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Kaisupeea: a new genus of Gesneriaceae centred in Thailand

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The genus *Kaisupeea* is established for *Boea herbacea*, a species long recognised as being out of place in *Boea*, and two new species closely allied to it. These plants produce annual flowering stems whose basal leaves may be represented by broad foliaceous cataphylls. *Kaisupeea herbacea* and *K. cyanea* have spirally twisted fruit-valves, but those of *K. orthocarpa* are straight. *Kaisupeea* ranges from Moulmein in Burma [Mawlamyne in Myanmnar] eastwards across Thailand to Bassac on the Mekong river in lower Laos and south to the neighbourhood of Satun on the south coast of Thailand just north of the Malaysian border.

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Introduction

When the generic concepts of *Boea* Lam. and *Paraboea* (C. B. Clarke) Ridl. were revised (Burtt 1984), *Boea herbacea* C. B. Clarke was allowed to remain in the genus *Boea* only because its affinity was unknown. Mentally it was assigned to an independent monotypic genus, but there are too many awkwardly isolated members of Gesneriaceae to make that solution immediately satisfactory.

The situation has now changed. Two new species clearly allied to *Boea herbacea* have been recognised and are here described. It is considered that this group of three species justifies the establishment of a distinct genus, *Kaisupeea*, which is formally validated below. Unfortunately, due to carelessness on my part, this name has already appeared in print in phytogeographical discussion (Burtt 1998) but it was not validly published there.

One of the new species has been in herbaria for some 70 years, having been collected in southern Thailand near Phangnga ("Pungah") by the well known collectors from Singapore Botanic Garden M. Haniff & M. Nur. That specimen was in fruit only and has not hitherto been determined. The species was re-discovered by Professor Kai Larsen and his team not far from Satun, which is almost on the Thai-Malaysia border and some 255km SE of Phangnga. Both flowers and fruit could be examined on this material and showed that it was congeneric with *Kaisupeea herbacea*, as it may now be called, but differed not only in its narrower more strongly toothed leaves and pale blue flowers, but in having straight fruit-valves. It is described below as *K. orthocarpa.*

The second new species, again collected by Larsen and his team, came from Khao Takrup in the east of Chachoengsao province, some 150km E of Bangkok and 45km from the Thai-Cambodia border. This specimen had fruit with twisted valves and I at first, too casually, put it down as *Boea herbacea.* The specimen was in fruit only, but yielded some seed that was sown at the R.B.G. Edinburgh and flowered in August 1997. The corolla was deep blue with a darker patch on the floor of the throat and was therefore strikingly different from corolla of *K. herbacea* which is pure white except for an orange-yellow V in the throat: there are other differences as well (see key). This species is described below as *Kaisupeea cyanea.*

Thus *K. herbacea* is now one of a group of three

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distinct but closely allied species. All have annual herbaceous flowering stems that die down after fruiting, all have an indumentum composed chiefly of patent glandular hairs, two fertile anthers that are coherent face to face and hairy on the back. The ovary is rather short, elliptic-conical and rather abruptly narrowed into the style: in *K. herbacea* and *K. cyanea* the ovary develops into a shortly cylindric capsule with valves showing 1-2 twists of a spiral, but in *K. orthocarpa* the fruit-valves are straight. Twisted fruit valves were at one time considered a tribal (Fritsch 1894) or subtribal (Ivanina 1967) character. It is now realised that this feature has evolved independently more than once in the family, and *Kaisupeea* is not the only genus to show both straight and twisted fruit valves. Another is the Malaysian limestone genus *Spelaeanthus* just described (Kiew et al. 1998), while the Madagascan *Streptocarpus capuronii* is exceptional in its genus by not having the valves twisted.

When working on three odd limestone plants from Malaysia (Kiew et al. 1998), we had carefully considered *Boea herbacea* to see if there were indications of affinity with any of these. None was found. Now, with the recognition of two congeneric species, the distinctiveness of *B. herbacea* is confirmed. The whole genus *Kaisupeea* differs from the three limestone plants (which have now each been recognised as an independent genus, *Emarhendia, Senyumia* and *Spelaeanthus)* by three constant characters: annual flowering stems, vegetative indumentum consisting almost wholly of gland-tipped hairs, and anthers hairy on the back.

The position of *Kaisupeea* among the genera of the tribe Didymocarpeae must remain uncertain, but the whole pattern of generic relationships in this group needs to be re-examined: simple characters such as the number of fertile stamens and twisted fruit-valves, so valuable in keys for identification, are not necessarily good indicators of affinity.

Phytogeographically *Kaisupeea* belongs to an interesting element in the Asiatic gesneriad flora. It is shown elsewhere (Burtt 1998) that the genera can be divided into two main geographical groups, one centred on the Himalayas and S. China (but including the three European genera *Haberlea, Jancaea* and *Ramonda)*, the other on Sundaland (Malay Peninsula, Sumatra and Borneo) and further east: between lies Thailand and its neighbours where various genera that are thought to have spread from the north (e.g. *Didymocarpus, Chirita* sect *Chirita)* and those that may have spread from the south (e.g. *Aeschynanthus, Paraboea)* overlap. There is also a small element which seems to have its centre in Thailand (e.g. *Ornithoboea, Trisepalum):* to this last the new genus *Kaisupeea* must now be added.

The first collections of *Kaisupeea (Boea herbacea)* were made, as were those of *Ornithoboea* and *Trisepalum* by the Rev. C. Parish of Moulmein in Burma (now Mawlamyine in Myanmar). This species has since been recorded as "common" around Paungdaw, a little south east of Tavoy in Tenasserim: all other records of it have been from Thailand, ranging from Mae Hong Son province in the north west (at Khun Yuam, c. 18°45'N 98°E) to Sai Yok in Kanchanaburi province at c. 14°20'N 99°E. The other two species are, as far as is known at present, more localised. *K. orthocarpa* is represented only from the neighbourhood of Satun, which is very near the Thai-Malaysian border, and from Phangnga [Pungah] at c. 8°30'N. *K. cyanea* is only known from its type locality at Khao Takrup in Chachoengsao province at c. 13°30'N 102°E. The easternmost record of the genus is provided by an old fruiting specimen collected by Thorel at Bassac on the R. Mekong in southern Laos. Until this is recollected in flower it cannot be safely determined at species level, although it seems most like a specimen of *K. herbacea.*

Kai and Supee Larsen have done an immense amount of good work for Thai botanists, Thai botany and the Flora of Thailand. and they have always encouraged the work on Gesneriaceae. The account for the Flora has not progressed as quickly as I, or they, may have wished, but the recognition of a new genus, of which the two new species have resulted from their discoveries, provides a unique opportunity of saying 'thank you' with a generic name that links theirs. I have called this genus (with their permission) *Kaisupeea.*

Taxonomy

Kaisupeea B. L. Burtt gen. nov.

Combinatione characterum sequentium in tribu Didymocarpearum distinctum. Habitus herbaceus, caulibus floriferis annuis et foliis primis caulis novi cataphylla saepe formantibus; tota planta pilis glandulosis induta pilis aliis longis eglandulosis interdum etiam praesentibus; calyx fere ad basin in segmenta 5 dissectus; corolla oblique campanulata vel alba vel pallide caerulea vel cyanea; stamina duo antica fertilia, antheris dorso in connectivo pilosis; ovarium glandulosum, breviter conicum, in stylum abruptius contractum; stigma capitatum, punctiforme; capsula loculicide dehiscens, valvis vel rectis vel tortis. Semina parva numerosa, fusiformia, c. 3mm longa, utrinque acuta, testa reticulata.

Type species: *K. herbacea* (C. B. Cl.) B. L. Burtt.

Herbs with annual flowering stems, the first leaves often forming bladeless cataphylls; whole plant with an indumentum of spreading gland-tipped hairs and sessile globular glands, some eglandular hairs intermixed and leaf-blades with short appressed acute hairs and globular glands. Flowers in axillary, pedunculate, pair-flowered cymes. Calyx divided almost to base into 5 segments. Corolla obliquely campanulate, held more or less horizontally. Fertile stamens 2, the anticous pair: filaments arising at base of corolla-tube, short thick and curved so that the anthers meet; anther cells divaricate, back of connective hairy. Disc annular, very small. Ovary ellipsoid conical covered with globular glands, with or without some glandular hairs intermixed. Style cylindric, about 3 times as long as ovary, glabrous or glandular, stigma capitate. Capsules pendent on decurved pedicels, c. 10mm long, valves straight or twisted. Seeds ellipsoid, reticulate, c. 0.3 mm long, shortly pointed at each end.

Key to the species

1. Corolla white (with yellow V in throat) or pale blue; hairs on back of anthers straight. Plants perennial with annual stems, the first leaves on the new stems being cataphylls (not differentiated into petiole and lamina) 2
1. Corolla deep blue, purple on floor of throat, hairs on back of anthers crispate-lanate, style glandular except near tip, fruit-valves twisted. Plants not known to produce cataphylls (perhaps only annuals?) ..... 2. *K. cyanea*

2. Corolla white (with yellow V in throat); style glandular throughout; fruit-valves twisted ..... 1. *K. herbacea*
2. Corolla pale blue; style glandular only near base, upper part glabrous; fruit-valves straight ..... 3. *K. orthocarpa*

1. Kaisupeea herbacea (C. B. Clarke) B. L. Burtt, comb. nov.

Boea herbacea C. B. Clarke in A. & C. DC., Mon. Phan 5:142 (1883) & in Hook. f., Fl. Brit. Ind. 4:365 (1884); Barnett in Fl. Siam. Enum. 3(3):230 (1962); Burtt in Notes Roy. Bot. Gard. Edinb. 41:420 (1984).

Type: [Myanmar] Burma, Moulmein (1837), Parish 7 (K). [There are two sheets bearing material of Parish 7 at K: I choose as lectotype that from Herb. Hooker bearing four single-stemmed pieces from base (including remains of cataphylls). [There is an additional small piece in top left-hand corner collected by T: Lobb. This sheet has the name pencilled on it in C. B. Clarke's hand.]

Distribution. Myanmar [Burma]. Moulmein, Lobb (K). Tavoy distr., radius of 12 miles from Paungdaw (14°N, 98°30'E), Aug. 1961, Keenan, Tun Aung & Rule 747 (E, K), 847 (E), 850 (E, K), 915 (E), 1332 (E), 1373 (E, K).

Thailand, Northern: Maehongson prov., Khun Yuam, 600-700m, 18°15'N 98°E, 7 ix 1974, Larsen & Larsen 34214 (AAU, E); Chiangmai prov., Maeklang Falls, c. 430 m, c. 50 km NW Chiangmai, 3 xi 1967, Burtt 5613 (E); Jawm Tong distr, Mae Soi valley, 800m, 1 x 1991, Maxwell 91-813 (E); Lampang prov., Me Ngow, 300-590 m, 23 viii 1922, Winit 754 (K). South Western: Kanchanaburi prov., Sai Yok [c. 14°N 99°E], 400 m, 18 xii 1961, Larsen 8804 (ABD, C).

The following record is of a fruiting specimen only and needs to be confirmed from flowering material: the presence of cataphylls suggests identification with *K. herbacea* despite the large geographical gap.

S. Laos: Bassac [c. 14° 54' N 105°51'E], 1866-1868, Thorel 2354 (E, P).

Note. Kaisupeea herbacea certainly has the widest known distribution of the three species of this genus, even if the record from Bassac is set aside pending confirmation.

2. Kaisupeea cyanea B. L. Burtt, sp. nov.

A *K. herbacea* corolla cyanea (nec alba) in fauce purpurea (nec V flava notata), antheris dorso crispolanatis (nec pilis rectis ad connectivo restrictis) conspicue differt.

Type: Thailand, South Eastern: Province Chachoengsao, Khao Tak Groep, trail from north slope to the top, 250 m, 6 xi 1993, in fruit only, Larsen et al 44272 (AAU).

Single stemmed herb with small horizontal rootstock. Stem c. 100-150 mm tall, villious, hairs gland-tipped to c. 1mm long, scattered eglandular to c. 5 mm. Leaves opposite, 3-6 distant pairs, up to 125 × 70 mm at maturity, obovate, apex subacute, base cuneate, tapering into a winged petiolar part, margin closely serrate, both surfaces densely glandular-pu-

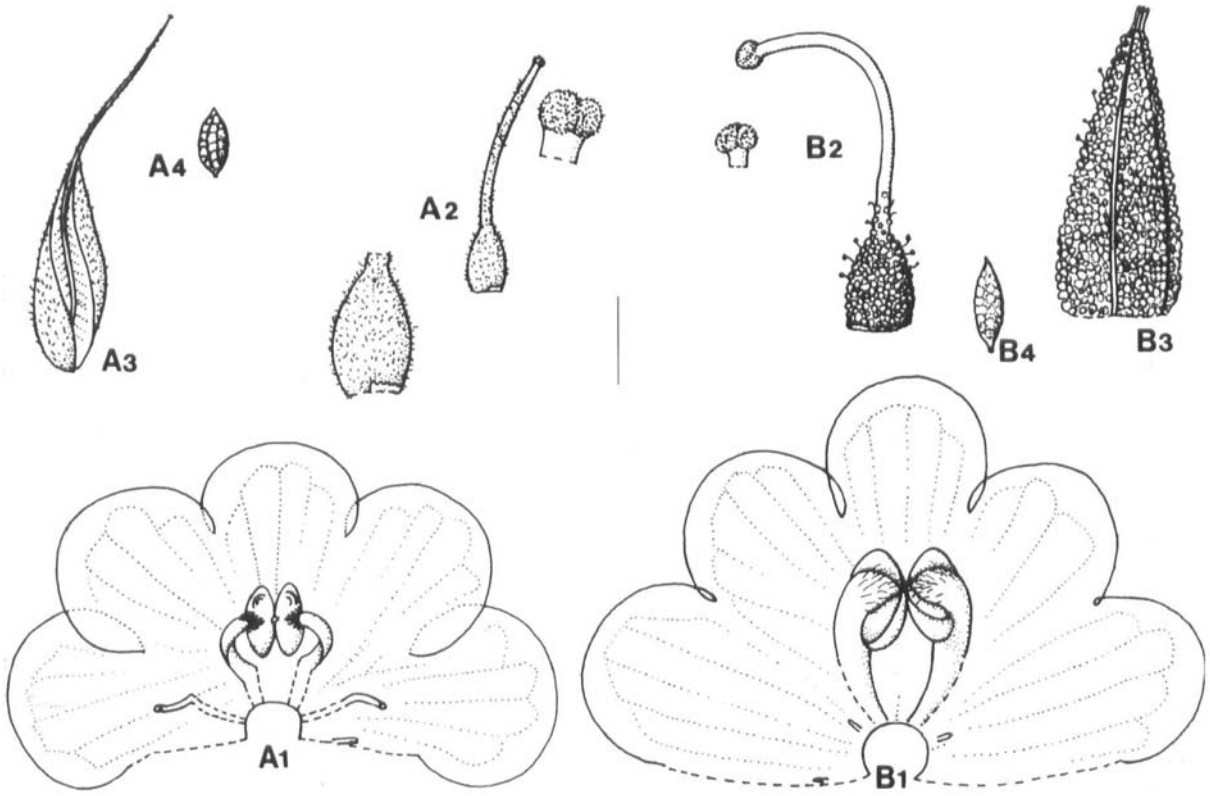

Fig. 1 A, *Kaisupeea cyanea.* A 1, corolla opened out; A 2, gynoecium (further enlarged to show disc, on left, and stigma, on right); A 3, capsule; A 4, seed. – B, *Kaisupeea orthocarpa.* B1, corolla opened out; B 2, gynoecium (with stigma further enlarged), B 3, capsule; B,4, seed. – Bar = 2 mm for A1-3; = 1 mm for B1-3.

bescent, conspicuous sessile globular glands as well particularly on lower surface, 5-6 pairs of sharply ascending veins each side of midrib. Flowers many in a lax dichasial cyme, solitary in axil of leaf, peduncle c. 50-100 mm, densely glandular-pubescent. Bracts (lowermost pair) c. 7 × 2 mm, lanceolate, glandular. Pedicels to 12 mm long, glandular. Calyx subequally 5-lobed nearly to base, lobes 3-5 × 1-1.4 mm, narrowly triangular, long spreading glandular hairs outside. Corolla broadly and shallowly campanulate, glandular outside, light violet, dark violet on floor of tube, tube c. 4 mm long, limb bilabiate upper lip c. 4.5 × 10 mm, lower c. 5 × 15 mm, lobes 5, subequal, c. 4-4.5 × 5-6 mm, rounded, reflexed. Stamens 2 (anticous pair), filaments inserted c. 1 mm above base of tube, c. 2.5 mm long, strongly twisted to bring anthers face to face, anthers 2.5 mm long, connective shortly and very densely bearded; staminodes 3. Ovary c. 2 × 1.4 mm, conical, densely glandular-puberulous; disc a shallow orange crenulate ring. Style c. 3 mm long, bilobed, papillose, far exserted. Capsule c. 7 × 2.2 mm, twisted once, splitting longitudinally into 2 valves. Seeds c. 0.3 × 0.15 mm, fusiform, reticulate, bright light brown, dark point at each end. – Fig. 1A.

Additional material. Cultivated in R.B.G. Edinburgh under No. 1997 2018; seed taken from herbarium specimen of Larsen et al 44272. Sa Kaeow prov., Khao Takrup, 13°26'N, 101°57' E, 250m, in rock crevices near small waterfall, 10 ix 1999, Middleton 222 (A, E).

No basal cataphylls have been seen on *Kaisupeea cyanea.* The cultivated plant appeared to die after flowering, but was retained and produced a shoot the following year but this shoot (which had no cataphylls) died before reaching flowering size. The original specimen was collected in fruit, but was without cataphylls although they are usually visible on fruiting specimens of *K. herbacea.* Perhaps the plants are naturally annuals.

3. Kaisupeea orthocarpa B. L. Burtt, sp. nov.

K. herbaceae affinis sed cataphyllis minoribus, foliis tenuioribus acuminatis acute serrato-dentatis regione petiolari angustius alata, floribus pallide caeruleis (nec candidis), stylo praeter ad basim glandulosum glabro (nec glandulis sessilibus dense obsito), capsula breviore (5 mm nec 10 mm longa) valvis rectis (nec leviter spiraliter tortis) distinguenda

Type:Thailand, Peninsular: Prov. Satun, Yar Roy waterfall c. 25km NE of Satun, 6°45'N 10°07'E, 100-200m; on wet rocks along stream and waterfall, flowers pale blue; 6 xi 1990, Larsen et al 41176 (AAU).

Herb to 25 cm high, but small plants flowering and fruiting at 5 cm, these not further described. Stem with a cluster of small cataphylls right at base; 2 mm diam. near base, smooth, glandular-pilose. Leaves opposite, those of a pair somewhat unequal in size (eg 12 cm and 9 cm long); lamina paper-thin when dried, c. 8 × 2.5-12 × 3.5 cm, including the ill-defined petiole, obliquely elliptic-lanceolate, attenuate at base into petiolar region, the leaf bases joined across the stem, tip gradually acuminate, margins irregularly, but sharply, serrate, main veins 6-7 on each side, curved upwards on the broad side, more or less straight on the narrow side, both surfaces thinly beset with short, sharply pointed hairs and scattered sessile globular glands. Inflorescences solitary, axillary; peduncle c. 2-4 cm, with short, dense, spreading glandular hairs. Bracts (1st pair) c. 4 mm long, lanceolate, green. Flowers paired. Pedicels c. 4 mm, glandular-pilose. Calyx tube 0.2 mm; lobes 2.25 × 0.8 mm, whole calyx beset with glandular hairs c. 0.5 mm long and sessile globular glands; calyx persistent in fruit. Corolla pale blue, obliquely campanulate, outside with glands and glandular hairs like the calyx, glabrous within, c. 5-6 mm to lip of median lobe; lobes rounded subequal, c. 1.5-1.8 mm long, c. 2.3-2.8 mm broad at base. Fertile stamens 2, arising at base of corolla tube; filaments c. 1.5 mm long, thickened upwards and curved so that the anthers meet; anther-thecae divergent, c. 2 mm across, densely but delicately bearded on connective. Staminodes 3, minute, the dorsal one arising slightly above the base of the corolla. Disc a thin, 0.1 mm deep, orange annulus. Ovary 1.5 mm high, 1 mm diam. at base, densely covered with globular glands, with a few gland-tipped hairs interspersed in upper part and on base of style. Style 5 mm long, glabrous except for a few glandular hairs just above the ovary. Stigma capitate. Fruit (not fully ripe, but perhaps fully formed) 5 × 2 mm, conical, readily splitting into 4 segments. Seeds (young) 0.3 mm long, ellipsoid, shortly pointed at both ends, testa reticulate. – Fig. 1B.

Additional material. Peninsular Thailand, Phangnga ('Pungah') 6 xii 1928, Haniff & Nur 3899 (K; originally det. by Ridley as *Lepadanthus flexuosus*).

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