong-obovate or obovate, 8 – 25 × 5 – 12 mm, apex obtuse or rounded, base cuneate or attenuate, margin entire or obscurely crenate, chartaceous, scabrid above, pubescent with hairs denser on veins beneath, red or golden sessile glands present on both sides, lateral veins 3 – 5, prominently raised beneath.

*Inflorescence* terminal, simple; spike-like head narrow cylindrical, up to 80 mm long and 8 mm wide; peduncles slender, up to 70 mm long, rusty pubescent; bracts ovate-caudate, pubescent. *Calyx* ovoid, c. 1 mm long at anthesis, densely villous; fruiting calyx 1.5 – 2 mm long; posterior lip shortly oblong, truncate or obscurely 3-toothed at

apex, slightly deflexed after anthesis but not concealing throat, pubescent; anterior lip truncate or obscurely 2-lobed, membranous and adpressed on tube; tube ventrally saccate around the middle, slightly constricted at throat, villous. *Corolla* 5 – 6 mm long, pubescent, with or without red sessile glands, colour unknown. *Nutlets* light brown, ovoid, c. 0.6 × 0.5 mm. Map 5.

**DISTRIBUTION.** India (Deccan Peninsula).

**INDIA:** Deccan Peninsula, Mysore, Bababoodan Hills, *Dalzell* s.n. (2 shts. K, lectotype & isolectotype); *idem.*, *Law* s.n. (lectoparatype K); *idem.*, *Stocks* s.n. (lectoparatype K).

**ECOLOGY.** Unknown.

**CONSERVATION STATUS.** Known only from one locality, although more recent collections may exist in regional herbaria. The species can be considered vulnerable under VU D2 and a more threatened assessment may be possible, but further data gathering is necessary.

**10. *Anisochilus dysophylloides* Benth.** (1830b: 19, 1832: 60, 1848: 82); Hook. f. (1885: 628); Gamble (1924a: 1128); Mukerjee (1940: 60); Noltie (2005: 299). Type: India, Madras, Nilghiri Hills, *Herb. Wight in Wall. Cat.* 2756 [K! (Herb. Benthamianum), lectotype **chosen here**; isolectotypes E, G-DC (microfiche!), K-W!].

*Anisochilus purpureus* Wight (1849: 7, t. 1435), as '*purpureum*'; (1851: 90), as '*purpureum*'. Type: Madras, Nilghiri Hills, About Coonoor, Ex Herb. Wight Propr., *Wight Ic. t.* 1435 (holotype K!).

*Anisochilus dysophylloides* Benth. var. *purpureus* (Wight) Gamble (1924a: 1128); Mukerjee (1940: 60). Type: as for *A. purpureus*.

*Anisochilus sericeus* Benth. (1848: 82); Hook. f. (1885: 629); Gamble (1924a: 1128); Mukerjee (1940: 60). Type: India, Deccan Peninsula, Courtallum, *Herb. Wight* 2515 [holotype K! (Herb. Benthamianum); isotype K! (Ex Herb. Wight Propr.)], **synon. nov.**

*Anisochilus albidus* Wight (1849: 7, t. 1436), as '*albidum*'. Type: Madras, Nilghiri Hills, About Coonoor and Kaitie, *Wight Ic. t.* 1436 (holotype K!).

Erect or ascending undershrub, up to 1.5 m tall. *Stems* round-quadrangular, glabrescent to densely tomentose, often 4-longitudinal grooved when dry, old stems glabrous with prominent circular leaf scars. *Leaves* subsessile or petiolate, opposite decussate, often with axillary young leaves, seemingly whorled in appearance, elliptic, elliptic-obovate, or obovate-spathulate, 15 – 40 × 8 – 20 mm, apex acute or obtuse, base cuneate, margin entire or obscurely serrate-crenate, fleshy, soft silky-tomentose on both sides, lateral veins 4 – 6, stout; petiole subsessile to 5 mm long, silky-tomentose. *Inflorescence* terminal and axillary, simple or branched; spike-like head cylindrical in bud and fruit,

up to 70 mm long and 10 mm wide; bracts lanceolate, densely villous. *Calyx* ovoid, 0.5 – 1 mm long at anthesis, villous; fruiting calyx 3 – 4 mm long; posterior lip shortly oblong, obscurely 3-lobed at apex, pubescent, slightly deflexed after anthesis but not concealing throat; anterior lip 2-lobed, adpressed on tube; tube ventrally saccate around the middle, slightly constricted at throat, pubescent to villous, with red sessile glands. *Corolla* white or purple, tubular, 3 – 4 mm long, pubescent with red sessile glands. *Nutlets* dark brown, ovoid, 0.6 – 0.7 × 0.5 – 0.6 mm. Map 5.

**DISTRIBUTION.** India (Deccan Peninsula).

**SELECTED COLLECTIONS. INDIA:** Madras, Anamallays, *Beddome* 33 (BM, K); Madras, Pulneys, Machur Path, 5 Nov. 1897, *Bournes* 1320 (K); *idem.*, 27 Dec. 1898, *Bournes* 1715 (CAL, 5 shts. K); Madras, Nilghiri, 17 March 1870, *Clarke* 10966 (BM); *idem.*, 2250 m, May 1881, *Clarke* 17298 (BM); *idem.*, Jan. 1883, *Gamble* 11898 (K); *idem.*, *Hohenacker* 1407 (BM, K); Kodai Kanal, 300 m, 24 June 1913, *Sanlieres* 718 (CAL); Madras, Nilghiri, *Schmidt* s.n. (2 shts. K); Madras, about Coonoor, Ex Herb. Wight Propr., *Wight Ic. t.* 1435 (holotype of *A. purpureus*, K); Nilghiri Hills, About Coonoor and Kaitie, *Wight Ic. t.* 1436 (holotype of *A. albidus*, K); Madras, Nilghiri Hills, *Herb. Wight* 2108 (K, NY); *idem.*, Jan. 1848, *Herb. Wight* 2110 (K); *idem.*, *Herb. Wight* 2112 (K, NY); Courtallum, *Herb. Wight* 2515 [holotype of *A. sericeus*, K (Herb. Benthamianum); isotype K (Ex Herb. Wight Propr.)]; Madras, Nilghiri Hills, *Herb. Wight in Wall. Cat.* 2756 [lectotype of *A. dysophylloides*, K (Herb. Benthamianum); isolectotypes E, G-DC (microfiche), K-W].

**ECOLOGY.** On exposed rocks; alt. 300 – 2250 m. Flowering September – February, fruiting January – June.

**CONSERVATION STATUS.** Singh (1988) records this species as “very rare”, Rao & Razi (1981) record it as “not common”. Endemic to Pulney Hills and Nilghiri Hills.

**NOTE.** We could not find good character to separate *Anisochilus sericeus* from *A. dysophylloides*, or even to divide into varietal status. The type of *A. sericeus* is a younger stage of *A. dysophylloides* (*Wight Cat.* 2515).

**11. *Anisochilus adenanthus* Dalzell** in Dalzell & Gibson (1861: 206). Type: India, the Concan, near Dharwar, Bababoodan hills, Bombay Herbarium of the late N. A. Dalzell. Presented by Mrs Dalzell, April 1878, *Dalzell* s.n. (holotype K!).

*Anisochilus verticillatus* Hook. f. (1885: 629); Gamble (1924a: 1127); Mukerjee (1940: 59). Type: India, the Concan, near Dharwar, Bababoodan hills, Bombay Herbarium of the late N. A. Dalzell. Presented by Mrs Dalzell, April 1878, *Dalzell* s.n. [K!, lectotype **chosen here** (holotype of *A. adenanthus*)], **synon. nov.**



Erect annual or short lived perennial herbs, up to 1 m tall. *Stems* rounded or round-quadrangular, 4 – 6-longitudinally grooved when dry, pubescent to villous, with scattered red sessile glands. *Leaves* subsessile, 3 – 4-whorled, sometimes with axillary young leaves, linear-lanceolate, oblong or obovate-oblong, 30 – 150 × 10 – 15 mm, apex acute or obtuse, base attenuate, margin entire or obscurely crenate, chartaceous, pubescent to silky-villous on both sides, with red sessile glands beneath, lateral veins 5 – 7. *Inflorescence* terminal, mostly simple, occasionally branched; spike-like head often narrowed toward apex in bud and becoming cylindrical after anthesis, up to 190 mm long and 150 mm wide; bracts lanceolate, densely pubescent. *Calyx* ovoid, 1 – 2 mm long at anthesis, densely villous; fruiting calyx 3 – 5 mm long; posterior lip entire or obscurely 3-lobed, slightly decurved after anthesis, not concealing throat; anterior lip entire or obscurely 2-lobed; tube ventrally saccate above the middle, not constricted at throat, pubescent, with scattered red sessile glands. *Corolla* white or light blue, 8 – 12 mm long, pubescent, with scattered red sessile glands. *Nutlets* brown, globose, c. 0.8 mm in diameter. Map 3.

**DISTRIBUTION.** South India.

**INDIA:** Hyderabad, Golconda Hills, *Beddome* 129 (K, lectoparatype of *Anisochilus verticillatus*); Coimbatore, Hassanur, 1110 m, 1 Dec. 1906, *Fischer* 1378 (CAL); the Concan, Purwar Ghat, *Ritchie* 1985 (E, K, lectoparatypes of *A. verticillatus*); the Concan, Belgaum (Cheeta Hill), *Ritchie* 1985 (K, lectoparatype of *A. verticillatus*); Kerala, Idukki, Moolamattam, 1000 m, 12 Oct. 1998, *Sunil* 2173 (K); near Purwar Ghat, Cheeta Hill, *Stocks* 546 (K).

**ECOLOGY.** In rock crevices in open places; alt. up to 1700 m. Flowering August – October, fruiting November – December.

**CONSERVATION STATUS.** Fairly widespread in the Decan Peninsula, least concern.

**NOTE.** When describing *Anisochilus adenanthus*, Dalzell in Dalzell & Gibson (1861) stated ‘unfortunately the lower part of our specimens has been lost’ in the original publication. There is one of Dalzell’s specimens from Bombay at K with no lower part. The specimen has ‘*Anisochilus* nov. sp.’ on it with the label ‘Bombay Herbarium of the late N. A. Dalzell. Presented by Mrs. Dalzell, April 1878’. The original description clearly matches this specimen. *A. verticillatus* which also occurs in the area is reduced to a new synonym.

**12. *Anisochilus argenteus* Gamble** (1924b: 265; 1924a: 1127); Mukerjee (1940: 61). Type: India, Madras, Pulney Hills, Kodaikanal Ghat new road, 29 Dec. 1898, *Bournes* 1441C (K!, lectotype **chosen here**; islectotype K!).

Erect or ascending stout undershrub, up to 1 m tall. *Stems* round-quadrangular, silvery or tawny tomentose, with sessile glands, internodes short, often longitudinally grooved when dry. *Leaves* sessile, opposite decussate or whorled, obovate or oblanceolate, 8 – 20 × 4 – 8 mm, apex acuminate, base cuneate, margin entire, subcoriaceous, densely silvery- or tawny-tomentose on both sides, veins and reticulation invisible. *Inflorescence* terminal, simple; spike-like head almost cylindrical in bud and fruit, up to 100 mm long and 10 mm wide; bracts ovate, longer than calyx, densely silvery or tawny tomentose. *Calyx* ovoid, c. 1 mm long at anthesis, densely tomentose; fruiting calyx obliquely 5-toothed, 3 – 4 mm long; posterior lip oblong, entire or obscurely 3-lobed at apex, erect or slightly decurved; anterior lip truncate or obscurely and obliquely 2-lobed; tube ventrally saccate above the middle, not constricted at throat, densely silvery or tawny tomentose. *Corolla* purple, 3 – 4 mm long, pubescent, with sparse red sessile glands. *Nutlets* brown, ovoid, 1 – 1.2 × 0.6 – 1 mm. Map 4.

**DISTRIBUTION.** India (Deccan Peninsula, Tamilnadu).

**INDIA:** Madras, Pulney Hills, Kodaikanal Ghat new road, 11 Nov. 1897, *Bournes* 885 (lectoparatype K); Madras, Pulney Hills, Kodaikanal, Lidcot Valley, 2 July 1898, *Bournes* 1036 (lectoparatype K, sterile); Madras, Pulney Hills, Kodaikanal Ghat new road, 26 Dec. 1898, *Bournes* 1441A (lectoparatype K); idem., 28 Dec. 1898, *Bournes* 1441B (lectoparatype K); idem., 29 Dec. 1898, *Bournes* 1441C (lectotype K; islectotype K); Pulneys Hills, March 1923, *Herb. Mrs M. A. Evershed* s.n. (BM); Madras, Dindigul, Kodaikanal, Tiger Shola, rock halfway across to Korappur, 1800 m, 1 Aug. 1986, *Matthew* RHT 46120 (K); Madras, Dindigul, Kodaikanal, Perumal peak, northern slopes, 2150 m, 12 Dec. 1986, *Matthew* RHT 47921 (K); Madras, Kodaikanal, Palni (Pulney) Hills, c. 2100 m, 10 March 1960, *Saldanha* CS 5190 (K).

**ECOLOGY.** On exposed rocks with thin layer of soil; alt. 1800 – 2200 m. Flowering November – March, fruiting December – April.

**CONSERVATION STATUS.** Henry *et al.* (1987) record this species as rare and endangered; although Matthew (1999) describes it as common in the Pulney hills.

**13. *Anisochilus harmandii* Doan ex Suddee & A. J. Paton** in Suddee *et al.* (2004: 384, f. 1). Type: Cambodia, Mlu Prey, Jan. 1876, *Harmand* 326 (holotype P!; isotypes A!, P!). *Anisochilus harmandii* Doan (1936: 943, f. 99, 11 – 13), *nom. inval.*; Murata (1976: 179).

Erect short-lived perennial herbs or undershrub 1 – 1.5 m tall. *Stems* woody or herbaceous and woody at base, quadrangular, hoary-pubescent. *Leaves* petiolate or sessile, opposite decussate, often pseudo-verticillate

due to the presence of axillary young leaves, lanceolate, 15 – 90 × 5 – 25 mm, apex acute, base attenuate, margin crenate, serrate or subentire, often revolute, scabrate to tomentose with or without sessile glands above, tomentose with sessile glands beneath, sometimes glands hardly visible because of dense indumentum, lateral veins 3 – 6, prominently raised beneath; petiole 0 – 10 mm long, pubescent. *Inflorescence* terminal, much branched; spike-like head cylindrical, 10 – 150 × 10 – 12 mm; bracts ovate or lanceolate, pubescent, with sessile glands. *Calyx* ovoid, 1 – 1.2 mm long at anthesis, tube densely villous; fruiting calyx 3 – 6 mm long; uppermost tooth oblong, slightly decurved, not concealing throat, apex obtuse or rounded, occasionally shallowly emarginate or shortly apiculate, villous with sessile glands; 4 remaining teeth subequal, apex obtuse or rounded, reflexed or not, arranged obliquely on throat at base of uppermost tooth; tube ventrally saccate below the middle, villous. *Corolla* white, whitish-purple or purple, 8 – 10 mm long, villous with sessile glands. *Nutlets* dark brown or black, ovoid, c. 1 mm long. Fig. 3 & Map 1.

**DISTRIBUTION.** Cambodia, Laos and Thailand.

**SELECTED COLLECTIONS. CAMBODIA:** Mlu Prey, Jan. 1876, *Harmand* 326 (holotype P; isotypes A, P). **LAOS:** Vientiane, Phou Khao Khouay, 800 m, 28 Oct. 1971, *Vidal* 5531 (KYO, P); *idem*, 800 m, 29 Oct. 1971, *Vidal* 5733 (P). **THAILAND:** Sakon Nakhon, Lad Kacher, 23 Nov. 1962, *Adisai* 152 (BK); Chaiyaphum, Tungkamang, 16°20'N 101°45'E, 800 m, 14 Dec. 1971, *Beusekom et al.* 4266 (BKF, C, K, KYO, L, MO, P); Phetchabun, Na Por Song forest, 24 Dec. 1952, *Dee* 626(ABD); Chanthaburi, Makham, 20 m, 9 Dec. 1924, *Kerr* 9582 (BK, 2 sht. BM, SING); Nakhon Panom, Phu Wat (now Mukdahan), c. 300 m, 16 May 1932, *Kerr* 21499 (BK, BM); Phetchabun, Nam Nao National Park, 850 m, 25 Dec. 1982, *Koyama, Terao & Wongprasert* T-31685 (BKF, KYO); Trang, Yan Ta Khao Distr., Thung Khai Botanic Garden, 40 m, 15 Dec. 1995, *Mauric* 27 (BKF); Sakon Nakhon, Phu Phan National Park, c. 30 km SW of Sakon Nakhon City, c. 17°00'N 104°00'E, 15 Nov. 1984, *Mitsuta et al.* T-50484 (A, AAU, BKF, 2 sht. KYO); Mukdahan, Phu Hin Turb, c. 18 km S of Mukdahan City, 16°29'N 104°43'E, 17 Nov. 1984, *Murata et al.* T-50716 (A, 2 sht. KYO); Chaiyaphum, Pa Hin Ngam National Park, 700 m, 3 Sept. 1993, *Suddee* 156 (BCU); Ubon Ratchathani, Pha Tam National Park, 300 m, 6 Sept. 1997, *Suddee* 775 (BKF, K, TCD); Nong Khai, Phu Wua Wildlife Sanctuary, summit plateau, 300 m, 14 Oct. 1998, *Suddee et al.* 976 (BKF, K, TCD); Trang, Thung Khai Botanic Garden, Swamp area, 10 Dec. 1999, *Wongprasert, Suddee & Puudjia* s.n. (BKF, K, TCD). For more collections see *Suddee et al.* (2004).

**ECOLOGY.** On rocks in open grassy places in Dipterocarp forest or mixed-deciduous forest, in marshy areas;

20 – 870 m. Flowering September – February, fruiting October – March.

**CONSERVATION STATUS.** Least concern (*Suddee et al.* 2004: 384).

**VERNACULAR NAMES. Thai:** Khuu muai (Chong-Trat), Khruu muai (Trat).

**14. *Anisochilus cambodianus* Murata** (1977: 26, f. 3, 1 – 5 & f. 4); *Suddee et al.* (2004: 386). Type: Cambodia, Kampot Province, Poporkvil, c. 1000 m alt., 4 Dec. 1964, *Kira, Hozumi, Yoda & Kokawa* 292 (holotype KYO!).

Erect stout undershrub, up to 0.7 m tall, sterile branches densely covered with leaves. *Stems* woody at base, round-quadrangular, internodes very short below, elongated on upper part, densely brownish pubescent with short antrorse hairs, with dense or sparse red or yellow sessile glands. *Leaves* petiolate, lanceolate or elliptic-lanceolate, 8 – 65 × 5 – 15 mm, apex acute or narrowly obtuse, base attenuate, margin obscurely serrate-crenate, revolute, densely pubescent with sessile glands on both sides, lateral veins 3 – 5; petiole short, up to 5 mm long, pubescent. *Inflorescence* terminal, mostly simple, rarely branched; spike-like head cylindrical, 10 – 75 × 8 – 12 mm; bracts ovate, pubescent, with sessile glands. *Calyx* ovoid, 1.5 – 2 mm long at anthesis, tube villous; fruiting calyx 2 – 5 mm long; uppermost tooth oblong, or elliptic-oblong, slightly decurved, not concealing throat, apex rounded, villous with sessile glands; 4 remaining teeth subequal, apex obtuse or rounded, reflexed, arranged obliquely on throat at base of uppermost tooth; tube inflated below the middle, villous with hairs sometimes glandular. *Corolla* white to pale purple, 6 – 8 mm long, villous, with sessile glands. *Nutlets* black, ellipsoid or ovoid, 1 – 1.5 mm long. Map 1.

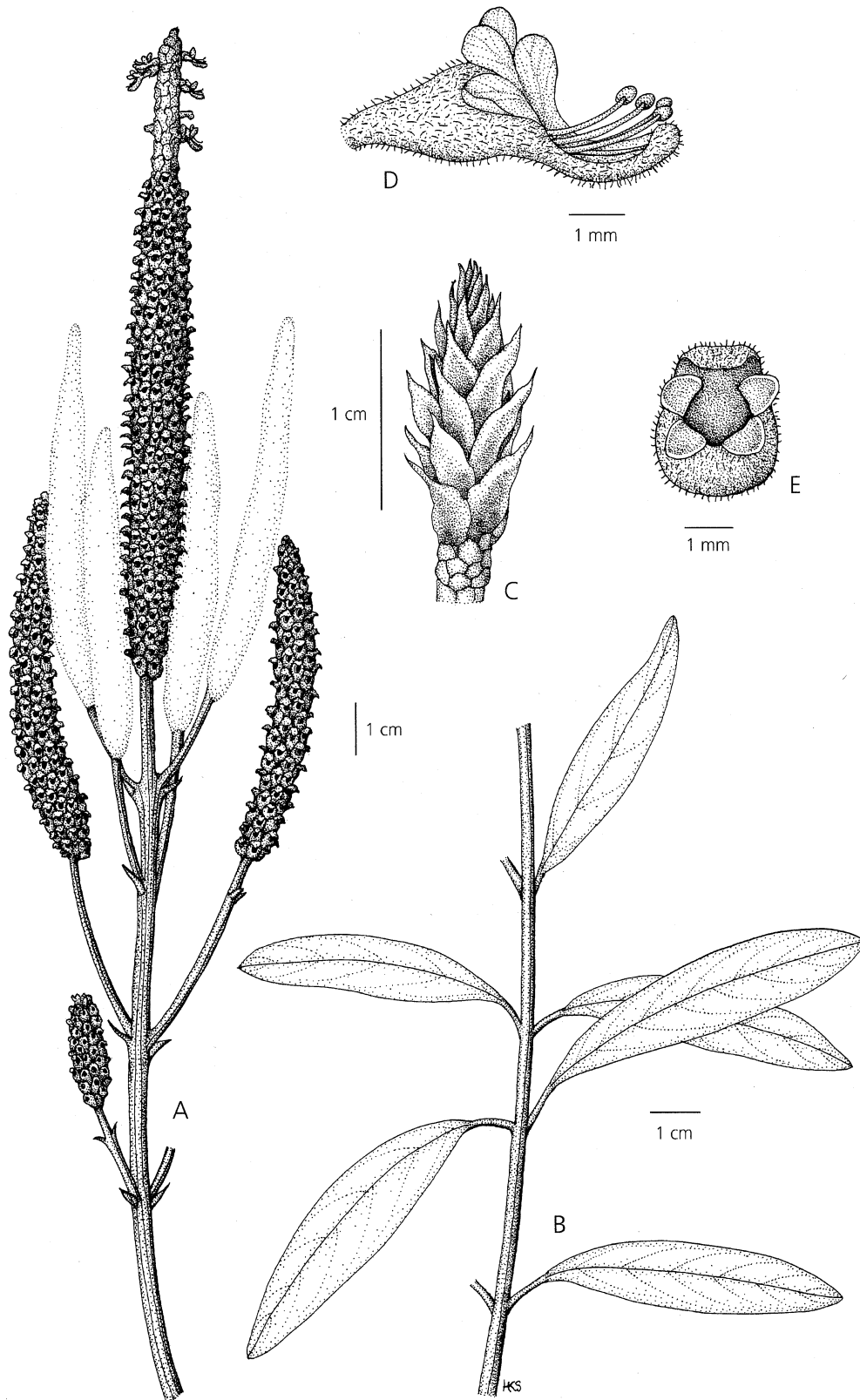
**DISTRIBUTION.** Cambodia and Thailand.

**SELECTED COLLECTIONS. CAMBODIA:** Kampot Province, Poporkvil, c. 1000 m alt., *T. Kira et al.* 292 (holotype KYO). **THAILAND:** Trat, Kao Kuap, c. 600 m, 23 Dec. 1929, *Kerr* 17721 (BK, 2 sht. BM); Trat, Kao Kuap, c. 1000 m, 26 Dec. 1929, *Kerr* 17822 (BK, 2 sht. BM); Bangkok (Plant brought from Kao Kuap, Trat and cultivated in Bangkok), 28 Sept. – 12 Oct. 1930, *Kerr* 19744 (BK, 2 sht. BM); Trat, Koh Chang, Klong Prao, 1899 – 1900, *Schmidt* 706c (paratype C); Trat, Kao Kuap, 24 May 1930, *Put* 2991 (2 sht. BM).

**ECOLOGY.** On rocks in open places; alt. from near sea level up to 1000 m. Flowering September – December, fruiting December.

**CONSERVATION STATUS.** EN B1 ab(i,iii) (*Suddee et al.* 2004: 386).

**VERNACULAR NAMES. Thai:** Khuu muai (Chong-Trat), Khruu muai (Trat).



**Fig. 3.** *Anisochilus harmandii*. A – B habit; C coma bracts on top of inflorescence; D corolla; E fruiting calyx. (A from Kerr 9582, BM; B – E from Wongprasert, Suddee & Puudjaa s.n., TCD). DRAWN BY HOLLY SOMERVILLE. Reproduced from *Kew. Bull.* 59: 385 (2004).

**NOTE.** Close to *Anisochilus harmandii*. The brownish pubescence on the stem separates it from the former.

**15. *Anisochilus pallidus*** Wall. ex Benth. (1830b: 18), as '*pallidum*'; Benth. (1832: 60, 1848: 82); Hook. f. (1885: 629); Dunn (1915: 141); Doan (1936: 942); Mukerjee (1940: 57); Murata (1966: 272, 1971: 491, 1976: 179); Hsuan (1977: 412, f. 86); Phuong (1982: 128); Press (1982: 150); Hô (1993: 1072); Li & Hedge (1994: 267); Phuong (1995: 33); Budantsev (1999: 25); Clement (1999: 992, f. 89 f & g); Phuong (2000: 39); Suddee *et al.* (2004: 380). Type: Burma, Taong Dong, 26 Nov. 1826, *Wallich Cat.* 2754, [lectotype K! (Herb. Benthamianum); isolectotypes G-DC (microfiche!), K-W!].

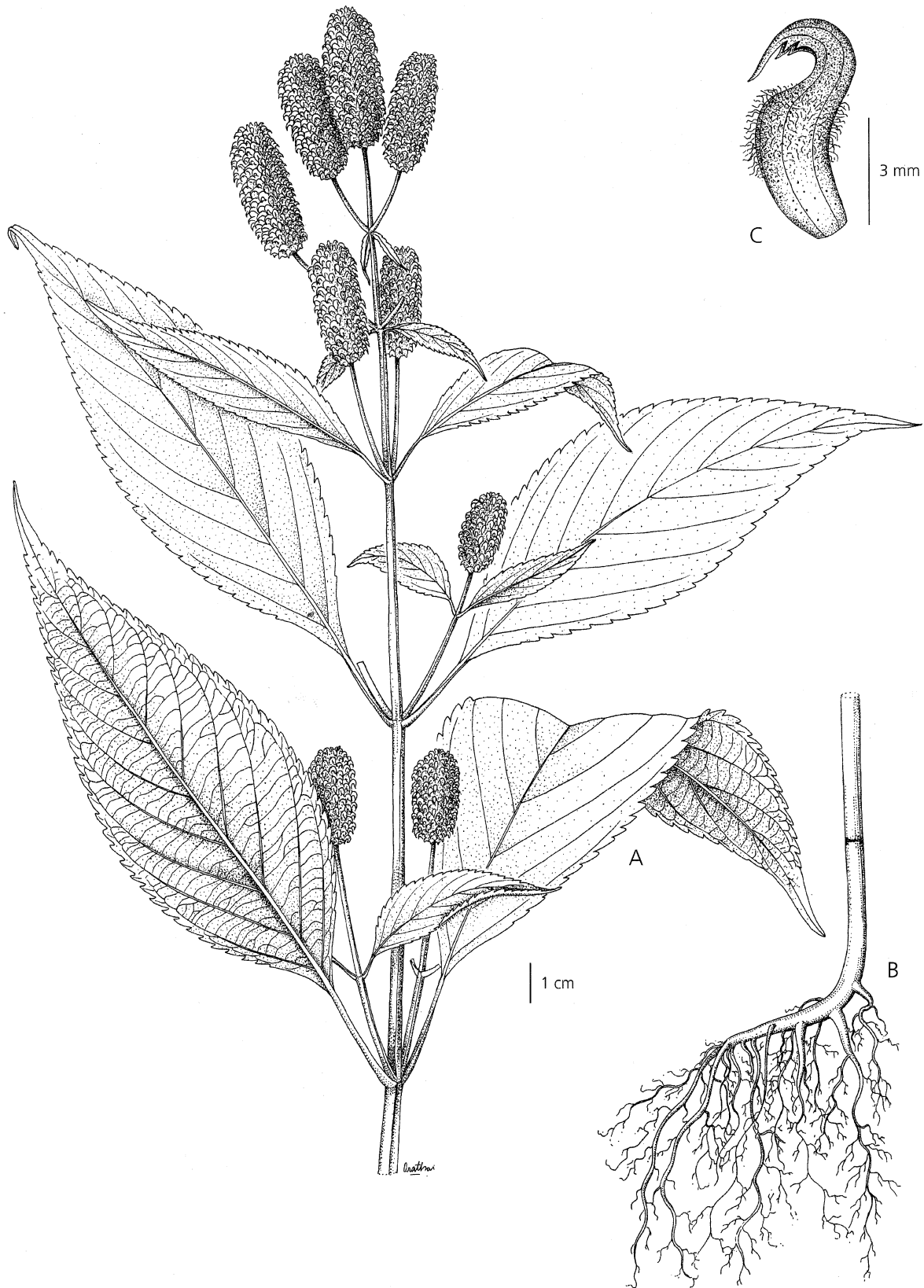
Erect annual herbs up to 1.50 m tall. *Stems* round-quadrate or quadrangular, usually 4-longitudinal grooved when dry, glabrescent to pubescent, with sessile glands, often with purple spots. *Leaves* petiolate, opposite decussate, often with axillary young leaves, elliptic-oblong or oblong-lanceolate, 30 – 160 × 15 – 70 mm, apex acuminate, base attenuate, margin dentate-serrate, membranous, glabrescent to sparsely pubescent above, glabrescent to pubescent with sessile glands beneath, lateral veins 5 – 12; petiole slender, up to 50 mm long, pubescent, with sparse sessile glands, often with 2 rows of longer hairs along edge near leaf base. *Inflorescence* terminal and axillary, simple or branched; spike-like head often narrowed toward apex in bud and becoming cylindrical after anthesis, up to 55 mm long and 12 mm wide; bracts narrowly lanceolate, pubescent. *Calyx* ovoid, c. 1 mm long at anthesis, densely villous; fruiting calyx obliquely 5-toothed, 4 – 6 mm long; uppermost tooth subulate, beak-like, deflexed after anthesis and concealing throat, pubescent; lateral 4 oblique teeth minute, erect; tube ventrally saccate around the middle, constricted at throat, villous. *Corolla* white to bluish-purple, 4 – 6 mm long, villous, with sparse sessile glands. *Nutlets* dark brown to black, oblong or ellipsoid, 1 – 1.2 × 0.6 – 0.8 mm. Fig. 4 & Map 2.

**DISTRIBUTION.** Nepal, Eastern India (Sikkim, Assam), Bhutan, Burma, SW China (Yunnan), Thailand, Laos and Vietnam.

**SELECTED COLLECTIONS.** **BURMA:** Shan Hills, Pwehla Distr., 900 m, Nov. 1888, *Collett* 947 (K); Shan State, Keng Tung, 1906, *Durie* s.n. (BM); Patkoye Mts., *Griffith* 3960 (K); Prome Hills, *Maingay* 1168 (K); Southern Shan State, Paktu Mong, Dec. 1909, *Robertson* 46 (K); Taong Dong, 26 Nov. 1826, *Wallich Cat.* 2754, [lectotype K, Herb. Benthamianum; isolectotype K-W, G-DC (microfiche)]. **CHINA:** Yunnan, Szemao, 1200 m,

*Henry* 12675 (K). **INDIA:** W Darjeeling, Surail, *Beddome* s.n. (BM); N Bengal, 4 Nov. 1869, *Clarke* 10357 (BM); Darjeeling, 1200 m, 5 Nov. 1870, *Clarke* 13587A (K); idem., 1500 m, 13 Nov. 1875, *Clarke* 26318 (K); idem., 1200 m, 1 Dec. 1875, *Clarke* 26506C (BM); idem., 1200 m, 1 Dec. 1875, *Clarke* 26506E (K); Sikkim, 900 m, 12 Oct. 1882, *Clarke* 36584A (BM); Nagaland, Kohima, 1 Nov. 1885, *Clarke* 41478 (K); Sikkim, 600 m, *Hooker* s.n. (K); idem., 600 – 1500 m, *Hooker* s.n. (K); idem., 600 – 1500 m, *Hooker & Thomson* s.n. (BM); Manipur, Laimasak, 1200 – 1500 m, Nov. 1907, *Meebold* 4822 (CAL, K); Assam, Lungshak, 1200 m, 7 Nov. 1948, *Mukerjee* 3663 (CAL); Assam, Lushai Hills, N Vanlaiphai, 1500 m, 2 Nov. 1927, *Parry* 373 (K); Assam, Lushai Hills, 900 m, 4 Nov. 1927, *Parry* 403 (K); West Bengal, Jalpaiguri Distr., Jashigaon Baraduar, 1350 m, 29 Nov. 1975, *Sikdar & Sikdar* 4015 (CAL); Manipur, *Watt* Distribution No. 6608 (K). **LAOS:** Bassac, 1866 – 1868, *Thorel* s.n. (2 shts. P). **NEPAL:** East Nepal, Phusri-Sanguri Bhanjang, 900 m, 16 Oct. 1963, *Hara et al.* 6306437 (K); East Nepal, N of Dharem, c. 900 m, *Schilling* 2451 (K); Col de Sukhchauri, 1000 m, 7 Nov. 1954, *Zimmermann* 2097 (K). **THAILAND:** Chiang Mai, Chiang Dao, Doi Khae Noi, 28 Nov. 1963, *Adisai* 724 (BK); Chiang Mai, Doi Inthanon, 12 Dec. 1964, *Bunchuai* 1448 (BKF, C, K, L, P); Chiang Mai, Doi Sutep, 1600 m, 4 Jan. 1915, *Kerr* 3511 (BM, K); Chiang Mai, near Mae Taman Reforestation Unit, south of Doi Chiang Dao, 1320 – 1400 m, 2 Dec. 1984, *Koyama, Mitsuta & Nagamasu* T-39850 (A, BKF, KYO); Mae Hong Son, Kiew Lom, border between Pai and Muang Distr., 1490 m, 16 Jan. 1983, *Koyama, Terao & Wongprasert* T-32577 (KYO); Doi Khun Sathan, W of Na Noi, 10 km SW of Ban San Tha, 18°16'N 100°31'E, 100 – 1300 m, 19 Nov. 1993, *Larsen et al.* 44626 (AAU, K); Lamphun, Mae Tah, Doi Khun Tan National Park, SW side of Doi Khun Tan, 1250 m, 1 April 1994, *Maxwell* 94-417 (A, CMU); Lampang, Muang Pan, Jae Sawn National Park, E of Mae Jam Village, along the main dirt road, 1025 – 1100 m, 3 Dec. 1995, *Maxwell* 95-1260 (CMU); Chiang Rai, Wieng Ba Bao, Mae Poon Luang, c. 1400 m, 11 March 1980, *Paisooksantiwatana* 242-80 (CMU, KKU); Chiang Mai, Chiang Dao, 16 Dec. 1963, *Phusomsaeng* 76 (BKF, L); Chiang Mai, Mae Taeng, c. 1200 – 1600 m, 3 Dec. 1977, *Santisuk* 1447 (AAU, C); Tak, Doi Mussor, c. 900 m, 9 Dec. 1960, *Smitinand* 7072 (A, ABD, BKF, K); Chiang Mai, Mae Tang, Doi Toong Jaw, 1100 – 1200 m, 12 Dec. 1981, *Thongisan* 35 (CMU). **VIETNAM:** Lam Dong, Bao Loc, 29 Nov. 1976, *Phuong* 148MN (HN); Vallee du Dong Nai sud de Dran, 600 m, 11 Jan. 1924, *Poilane* 9569 (P); massif de Braïan, 1500 m, 12 Feb. 1935, *Poilane* 24235 (A, HM, K, 3 shts. P).

**ECOLOGY.** Edges of forest or road sides in primary evergreen forest, lower montane forest, moist mixed



**Fig. 4.** *Anisochilus pallidus*. A – B habit; C fruiting calyx. (A & C from *Konta et al.* 4858, BKF; B from *Maxwell* 97-1495, BKF). DRAWN BY ORATHAI KERDKAEW.

deciduous forest; 300 – 1900 m. Flowering October – January, fruiting December – April.

**CONSERVATION STATUS.** Widespread, Least Concern.

**VERNACULAR NAME.** **Indian** (Assam): Hneminuchu. **Vietnamese:** Dithan tai.

**16. *Anisochilus polystachyus* Benth.** (1830b: 19, as '*polystachyum*'; 1832: 60; 1848: 82); Hook. f. (1885: 630); Mukerjee (1940: 62); Press (1982: 150); Clement (1999: 992). Type: Nepal, Hetoundah [Hetauda], 14 Dec. 1820, *Wall. Cat.* 2755 [K! (Herb. Benthonianum), lectotype **chosen here**; isolectotypes BM!, E!, G-DC (microfiche!), K! (Herb. Hookerianum), K-W!].

Erect annual herbs up to 3 m tall. *Stems* quadrangular, with 4 longitudinal grooves when dry, pubescent, with scattered red sessile glands. *Leaves* subsessile or petiolate, opposite decussate, lanceolate, 50 – 150 × 15 – 45 mm, apex acuminate, base attenuate, margin coarsely serrate, membranous, glabrescent to pubescent above, pubescent on veins, with red sessile glands beneath, lateral veins 7 – 12; petiole subsessile to 5 mm long, pubescent. *Inflorescence* terminal and axillary, branched; spike-like head often narrowed toward apex in bud, becoming cylindrical after anthesis, up to 80 mm long and 10 mm wide; bracts minute, lanceolate, pubescent. *Calyx* ovoid, c. 1 mm long at anthesis, densely villous; fruiting calyx obliquely 5-toothed, 3 – 4 mm long; uppermost tooth dentate, slightly decurved and slightly hooded after anthesis, not concealing throat; lateral 4 oblique teeth minute, erect or slightly decurved; tube ventrally saccate below the middle, constricted at throat, pubescent to villous. *Corolla* white, 6 – 8 mm long, villous, with scattered red sessile glands. *Nutlets* light brown, ellipsoid, 0.8 × 0.6 mm. Map 2.

**DISTRIBUTION.** Nepal, India (Sikkim, Assam), Bhutan.

**SELECTED COLLECTIONS. INDIA:** N Bengal, Siligori, 15 Nov. 1870, *Clarke* 13825A (BM); Darjeeling, Terai [Tarai], 14 Dec. 1896, *Clarke* 31736 (K); idem., Dec. 1879, *Gamble* 7596 (K); Darjeeling, *Griffith* 3959a (K); Assam, Mishmi, *Griffith* 3959b (K); Assam, Jeock Ghat near Jengali Bam, Oct. 1898, *Hock* 347 (CAL); Sikkim, 600 m, *Hooker* s.n. (K); Darjeeling, Terai [Tarai], 600 m, *Hooker* s.n. (K); Khasia, *Hooker & Thomson* s.n. (BM, K, NY); Assam, *Jenkins* s.n. [2 shts. K (Herb. Benthonianum), K (Herb. Hookerianum)]; Manipur, Bishnupur, 900 m, Nov. 1907, *Meebold* 4821 (K).

**ECOLOGY.** In dry open places in subtropical areas; alt. 150 – 900 m. Flowering October – November, fruiting November – December.

**CONSERVATION STATUS.** The collections seen suggest that the extent of occurrence of the species is less than 20,000 km<sup>2</sup>, suggesting a possible rating of vulnerable, if the habitats are threatened. No recent collections

have been seen, but they may well exist in regional herbaria. We consider this species as Data Deficient.

**NOTE.** Close to *Anisochilus pallidus* in having similar leaf and calyx shape but differs in having posterior lip of fruiting decurved or slightly hooded but never deflexed and concealing throat.

### Excluded names

*Anisochilus africanus* Baker ex Scott-Elliot, *J. Linn. Soc., Bot.* 30: 94 (1894) = *Plectranthus africanus* (Scott-Elliot) A. J. Paton

*Anisochilus engleri* Briq., *Bot. Jahrb. Syst.* 19: 190 (1894) = *Plectranthus africanus* (Scott-Elliot) A. J. Paton

*Anisochilus euneurus* Miq., *Fl. Ned. Ind. Bat.* ii: 957 (1858) = *Elsholtzia pubescens* Benth.

*Anisochilus sinensis* Hance, *J. Bot.* 23: 327 (1885) = *Platostoma cochinchinense* (Lour.) A. J. Paton.

### Doubtful name

*Anisochilus siamensis* Ridl., *J. Straits Branch. Roy. Asiat. Soc.* 1911: 159 (1911). Type: Thailand, Bangsaphan Distr., Prachuap Khirikhan Province, *Keith* s.n. (not seen). In the original publication, Ridley did not mention where the type was. Keith's specimens should be deposited at SING but so far no specimen has been found.

### Acknowledgements

We wish to thank Boonyakrit Butchaya (BKF), Orathai Kerdkaew (BKF) and Holly Somerville (TCD) for the line drawings. The staff, directors and keepers of the herbaria mentioned in the treatment are thanked for making specimens available on loan for study, or providing facilities during visits. This work was partly supported by the Tobu fund, administered by the Royal Botanic Gardens, Kew.

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