



Strobilanthes Blume (Acanthaceae) in Myanmar, a new species and an updated checklist

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Summary. A brief history of the discovery of *Strobilanthes* species in Myanmar is presented. The revival of fieldwork in recent years has resulted in many new records, so an updated checklist of all known species from the country is needed. Selected specimens are cited and distribution notes provided. One new species, *Strobilanthes hians* J.R.I.-Wood & K.Armstr., with unusual pollen, is described and illustrated bringing the total of recognised species in the country to 81 with six additional infraspecific taxa.

Key Words. Kachin, Naga Hills, Natma Taung, Sagaing, Shan, species description.

Introduction

Myanmar is a country of great topographical diversity with snow-capped Himalayan mountains in the north, the plains of the Ayeyarwady (Irrawaddy) River and its tributaries in its central heartlands and a series of forest covered hills on both its western and eastern borders. This diverse topography is reflected in a great variety of forest types (Kress *et al.* 2003) with a very diverse flora. One of the most species-rich and characteristic genera of forest plants occurring throughout Myanmar is the genus *Strobilanthes* Blume.

The earliest records of *Strobilanthes* from Myanmar date from 1832 when Nees published the Acanthaceae for Wallich's *Plantae Asiaticae Rariores* (Nees 1832), which included species of *Strobilanthes* collected by Nathaniel Wallich himself from Taong Dong, which he visited during his participation in an official mission to the court at Ava. Additional records emerged steadily during the 19th century, initially from British occupied Tenasserim (Tanintharyi) where collections were made by J. W. Helfer, R. H. Beddome and others. From the 1850s onwards, important collections were made from the interior of Myanmar, notably by Dietrich Brandis, Sulpiz Kurz (1877), and Henry Collett (Collett & Hemsley 1890). General Henry Collett was not the only active British soldier botanist, another being Sidney Miles Toppin who made the first significant collections from Kachin State. Interesting observations (Anon. 1895) and records were added by forestry officers of whom John Henry Lace was the most important. Travellers and professional plant collectors, including Alfred Meebold, George Forrest, Reginald Farrer and Frank Kingdon Ward, found unusual species of

Strobilanthes in remote parts of northern Myanmar in the early twentieth century. Much the most significant of these collectors was Kingdon Ward, who found numerous new species over a long career as can be appreciated by the frequency of his name in the citations in the following lists. He was accompanied by Chit Ko Ko on his last expeditions to Kachin and Chin States in the 1950s.

There were few new discoveries in the second half of the twentieth century but since 2000, there has been renewed impetus as a result of collaboration between the Forest Department of the Ministry of Natural Resources and Environmental Conservation in Myanmar and scientific institutions in other countries. Japanese botanists from the Makino Botanical Garden working with colleagues from Myanmar have made inventories and carried out extensive studies focussed on Natma Taung National Park in Chin State (Fujikawa 2021), but have also been involved in fieldwork in Kachin, Kayin and Shan States. More recently another group of Japanese botanists led by Nobuyuki Tanaka from the National Museum of Nature and Science, Tsukuba, have also been carrying out field work. Since 2014, the New York Botanical Garden has been involved in an initiative to document the flora of Myanmar's Northern Forest Complex through botanical inventories in and around Hkakaborazi National Park and Hponganrazi Wildlife Sanctuary in Kachin State, and Htamanthi Wildlife Sanctuary and the surrounding Naga Hills in Sagaing Region. The new species described in this paper was collected in the vicinity of Layshi, in the Naga Self-Administered Zone during an expedition in 2017.

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Today 81 species of *Strobilanthes* are recorded from Myanmar, representing probably the third largest number of *Strobilanthes* species occurring in a single country, only India and China having more. Twenty-five of these species were not included, even under a synonym, in the most recent checklist of Myanmar plants (Kress *et al.* 2003). Some of the species present in Myanmar are quite widespread extending from northern India across much of SE Asia and include *S. auriculata*, *S. atropurpurea*, *S. echinata* and *S. tomentosa* (authorities in this section are provided in the checklist below). However, many have a more restricted distribution. Of the 81 species nearly one quarter (20) appear to be endemic to Myanmar. As might be expected, significant numbers are shared with neighbouring countries, about 13 with Thailand, nine with India and six with China. Of some interest are a group of species which are absent from Thailand but found in the island of Sumatra including *S. brunelloides*, *S. inflata* and *S. pedunculosa* but several other species, such as *S. cruciata* and *S. serpens*, show a somewhat similar distribution although these are also recorded from Thailand. Within Myanmar species are found in all parts of the country and there is no outstanding centre of endemism but Kachin State is richer in endemics than others with some six species restricted to it.

Strobilanthes species are most common in hill country enjoying a seasonal monsoon climate and are generally absent from the plains. The precise habitat and altitude range of most species is not accurately known but only a few species are found commonly above about 2500 m (*S. atropurpurea*, *S. lachenensis*, *S. tanakae*) and only one, *S. oresbia*, is certainly recorded above 3000 m. Rarely altitude can provide a useful clue to identification. *S. hamiltoniana*, for example, is usually found below 1200 m, whereas the somewhat similar *S. euantha* usually grows above 1500 m. The only species documented in Myanmar as being plietesial is *S. rufescens* (Anon. 1895), but several species, such as *S. echinata*, are known to be plietesial in other parts of their range. However, many of the rare species are likely to be plietesial and will only be found in flower at irregular intervals.

Strobilanthes does not lend itself to a Linnean subclassification (Carine & Scotland 2002) but certain groups are apparent based on morphology and the very limited molecular data available. Perhaps the most important in Myanmar is the group placed by Bremekamp (1944) in *Gutzlaffia* Hance, because of its distinctive echinulate pollen. This consists of about seven species of which five are present in Myanmar, *S. aprica*, *S. connata*, *S. gregalis*, *S. obtusibracteata* and *S. rosea*, the last four being endemic to the country. More numerous are species which conform to *Goldfussia* Nees in having ellipsoid, ribbed pollen combined with the anthers of the shorter stamens subglobose and incurved. Species in this group, which is diverse throughout the Himalayan region and South

China as well as Myanmar, include *Strobilanthes arenicola*, *S. capitata*, *S. dimorphotricha*, *S. paniculiformis*, *S. shanensis* and *S. tanakae*.

Materials and Methods

In the first place, this paper is based on a survey of the relevant literature recording the presence of *Strobilanthes* in Myanmar since the beginning of the 19th century. The second main source of information has been the collections held in the herbaria at BM, CAL, E, K, MBK, NY and TI (acronyms follow Thiers 2021, continuously updated). In recent years fieldwork, principally by Jin Murata, Nobuyuki Tanaka, Kazumi Fujikawa and Kate Armstrong and colleagues, has increased the number of *Strobilanthes* records considerably. An earlier paper (Wood & Scotland 2009) described two new species, *S. muratae* and *S. tanakae*, based on recent fieldwork and a further species is described here. The description is based on the specimen and photographs taken by one of us (KA) and details were observed using a binocular microscope. Pollen was extracted from a single unopened bud by TW and acetolysed following Erdtman (1960). Acetolysed pollen was then mounted on 15 mm stubs and coated with a single layer of gold/palladium in a Polaron SC7640 sputter coater, before being imaged with a JEOL JSM-7010F Plus field emission SEM operating at either 5 or 15kV.

New species from Myanmar

***Strobilanthes hians* J.R.I.Wood & K.Armstr., sp. nov.**
Type: Myanmar. Sagaing Division, Hkamti Distr., [Naga Region], c. 0.8 miles N of Layshi township, c. 0.75 miles downhill towards Tinglay Weh, 25°27'28.2"N 94°57'27.1"E, 1275 m, along trail in disturbed secondary woodland, 25 Nov. 2017, *Kate Armstrong, J. Richard Abbott, Thet Yu Nwe, Ye Yint Tun, Phoe La Pyae, Daniel Aung & Kaw Ree Ke* 3262 (holotype NY 02655845, isotype RAF).

<http://www.ipni.org/urn:lsid:ipni.org:names:77297516-1>

Erect perennial *herb* to 1 m, stems glabrous. *Leaves* slightly to very unequal, petiolate, 10 – 18 × 4 – 7.2 cm, narrowly ovate-elliptic, apex long-acuminate, base attenuate; margin obscurely serrate, veins c. 8 pairs, both surfaces nearly glabrous except for minute pubescence along main veins, adaxially dark green with scattered small cystoliths, abaxially paler (Fig. 1A); petioles 1 – 2.2 cm. *Inflorescence* terminal and from uppermost leaf axils, consisting of branched racemes with flowers arranged in opposite pairs, each pair 1 – 1.8 cm distant; branches up to 11.8 cm long, glabrous; bracts at inflorescence branching points subsessile, ovate, resembling small leaves, 0.5 – 5.5 × 0.3 – 3.8 cm, diminishing in size upwards; floral bracts linear-



Fig. 1. *Strobilanthes hians*. A abaxial leaf surface and stem; B flower. PHOTOS: K. ARMSTRONG.

oblanceolate, obtuse, c. 5×0.5 mm, bracteoles $2 - 5 \times 0.5$ mm, linear-oblong, obtuse, green, glabrous; *calyx* subequally divided to base, glabrous, lobes $8 - 9 \times 1$ mm, linear-oblong, acute, pale green, sometimes recurved at tip; *corolla* in bud pear-shaped, tomentellous, nearly straight, in flower subcampanulate, c. 20 mm long and wide at mouth (Fig. 1B), white, minutely tomentellous, basal cylindrical tube c. 6×3 mm, then bent c. 90° and abruptly widened asymmetrically, *stamens* 4, didynamous, white, filaments white, minutely pubescent, anthers 2.5×0.5 mm, erect, exserted, *pollen* 3-colporate, intactate, 50×40 μm , broadly ellipsoid, echinulate, the echinulae rounded, somewhat variable in size (Fig. 2A); *ovary* c. 2.5×0.75 mm, glabrous; *style* white, glabrous, *stigma* entire. *Capsule* and *seeds* not seen. Fig. 3.

RECOGNITION. The gaping subcampanulate corolla with four exserted stamens immediately stands out as it is a relatively unusual character found in very few other species of *Strobilanthes*. This species appears to be closest to *S. rostrata* Y.F.Deng & J.R.I.Wood from

Yunnan in China in its slightly unequal, glabrous or near glabrous leaves, terminal inflorescence with branched leafless spikes and \pm linear bracts and bracteoles but differs in the glabrous calyx, bracts and bracteoles (not thinly glandular-pilose), and the white tomentellous corolla (not blue, not glabrous). It might also be compared with *S. helicta* T.Anderson but the inflorescence of *S. helicta* is clearly axillary and the corolla is glabrous and strongly ventricose. The pollen is of an unusual type superficially similar to that of *S. japonica* (Thunb.) Miq., *S. oligantha* Miq. and its allies (Deng *et al.* 2006: 372) but clearly ellipsoid in shape and with tectum apparently absent.

DISTRIBUTION & HABITAT. *Strobilanthes hians* is only known from the type collection made in a patch of remnant forest at 1,275 m near Layshi, a large town in the Naga Hills (Map 1). The area is classified as belonging to the "Sagaing warm temperate rainforest" ecosystem (Murray *et al.* 2020a, b), a type of closed-canopy, humid, mostly evergreen forest occurring at intermediate elevations along the north-western bor-

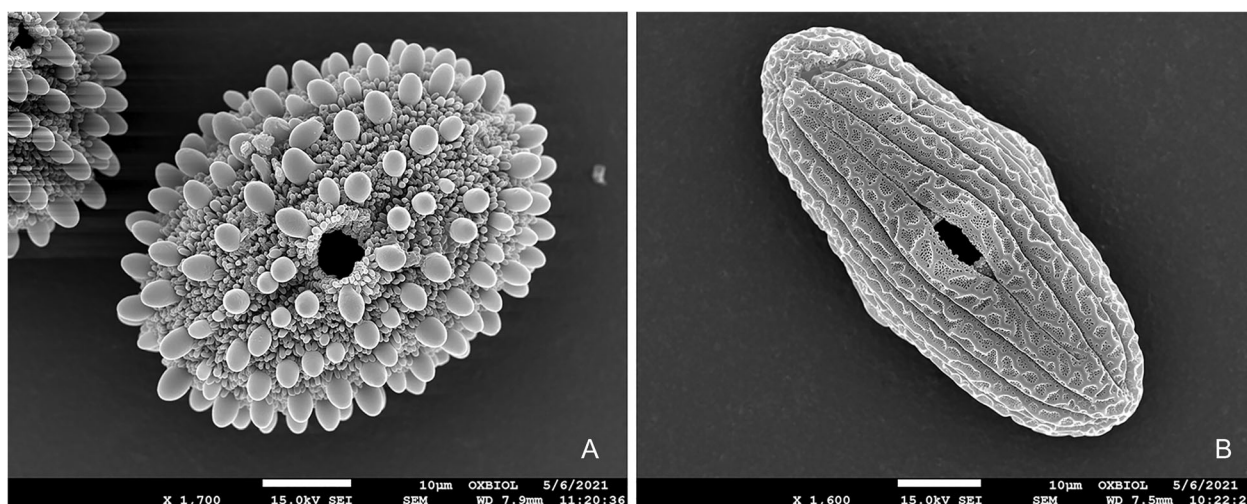


Fig. 2. S.E.M. pollen images A *Strobilanthes hians* from Armstrong *et al.* 3262; B *S. maxwellii* from S. Tagane *et al.* MY4337.

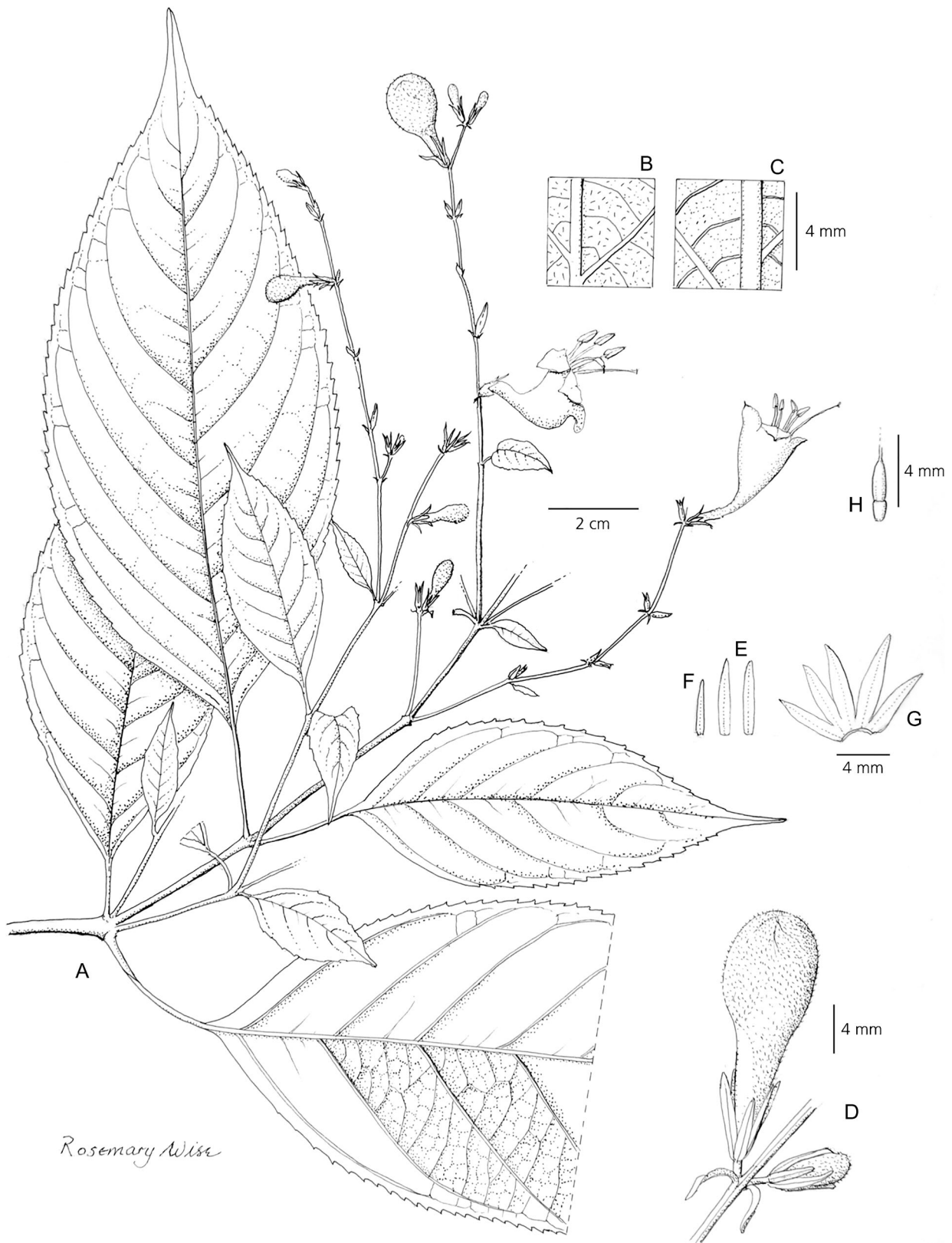
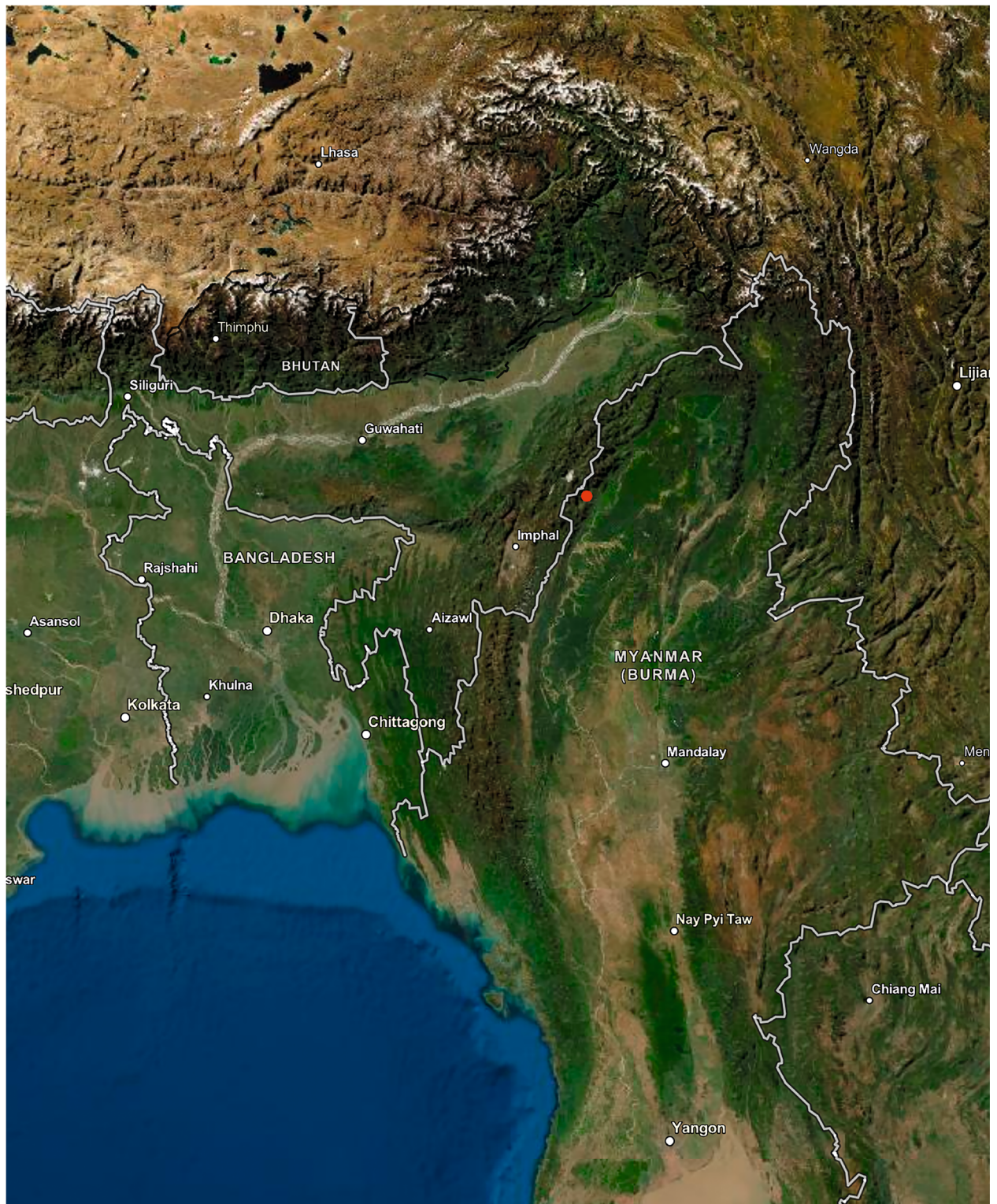


Fig. 3. *Strobilanthes hians*. A habit with detail of abaxial leaf surface; B adaxial leaf surface; C abaxial leaf surface; D flower pair showing bracts bracteole and calyx (side view); E bracts; F bracteole; G calyx opened out; H ovary. From Armstrong *et al.* 3262. DRAWN BY ROSEMARY WISE.



Map 1. Myanmar and neighbouring countries showing location of *Strobilanthes hians* (red dot).

der of Myanmar. Pockets of intact forest are interspersed with secondary vegetation and are more common on steep mountain slopes and in the vicinity of sheer rock faces.

CONSERVATION STATUS. This species is only known from a single collection. All evidence suggests it is very restricted in its distribution. The only known locality is a small patch of forest near Layshi, a town in

the Naga Hills. The surrounding areas are disturbed by periodic slash and burn for agriculture. The site is highly vulnerable to encroachment in the near future. Therefore, we consider a placement in the Vulnerable category under VU D2 (IUCN 2017) to be appropriate.

PHENOLOGY. Found in flower in November.

ETYMOLOGY. The specific epithet is in reference to the gaping shape of the open corolla.

List of *Strobilanthes* species recorded from Myanmar

The list is arranged alphabetically under accepted name. Collections are cited by Region/State. While all types have been cited (if from Myanmar), only selected specimens are cited where several collections are known from the same or nearby localities. An asterisk* indicates type number of accepted species. Notes have been added on points of taxonomic or distributional interest with references to significant other publications. Full synonymy is not provided for widespread species such as *Strobilanthes echinata*, but basionyms and all names used in publications related to the Myanmar flora are provided.

We have cited herbaria where we know or are confident there are duplicates of each collection but collections may not always have been distributed as expected and more may be present in CAL and RAF than we know of.

The localities where some old collections were made are extremely imprecise. Pegu (Bago), Mergui (Myeik) and Tenasserim (Tanintharyi) may imply little more than the base used by the collector.

Strobilanthes abbreviata *Y.F.Deng & J.R.I.Wood* (Deng *et al.* 2006: 377).

DISTRIBUTION. Myanmar: Mandalay (Maymyo, Kundaing, *Maung Po Khant* 16376 [K]). India (Mizoram); China; Thailand; Cambodia.

Strobilanthes affinis (*Griff.*) *Terao ex J.R.I.Wood & J.R.Benn.* (Wood *et al.* 2003: 134).

Adenosma affinis Griff. (Griffith 1854: 133).

Tarphochlamys affinis (Griff.) Bremek. (Bremekamp 1944: 156).

Strobilanthesacrocephala T.Anderson (Anderson 1867: 473).

DISTRIBUTION. Myanmar: Chin State (Natma Taung, *Nagamasu et al.* 035504 [FHO, MBK, RAF], Kanpetlet, *Ling Shein Man* 087722 [FHO, MBK, RAF]); Kachin State (Bhamo, *Lace* s.n. [E]); Mandalay Region (Maymo, *Lace* 4961 [E, K]); Shan State (Pwela, *Collett* 924 [K]). India (North East); China; Vietnam.

Strobilanthes aprica (*Hance*) *T.Anderson ex Benth.* (Bentham 1861: 262).

Gutzlaffia aprica Hance (1849: 142).

DISTRIBUTION. Myanmar: Mandalay Region (Maymyo, *Rogers* 884 [E], *Lace* 6299 [E, K]); Shan State (Taunggyi, *Vogt* BU-514 [K], Inlay Lake, Nyaung Shwe, *Tanaka et al.* 080710 [FHO, MBK, TI]). Thailand (N); Laos; China.

Strobilanthes arenicola *W.W.Sm.* (Smith 1918: 190).

DISTRIBUTION. Endemic to Myanmar: Kachin State (*Kingdon Ward* 0018 [NY], Malikha R., *Kingdon Ward* 2000 [E], N of Myitkyina on road to Kanpti Long [Putao] via Mali Hka branch, *Toppin* 4108 [E, K]); Sagaing Region (Tamu, *Kingdon Ward* 0018 [E, NY]).

Strobilanthes asymmetrica *J.R.I.Wood & J.R.Benn.* (Wood *et al.* 2003: 161).

DISTRIBUTION. Myanmar: Chin State (Kanpetlet, Natma Taung, *Fujikawa et al.* 095378 [FHO, MBK, RAF]). India (Manipur, Mizoram).

Strobilanthes atropurpurea *Nees* (1832: 108).

Strobilanthes wallichii Nees (1832: 87).

Ruellia alata Wall. (Wallich 1830: 26), non *Strobilanthes alata* Blume

Pteracanthus alatus (Wall.) Bremek. (Bremekamp 1944: 199).

DISTRIBUTION. Myanmar: Chin State (Natma Taung, *Law Shein* 091623 [FHO, MBK, RAF], Mount Victoria, *Cooper* 5930A [E]); Kachin State (Chimili, *Farrer* 1247 [E], Hpawte, Myitkyina, *Naw Mu Pa* 17427 [K]). Pakistan; India (Himalaya and North East); Nepal; Bhutan; China; Vietnam; ?Indonesia (Sumatra).

NOTE. *Strobilanthes atropurpurea* is widely distributed along the Himalayan chain and across southern China and is correspondingly variable. *K. Fujikawa et al.* 053144 (FHO, MBK, RAF) from between Mindat and Hilong in the Natma Taung National Park represents a form with large strongly ventricose corollas and a tendency to develop a zigzag terminal rachis. Such forms occur in the western Himalaya but were hitherto unknown east of Nepal. *Fujikawa et al.* 051349 (FHO, MBK, RAF, TI) from near the summit of Mount Victoria at 2925 m, appears to be a depauperate form of *S. atropurpurea* but further collections are needed to confirm this. The following is a named variety of this species:

Strobilanthes atropurpurea* var. *stenophylla (C.B.Clarke) Y.F.Deng & J.R.I.Wood (Deng *et al.* 2010: 482).

Strobilanthes stenophylla C.B.Clarke (1884: 472).

DISTRIBUTION. Myanmar: Chin State (Mount Victoria, Tanaka *et al.* 023333 [FHO, MBK, RAF]). India (Meghalaya); China.

***Strobilanthes auriculata* Nees** (1832: 86, t. 295).

Perilepta auriculata (Nees) Bremek. (Bremekamp 1944: 194).

Strobilanthes amplexens Nees (1832: 86).

Strobilanthes plumosa Nees (1832: 86).

DISTRIBUTION. Myanmar: Kachin State (Myitkyina, Lace 5550 [E, K]); Kayin State (Thakon, Lace 4573 [E], Mt. Kama Phaw, Hlaingbwe, Fujikawa *et al.* 107046 [FHO, MBK, RAF]); Mandalay Region (Meiktila, Smith 13740 [K], Mogok, Lace 5066 [E], Popa Hill, Collett 32 [K], Maymyo, Meebold 7989 [E]), Baw Reserve Boundary, Pyin Oo Lwin, Tanaka *et al.* 021878 [FHO, MBK, RAF]); Naypyitaw Union Territory (Pyinmana Reserve, Rogers 7 [E], Pedonmyaung, Rogers 307 [FHO]); Sagaing Region (Alaungdaw Kathapa National Park, Murata *et al.* 032319 [FHO, MBK, RAF]); Shan State (Thein Taung, Tanaka *et al.* 021730 [FHO, MBK, RAF], Salween Valley, Micholitz [K], Kalaw, McKee 5955 [K], Paung Taw Village, Pindaya, Srisanga *et al.* MI-163 [MBK, QBG]). Pakistan; Nepal; India; Bangladesh; China; Thailand; Malaysia; Cambodia; Laos; Vietnam.

NOTE. For information on the characteristics, wider synonymy, variation and distribution of this species, see Wood & Scotland (2003a: 89 – 94). The following is a named variety of horticultural significance:

Strobilanthes auriculata* var. *dyeriana (Mast.) J.R.I.Wood (Wood & Scotland 2003a: 92).

Strobilanthes dyeriana Mast. (Masters 1893: 442).

Perilepta dyeriana (Mast.) Bremek. (Bremekamp 1944: 195).

Strobilanthes maclellandii C.B.Clarke (1884: 453).

DISTRIBUTION. Myanmar: Bago Region (South Zamayi Reserve, Lace 2857 [E, K], 2858 [E]); Yangon (*Maclelland* s.n. [K]). Thailand.

NOTE. Native to Myanmar but widely cultivated in tropical countries and conservatories in temperate regions for its distinctive white- or rosy-lilac-blotched leaves. It is often sold under the name “Persian Shield”.

Strobilanthes brandisii T.Anderson (1867: 475).

DISTRIBUTION. Myanmar: Kayin State (Dawna Range, Lace 4614 [E, K], Karen, Brandis s.n. [K]); Bago Region (“Toungoo mountain” [Taungoo], Brandis s.n.* [CAL000019781]). Thailand; Laos.

Strobilanthes brunelloides (Lam.) J.R.I.Wood (2014: 389).

Justicia brunelloides Lam. (Lamarck 1791: 40 – 41).

Ruellia griffithiana Nees (1847: 149).

Hemigraphis griffithiana (Nees) T.Anderson (1867: 463).

Ruellia confinis Nees (1847: 48).

Hemigraphis confinis (Nees) T.Anderson (1867: 463).

DISTRIBUTION. Myanmar: Tanintharyi Region (“Mergui,” Griffith K.D. 6091, 6187 [K]). Malaysia; Indonesia.

Strobilanthes candida J.R.I.Wood (1994: 236).

DISTRIBUTION. Endemic to Myanmar: Kachin State (*Kingdon Ward* 7352* [K], 13063 [BM], Shinbuiyang, J. Murata *et al.* 041407 [FHO, MBK, RAF], Shinbweyan-Pansaung, J. Murata *et al.* 041407 [MBK, RAF, TI]).

Strobilanthes capitata (Nees) T.Anderson (1867: 475).

Goldfussia capitata Nees (1832: 88).

DISTRIBUTION. Myanmar: Kachin State (Bhamo, Lace 6064 [E, K]); Chin State (Kanpetlet, Fujikawa *et al.* 084002 [FHO, MBK, RAF]); Mandalay Region (Pyin Oo Lwin, Murata *et al.* 365 [FHO, MBK, RAF], Maymyo, Lace 4362 [E, K]); Sagaing Region (Kathapa N.P., Tanaka 030043 [FHO, MBK], Katha, Lace 4438 [E, K], Shwebo, Nankyitha Reserve, Rogers 691[E]); Shan State (Kengtung, MacGregor 863 [E], Gokteik, Lace 4980 [K], Kalaw, Tanaka *et al.* 080212 [FHO, MBK, RAF], Blue Water Lake, Srisanga *et al.* 103934 [E, L, MBK, RAF]). China (Tibet); Nepal; Bhutan; India (North East); Thailand.

NOTE. This species may prove to be conspecific with *Strobilanthes speciosa* Blume.

Strobilanthes chrysodelta J.R.I.Wood (Wood & Scotland 2009: 41).

DISTRIBUTION. Myanmar: Shan State (Mong Kai, *Kingdon Ward* 8859* [F, GH, NY]). China (Yunnan).

Strobilanthes congesta Terao (1982: 153).

DISTRIBUTION. Myanmar: Kachin State (Hpawte Valley, Farrer 1263* [E], Chawngmai, Kingdon Ward 3481 [E]). China (Yunnan).

Strobilanthes connata Collett & Hemsl. (Collett & Hemsley 1890: 104).

DISTRIBUTION. Endemic to Myanmar: Shan State (Eastern Karen, Collett 980* [K, CAL]). Only known from type.

Strobilanthes consors C.B. Clarke (1907: 66).

DISTRIBUTION. Myanmar: Shan State (Hills W of Keng Tung, Kingdon Ward 8773 [NY]). Thailand.

Strobilanthes crataegifolia T. Anderson (1867: 477).

DISTRIBUTION. Endemic to Myanmar: Mon State (“Moulmein” [Mawlamyine] (Parish 413* [CAL, K], Griffith 277 [CGE, K]).

NOTE. This species may be extinct, as it has not been found for over 150 years.

Strobilanthes crossandra (Steud.) J.R.I. Wood (2014: 391).

Ruellia crossandra Steud. (Steudel 1841: 481, nom. nov. Replaced name: *Ruellia diffusa* Nees (1832: 83), non *Ruellia diffusa* Vell. 1825 [Vellozo 1829].

Hemigraphis crossandra (Steud.) Bremek. (Bremekamp 1944: 137).

Strobilanthes birmannica Kurz (1873: 92).

DISTRIBUTION. Myanmar: Bago Region (Pyay [Promé], Kurz 2125 [K], *ibid.*, Kurz in *Hance* 18669 [K]); Mandalay Region (Ava [Inn Wa], fide Clarke [1884: 423]).

NOTE. Apparently replaces *Strobilanthes pavala* (Roxb.) J.R.I. Wood in Myanmar. We have seen no recent collections.

Strobilanthes cruciata (Bremek.) Terao (1980: 59).

Tetragoga cruciata Bremek. (Bremekamp 1944: 300).

Tetragoga nagaënsis Bremek. (Bremekamp 1944: 299).

DISTRIBUTION. Myanmar: Kachin State (Putao, Hkamti Plain, Kingdon Ward 9052 [BM], Tisang Valley, E of Mali Hka, Kingdon Ward 12873 [BM], Putao Distr., Naungmung Township, hill next to Naungmung village, Armstrong *et al.* 2788 [E, FHO, NY, RAF]); Sagaing Region (Naga district, Meebold 4891 [B]). India (North East); China; Thailand;

Vietnam; Indonesia (Sumatra).

Strobilanthes cusia (Nees) Kuntze (Kuntze 1891: 499). *Goldfussia cusia* Nees (1832: 88).

Baphiacanthus cusia (Nees) Bremek. (Bremekamp 1944: 190).

Strobilanthes flaccidifolia auct., *sensu* Clarke (1884) in *Flora of British India*.

DISTRIBUTION. Myanmar: Kachin State (Toppin 4115 [E, K], Kingdon Ward 9036 [BM, NY], Bhamo, Henderson 1113 [E], Sumprabum, Keenan *et al.* 3335 [E, K]); Tanintharyi Region (Mergui (Griffith K.D. 6106 [K]). Bhutan; India (North East); China; Bangladesh; Thailand; Vietnam; Laos. **NOTE.** Cultivated formerly as the source of ‘Assam Indigo’ and grown today in China as a medicinal plant; possibly native in Kachin State, the record from Mergui could well be of a cultivated plant. Of uncertain origin, possibly the eastern Himalayas.

Strobilanthes dalzielii (W.W.Sm.) Benoist (1935: 679).

Acanthopale dalzielii W.W.Sm. (Smith 1920: 193).

DISTRIBUTION. Myanmar: Kachin State (N of Myitkyina, Mali Valley, Kingdon Ward 5573 [E], Putao Distr., Maliraing area, buffer zone of Hkakaborazi National Park, Armstrong *et al.* 2275 [E, FHO, NY, RAF]); Sagaing Region (Hkamti Distr., Layshi, Armstrong *et al.* 3187 [E, FHO, NY, RAF]). Thailand; Laos; Vietnam; China.

Strobilanthes dasysperma Kurz (1873: 94).

DISTRIBUTION. Endemic to Myanmar: Chin State (Natma Taung, Prachaya Srisanga *et al.* 097659 [FHO, MBK, RAF], Kanpetlet, Dickason 8430 [E]); Bago Region (Kurz 2136* [CAL, K], Kanbalu Taung, Rogers s.n. [E]).

Strobilanthes dimorphotricha Hance (1883: 355) subsp. **dimorphotricha**

Strobilanthes geniculata C.B. Clarke (1884: 459).

DISTRIBUTION. Myanmar: Shan (Pindaya, Paung Taw village, Yumiko Baba & Win Win Nwe 101677 [FHO, MBK, RAF]). India (North East); China; Vietnam. This subspecies is common in southern China.

NOTE. Srisanga *et al.* MI-251 [MBK] from Pin Sein Pin village, Pindaya may also be this subspecies.

Strobilanthes dimorphotricha subsp. **rex** (C.B. Clarke) J.R.I. Wood (in Wood & Scotland 2006: 13).

Strobilanthes rex C.B.Clarke (1907: 68).

Strobilanthes pentstemonoides (Nees) T.Anderson var. *rex* (C.B.Clarke) Benoist (1935: 667).

Goldfussia rex (C.B.Clarke) Bremek. (Bremekamp 1944: 283).

DISTRIBUTION. Myanmar: Kachin State (Bhamo, *Forrest* 12145 [E, K]); Shan State (*Melville* 51 [BM], *MacGregor* 1191 [CAL, E]). Thailand; Laos; China.

NOTE. Subsp. *dimorphotricha* has very unequal, usually falcate leaves. It is common in southern China. In subsp. *rex*, the leaves are subequal and are not obviously falcate. It is the common subspecies in Thailand. Specimens intermediate between the subspecies sometimes occur.

Strobilanthes discolor (Nees) T.Anderson (1867: 477).

Goldfussia discolor Nees (1847: 172).

Difflugossa nagaensis Bremek. (Bremekamp 1944: 237).

Strobilanthes nagaensis (Bremek.) W.J.Kress & DeFilippis (in Kress *et al.* 2003: 483).

DISTRIBUTION. Myanmar: Chin State (Yeongpan, *Fujikawa et al.* 084033 [FHO, MBK], Matupi township, near border with Rakhaine, *Tanaka et al.* MY2777 [FHO, RAF, TNS]); Sagaing Region (Naga Distr., *Meebold* 7381 [B]). India (North East).

Strobilanthes echinata Nees (1832: 85).

Strobilanthes pectinata T.Anderson (1867: 474), *nom. illeg., superfl.*

Strobilanthes calvata J.R.I.Wood (1994: 233).

DISTRIBUTION. Myanmar: Kachin State (Laktang, *Kingdon Ward* 3458 [E], Valley of Nam Tisang, *Kingdon Ward* 7374 [K], Mahtum, *Kaulback* 332 [BM]). India (North East); Bhutan; China; Thailand; Vietnam; Cambodia; Laos; Malaysia; Indonesia.

Strobilanthes erecta C.B.Clarke (1907: 67).

Strobilanthes suborbicularis J.B.Imlay (1939: 118).

Dossifluga suborbicularis (J.B.Imlay) Bremek. (Bremekamp 1944: 235).

DISTRIBUTION. Myanmar: Shan State (Loi Mwe, *MacGregor* 9 [CAL, E]). China; Laos; Thailand (Chiang Mai, Loei); Vietnam (Son *et al.* 2018).

Strobilanthes esquirolii H.Lév. (Léveillé 1913: 18).

Strobilanthes leucocephala Craib (1914: 130).

DISTRIBUTION. Myanmar: Mandalay Region (Pay Chin Maung waterfall, *Tanaka et al.* 028938 [FHO, MBK,

RAF]). China; Thailand.

Strobilanthes euantha J.R.I.Wood (in Wood & Scotland 2003b: 697).

DISTRIBUTION. Myanmar: Kachin State (“NE Upper Burma,” *Forrest* 24901 [E, K], Laukuang, *Kingdon Ward* 24 [A, E, NY], North Triangle, Hkinlum, *Kingdon Ward* 21279 [BM], Putao Distr., between Wa Sa Dam and Zi Ya Dam, *Armstrong* 1845 [E, FHO, NY, RAF]). China (Yunnan).

NOTE. Easily confused with *Strobilanthes hamiltoniana* but occurs at higher altitudes above 1350 m and distinguished by the shorter arcuate corolla and the hairy axes of the inflorescence.

Strobilanthes extensa (Nees) Nees (1847: 191).

Goldfussia extensa Nees (1832: 88).

Pteracanthus extensus (Nees) Bremek. (Bremekamp 1944: 199).

Strobilanthes claviculata W.W.Sm. (Smith 1918: 191).

DISTRIBUTION. Myanmar: Chin State (Mount Victoria, *Murata et al.* 024930 [FHO, MBK], *ibid.*, *Fujikawa et al.* 094559 [FHO, MBK]). India (North East); Bhutan; China.

Strobilanthes falconeri T.Anderson (1867: 484).

DISTRIBUTION. Myanmar: Mon State (“Moulmein” [Mawlamyine], *Falconer* 423* [CAL, K]), Kayin State (Karen, *Kurz* 2128 [K]). Thailand.

Strobilanthes farinosa C.B.Clarke (1884: 470).

DISTRIBUTION. Endemic to Myanmar: Mon State (“Moulmein” [Mawlamyine], *T. Lobb* s.n.* [K]). Only known from the type.

Strobilanthes fimbriata Nees (1832: 85).

Strobilanthes fimbriata var. *majuscula* W.W.Sm. (Smith 1918: 192).

Endopogon macrostegius Nees (1847: 104).

Strobilanthes macrostegia (Nees) C.B.Clarke (1884: 456).

Strobilanthes neesii Kurz (1873: 93).

DISTRIBUTION. Myanmar: Kachin State (*Toppin* 4244 [E], Sumprabum, *Keenan* 3927 [E]); Kayin State (“Martaban”, *Kurz* 835 [CAL]). India (Meghalaya); Bangladesh (Chittagong).

NOTE. The presence of this species in Kayin State seems improbable but the specimen at CAL appears correctly named and Kurz would not have had access to specimens

from northern Myanmar in 1873. Kurz (1877) records *Strobilanthes fimbriata* from “Pegu Yomah” and “Tenasserim” but whether these are correctly identified is uncertain.

Strobilanthes flava Kurz (1870: 78).

Ruellia flava Roxb. (Roxburgh 1832: 43).

Hemigraphis flava (Kurz) C.B. Clarke (1884: 426).

Sericocalyx flavus (Kurz) Bremek. (Bremekamp 1944: 163).

DISTRIBUTION. Myanmar: Bago Region (Kurz 2130* [K], Tharrawaddy Distr., Kangyi Reserve Lace 5708 [E, K], Bacobin, Lace 2749 [K]); Chin State (Natma Taung, Murata et al. 022093 [FHO, MBK]); Magway Region (Saw township, Srisanga et al. 097228 [E, FHO, MBK]); Mandalay Region (Mt Popa, Than Than Aye & Khin Myo Htwe 021406 [FHO, MBK]); Mon State (“Moulmein” [Mawlamyine], Lobb s.n. [K], Griffith 278 [K]); Naypyitaw Union Territory (near Pinyinmana 17224 Dickason 7710 [E]); Sagaing Region (Tan Reserve, Chindwin, Fields Clarke 7 [E]); Shan State (Hill region, Collett 36 [K]); Yangon Region (McClelland s.n. [K]). India (North East).

NOTE. *Strobilanthes flava* is not easily separated from *S. scabra* and *S. phyllostachya*. It is reported to have an 8-seeded capsule but as almost all specimens lack fruit and the character is, in any case, variable in this group, it is of limited utility. The epitype has an obscurely glandular inflorescence and most species have a broad, branched inflorescence but the status of the three species in this group requires revision. The following collections might be regarded as intermediate with *S. phyllostachya*:

Chin State (Nagamasu Hidetoshi et al. 035464 [FHO, MBK]); Kayin State (Mt Xwe Ka Bin, Hpa-an, Fujikawa et al. 107113 [FHO, MBK, RAF], Kyone Pako Com, Forest, Hlaingbwe, Fujikawa et al. 107003 [FHO, MBK, RAF]); Naypyitaw Union Territory (Pinyinmana, Unknown collector no. 17224 [E-00133373]).

Strobilanthes fluviatilis (C.B. Clarke ex W.W.Sm.) Moylan & Y.F. Deng (Deng et al. 2006: 389).

Hemigraphis fluviatilis C.B. Clarke ex W.W.Sm. (Smith 1918: 182).

Sericocalyx fluviatilis (C.B. Clarke ex W.W.Sm.) Bremek. (Bremekamp 1944: 163).

DISTRIBUTION. Myanmar: Shan State (Mong Nai, Robertson 242 [K]). China; Thailand.

Strobilanthes frondosa J.R.I. Wood (1994: 239).

DISTRIBUTION. Myanmar: Chin State (Mt Victoria, Cooper 5943A [E], Natma Taung, Murata et al. 025144

[FHO, MBK], ibid., Prachaya Srisanga et al. 097545 [E, FHO, MBK]). India; Bhutan.

Strobilanthes glaucescens Nees (1832: 85).

Hemigraphis glaucescens (Nees) C.B. Clarke (1884: 425).

Sericocalyx glaucescens (Nees) Bremek. (Bremekamp 1944: 163).

DISTRIBUTION. Myanmar: Bago Region (Pyay [Prome], Wallich 7155 [K], Oleswe Reserve Lace 2721 [K], border with Rakhine State, Sugawara et al. 036412, [FHO, MBK]); Mandalay Region (Yamethin, Lace 4535 [E, K], Popa Mountain National Park, Ye Nge camp, Khaing Yin Myint 14 [NY, RAF]); Mon State (“Moulmein” [Mawlamyine], Griffith s.n. [K]); Sagaing Region (Alaungdaw Kathapa N.P., Murata et al. 032336 [FHO, MBK, TI]); Shan State (Mawmai, Robertson 210 [K]); Tanintharyi Region (“Tennaserim,” [Tanintharyi] Beddome 98 [K]). Thailand; Laos; Vietnam.

Strobilanthes gregalis Collett & Hemsl. (Collett & Hemsley 1890: 104).

Gutzlaffia fruticosa Chatterjee (1951: 18).

Strobilanthes fruticosa (Chatterjee) W.J. Kress & DeFilipps (Kress et al. 2003: 483).

DISTRIBUTION. Endemic to Myanmar: Shan State (Kouli distr., Collett 944* [CAL, K], Taunggui, Hole s.n. [K]).

Strobilanthes hamiltoniana (Steud.) Bosser & Heine (1988: 148).

Ruellia hamiltoniana Steud. (Steudel 1841: 481).

Goldfussia colorata Nees (1832: 89).

Strobilanthes colorata auct. sensu T. Anderson (1867) & C.B. Clarke (1884), non *S. colorata* Nees (1837: 312).

Difflugossa colorata (Nees) Bremek. (Bremekamp 1944: 237). *Goldfussia crinita* Nees (1847: 176).

Strobilanthes crinita (Nees) T. Anderson (1867: 481).

Strobilanthes colorata var. *crinita* (Nees) C.B. Clarke (1884: 473).

Difflugossa crinita (Nees) Bremek. (Bremekamp 1944: 246).

DISTRIBUTION. Myanmar: Kachin State (Shinbweyan, Murata et al. 040888 [FHO, MBK], Putao Distr., Naungmung Township, between Khe Dam rest house and Dabu Dam, Armstrong et al. 805 [E, FHO, NY, RAF], N of Myitkyina on road to Kanpti Long, Toppin 4001 [E], valley of the N' Mai Hka, Kingdon Ward 3727 [E]). Nepal; Bhutan; India (North East); China (Tibet). Also widely cultivated and sometimes naturalised in humid tropical climates, especially on islands, but not yet reported as cultivated in Myanmar.

Strobilanthes helferi *T.Anderson* (1867: 472).

DISTRIBUTION. Myanmar: Tanintharyi Region (“Tenasserim” [Tanintharyi], *Helper* 495/K.D. 6117* [CAL, K]). Thailand.

Strobilanthes helicta *T.Anderson* (1867: 479).

Asystasia cabycina Nees (1832: 90).

Pteracanthus cabycinus (Nees) Bremek. (Bremekamp 1944: 199).

DISTRIBUTION. Myanmar: Kachin State (*Kingdon Ward* 21109 [BM], Chimli N'Maikha-Salween divide, *Forrest* 24866 [E]). Nepal; Bhutan; India (North East); China (Tibet, Yunnan); Vietnam.

Strobilanthes heliophila *J.R.I.Wood* (in Wood & Scotland 2003a: 98).

DISTRIBUTION. Myanmar: Tanintharyi Region (Hills W of Paungdaw, *Keenan et al.* 1681* [E, K, NY], *ibid.*, *Keenan et al.* 1688 [E]). Thailand.

Strobilanthes hians *J.R.I.Wood & K.Armstr.* (see above).

DISTRIBUTION. Endemic to Myanmar. Sagaing Division (Hkamti Distr., [Naga Region], c. 0.8 miles N of Layshi township, *Armstrong et al.* 3262 [NY, RAF]).

Strobilanthes hossei *C.B.Clarke* (1907: 67).

DISTRIBUTION. Myanmar: Sagaing Region (Katha, *Lace* 5114 [E]); Tanintharyi Region (Dawei [Tavoy], *Keenan et al.* 1625 [E]). Indonesia; Malaysia; Thailand; Vietnam (Oahn *et al.* 2017); China.

Strobilanthes imbricata *Nees* (1832: 86).

Strobilanthes pterocaulis *Kurz* (1873: 93).

DISTRIBUTION. Myanmar: Bago Region (*Kurz* 788 [CAL, K], *McClelland* s.n. [K]); Chin State (Natma Taung, *Murata et al.* 025441 [MBK]); Mandalay Region (Taong Dong, *Wallich* 7156* [K]; Pyin Oo Lwin, *Murata et al.* 321 [FHO, MBK], Maymyo, *Lace* 4974 [E, K]); Shan State (Kunchaung Forest, *Lace* 5063 [E, K], Pindet Pap, *Collett* 116 [K], Taunggyi, *McKee* 5873 [K], *ibid.*, *Baba et al.* 103428 [FHO, MBK, RAF]); Tanintharyi Region (“Tenasserim” [Tanintharyi], *Helper* s.n. [K]); Yangon Region (*McClelland* s.n. [K]). India (Manipur); Thailand.

Strobilanthes inflata *T.Anderson* (1867: 476), var. ***inflata***

Pteracanthus inflata (T.Anderson) (Bremek). (Bremekamp 1944: 199).

Strobilanthes wardii *W.W.Sm.* (Smith 1918: 201).

DISTRIBUTION. Myanmar: Kachin State (Naw Chaung Valley, *Kingdon Ward* 1912 [E], Chimili, *Forrest* 25044 [E]). India (North East); China; Indonesia (Sumatra).

NOTE. See Deng *et al.* 2006: 384 – 388 for a discussion of the variation and unusual distribution of this species including the recognition of the following varieties:

Strobilanthes inflata var. ***aenobarba*** (*W.W.Sm.*)

J.R.I.Wood & Y.F.Deng (Deng *et al.* 2006: 386).

Strobilanthes aenobarba *W.W.Sm.* (Smith 1920: 185).

DISTRIBUTION. Myanmar: Kachin State (Myitkyina, camp above Hpawte, *Naw Mu Pa* 17445 [K]). China; Indonesia (Sumatra).

Strobilanthes inflata var. ***gongshanensis*** (*H.P.Tsui*)

J.R.I.Wood & Y.F.Deng (Deng *et al.* 2006: 387).

Pteracanthus gongshanensis *H.P.Tsui* (1990: 277).

Strobilanthes unilateralis *J.R.I.Wood* (1994: 264).

DISTRIBUTION. Myanmar: Kachin State (Hkinlum, *Kingdon Ward* 2180 [BM], Ahkail, *Kingdon Ward* 21576 [BM]). China; Indonesia (Sumatra).

Strobilanthes kachinensis *J.R.I.Wood & J.R.Benn.* (in Wood *et al.* 2003: 170).

DISTRIBUTION. Endemic to Myanmar: Kachin State (*Toppin* 4040* [CAL, E], Myitkyina, Mali Hka Valley, *Kingdon Ward* 20328 [BM], Sausi Gorge to Sadon, *Forrest* 9097 [E, K], Putao Distr., Maliraing area, *Armstrong et al.* 2224 [E, FHO, NY, RAF]).

Strobilanthes karenium *Kurz* (1873: 94).

Strobilanthes lilacina *C.B.Clarke* (1907: 67).

DISTRIBUTION. Myanmar: Kayin State (“Martaban”, *S. Kurz* s.n*. [CAL]). Thailand.

Strobilanthes kingdonii *J.R.I.Wood* (1994: 244).

DISTRIBUTION. Myanmar: Sagaing Region (“Upper Chindwin,” *Kingdon Ward* 11233 [BM]). India (Arunachal Pradesh); China (Tibet, Yunnan).

Strobilanthes lachenensis C.B. Clarke (1884: 465).

DISTRIBUTION. Myanmar: Kachin State (Putao Distr., Hponganrazi Wildlife Sanctuary, Ye Khe Sap camp, 3061 m, *Armstrong et al.* 2041 [E, FHO, NY, RAF]). Nepal; Bhutan; India; China.

NOTE. This is included tentatively. The specimen is very atypical with a reduced subcapitate inflorescence but *Strobilanthes lachenensis* is notoriously variable and this specimen resembles *Wood* 7480 (E) collected in Bhutan at a similar altitude

Strobilanthes lamioides T. Anderson (1867: 485).

DISTRIBUTION. Endemic to Myanmar: Bago Region (Tajoo Mt, *Brandis* s.n.* [CAL]); Mandalay Region (Pwin Oo Lwin, *Murata et al.* 319 [FHO, MBK], *Murata et al.* 328 [FHO, MBK]).

Strobilanthes lanceifolia T. Anderson (1867: 480).

DISTRIBUTION. Myanmar: Mon State (“Moulmein” [Mawlamyine], *Parish* 402* [CAL, K]). Thailand.

Strobilanthes longipes C.B. Clarke (1884: 455).

Strobilanthes spathulata R. Parker (1931: 105).

DISTRIBUTION. Endemic to Myanmar: Kayin State (Mulayit, *Beddome* 218* [BM]); Tanintharyi Region (headwaters of Talaingya Chaung, Dawei [Tavoy], *Gage* 62 [?CAL, K], Myinmolekat, Mergui, *Parker* 3102 [K]).

Strobilanthes longispica (H.P. Tsui) J.R.I. Wood & Y.F. Deng (Deng *et al.* 2006: 383).

Adenacanthus longispicus H.P. Tsui (2002: 348).

Strobilanthes tripartita J.R.I. Wood (in Wood & Scotland 2003a: 108).

DISTRIBUTION. Myanmar: Kachin State (Adung valley, *Kingdon Ward* 9184 [BM, E]). China.

Strobilanthes maxwellii J.R.I. Wood (in Wood & Scotland 2003a: 103).

DISTRIBUTION. Myanmar: Tanintharyi (Tanintharyi Nature Reserve, Yaephyu township. *S. Tagane et al.* MY4337 [FHO, TNS]). Thailand.

NOTE. This is a very interesting but not entirely unexpected new country record. The Myanmar collection was made at 14°44'20"N 98°11'49"E, not far from the type locality in the Toong Yai Naresuan Wildlife Reserve in Thailand at approx. 15°02'N

98°59'E. The Myanmar collection is slightly anomalous because of the larger calyx lobes, 13 – 15 × 2 – 4 mm, which appear to be free at the base. We have taken the opportunity to illustrate the pollen of this species (Fig. 2B) as this has never been published before. It is similar to the ellipsoid, ribbed pollen common in *Strobilanthes* but more obviously narrowed at the two poles than in most species.

Strobilanthes microcarpa T. Anderson (1867: 482).

DISTRIBUTION. Myanmar: Tanintharyi Region (“Tenasserim” [Tanintharyi], *Helper* 29/K.D. 6113* [CAL, K]). Thailand.

Strobilanthes mogokensis Lacey (1915: 406).

DISTRIBUTION. Myanmar: Chin State (Kanpetlet, Natma Taung, *Ling Shein Ming* 096282 [FHO, MBK]); Mandalay Region (Mogok, *Lacey* 6018* [CAL, E]); Shan State (Loi Mwe, *MacGregor* 25 [?CAL, E]). China.

NOTE. The distinctive pollen is illustrated in Wood & Scotland 2003a: 124.

Strobilanthes moschifera Blume (1826: 800).

Adenostachya moschifera (Blume) Bremek. (Bremekamp 1944: 192).

Strobilanthes haplanthoides T. Anderson (1867: 471).

Strobilanthes debilis C.B. Clarke (1884: 467).

DISTRIBUTION. Myanmar: Bago Region (Bago (*Kurz* 2129 [K])); Mon State (“Moulmein” [Mawlamyine], *Falconer* 402 [CAL]). Thailand; Cambodia; Indonesia (Java).

Strobilanthes muratae J.R.I. Wood (in Wood & Scotland 2009: 39).

DISTRIBUTION. Endemic to Myanmar: Chin State (Natma Taung, *J. Murata et al.* 022905* [FHO, MBK], Mindat, *Kingdon Ward* 21749 [BM]).

Strobilanthes nobilis C.B. Clarke (1884: 471).

Pteracanthus nobilis (C.B. Clarke) Bremek. (Bremekamp 1944: 199).

Strobilanthes petelotii Benoist (1934: 731).

DISTRIBUTION. Myanmar: Kachin State (Chaung Hka, *Kingdon Ward* 3492 [E]); Mandalay Region (Yamethin, *Rogers* 586 [E]). India (Khasi Hills); China (Yunnan); Vietnam (North).

NOTE. This species is closely related to *Strobilanthes fimbriata* and may eventually be shown to be a form

with a paniculate inflorescence.

Strobilanthes obtusibracteata Terao (1982: 154).

DISTRIBUTION. Endemic to Myanmar: Shan State (Tigaung Taung, *Maung Gale* 14603 [E]). Only known from the type.

Strobilanthes oresbia W.W.Sm. (Smith 1918: 196).

DISTRIBUTION. Myanmar: Kachin State (Valley of Naw Chaung, *Kingdon Ward* 1911 [E], W flank of the N'Maikha-Salwin divide, *Forrest* 27249 [E], Moku-ji Pass, *Farrer* 1765 [E], Putao Distr., Hponganrazi Wildlife Sanctuary, Ye Khe Sap camp, *Armstrong et al.* 2036 [E, FHO, NY, RAF]). China (Tibet, Yunnan), India (Arunachal Pradesh).

Strobilanthes panichanga (Nees) T.Anderson (1867: 478).
Asystasia panichanga Nees (1832: 90).

DISTRIBUTION. Myanmar: Kachin State (Tainlon, Myitkyina Distr., *Lace* 6033 [E, K], Kachin Hills, *Kingdon Ward* 9034 [BM, NY], W of Shinbweyan, *Murata et al.* 040927 [FHO, MBK]; *ibid.*, 040738 [MBK, TI]). India (Meghalaya).

Strobilanthes paniculata (Nees) Miq. (Miquel 1858: 802).
Goldfussia paniculata Nees (1837: 313).
Microstrobilus paniculatus (Nees) Bremek. (Bremekamp 1944: 105).
Strobilanthes subcapitata C.B.Clarke (1884: 455).

DISTRIBUTION. Myanmar: Tanintharyi Region (“Tenasserim,” *Helper* K. D. 6111 [K]). Indonesia (Sumatra, Java); Thailand; Laos; Malaysia (Sarawak).

Strobilanthes paniculiformis J.R.I.Wood (in Wood & Scotland 2006: 10).

DISTRIBUTION. Myanmar: Kachin State (*Shaik Mokim* s.n. [P], Shinbweyan-Pansaung, *Murata et al.* 040906 [FHO, MBK, TI]); Sagaing Region (Hkamti Distr., Layshi, *Armstrong* 3270 [E, FHO, NY, RAF, UAM]). India (Manipur, Nagaland).

Strobilanthes pedunculosa Miq. (Miquel 1858: 803).

DISTRIBUTION. Myanmar: Tanintharyi Region (Dawei [Tavoy], *P. T. Russell* 2125 [CAL]). Indonesia (Java, Sumatra).

Strobilanthes phyllostachya Kurz (1871: 75).

Sericocalyx phyllostachyus (Kurz) Bremek. (Bremekamp 1944: 163).

DISTRIBUTION. Myanmar: Bago Region (“Beeliz”. *Brandis* [K], Yomah, *Kurz* 839 [CAL]); Mon State (“Moulmein” [Mawlamyine], *Parish* 91 [K]); Tanintharyi Region (“Tenasserim,” *Gallatly* 57 [K], *Beddome* 95 [K]); Yangon Region (Okkan Reserve, *Lace* 2898 [K]). Bangladesh (Chittagong).

NOTE. This species is very close to both *Strobilanthes scabra* and *S. flava* and is doubtfully distinct from both. It is distinguished by the large, very glandular bracts with recurved, ligulate tips. The seed differences mentioned by Clarke (1884: 446 – 7) cannot usually be observed as ripe capsules are almost unknown.

Strobilanthes quadrifaria (Nees) Y.F.Deng (Deng *et al.* 2007: 849).

Ruellia quadrifaria Nees (1832: 83).

Hemigraphis quadrifaria (Nees) T.Anderson (1867: 463).

DISTRIBUTION. Myanmar: Mandalay Region (“Taong Dong,” *Wallich* 7152* [K-W], Dat Taw, Gyoik waterfall, Pin Oo Lwin, *Tanaka et al.* 021975 [MBK, RAF], Anisakhan waterfall, *J. Murata et al.* 361A [MBK, TI]); Sagaing Region (Katha, *Lace* s.n. [E]); Shan State (Gokteik, *Lace* 4977 [E, K]); Tanintharyi Region (“Tenasserim,” *Beddome* 96, 97 [K]). Thailand; Laos.

Strobilanthes ramulosa J.R.I.Wood (in Wood & Scotland 2009: 43).

DISTRIBUTION. Endemic to Myanmar: Kachin State (sine data, *Kingdon Ward* 9031* [BM], *Toppin* 4307 [K], between Putao and Sumprabum, *Kingdon Ward* 10223 [BM], Mali Hka Valley, Myitkyina, *Kingdon Ward* 20335 [BM], Putao Distr., Naungmung Township, buffer zone of Hkakaborazi National Park, between Tup Kwan rest house and Gushin village *Armstrong et al.* 1048 [E, FHO, NY, RAF]).

NOTE. This species is very close to the poorly known *Strobilanthes rhombifolia* C.B.Clarke from Assam.

Strobilanthes repanda (Blume) J.R.Benn. (in Bennett & Scotland 2003: 56).

Lepidagathis repanda Blume (1826: 802).

Adenacanthus repandus (Blume) Bremek. (Bremekamp 1944: 196).

Adenacanthus acuminata Nees (1832: 74).

Strobilanthes acuminata (Nees) T.Anderson (1867: 473).

Strobilanthes subflaccida Kurz (1873: 94).
Strobilanthes rubroglandulosa Craib (1912: 268).

DISTRIBUTION. Myanmar: sine data, *Wallich* 7153 [K]; Mandalay Region (Pyin Oo Lwin, *Murata et al.* 327 [FHO, MBK], Kwar-twin-ye, Pyin Oo Lwin, *Tanaka et al.* 021844 [FHO, MBK]); Tanintharyi Region (“Mergui,” *Parker* 2594 [K]); “Tenasserim,” *Helfer* 304 [CAL, K]). Thailand; Cambodia; Indonesia.

Strobilanthes rosea Nees (1832: 84).
Gutzlaffia birmanica Bremek. (Bremekamp 1944: 155).
Strobilanthes birmanica (Bremek.) W.J.Kress & DeFilippis
 (Kress *et al.* 2003: 483).

DISTRIBUTION. Endemic to central Myanmar: Magway Region (Lezen to Thigon, Thayetungo, *Lace* 2702 [K], Minbu, *Parkinson* 15668 [E]); Mandalay Region (“Taong Dong,” *Wallich* 7154* [K], Yamethin, *Lace* 4564 [K], Meiktila, Taungyigon Reserve, *Maung Tha Myaing* 257 [E]); Sagaing Region (Kabwet, *Ehrenreich* s.n. [B], Monywa-Yagyi, *Than Than Aye & Khin Myo Htwe* 031690 [FHO, MBK]); Shan State (Paktu Mong, *Robertson* 52 [K], Nyaung Dauk Forest, Namcho, *Fujikawa et al.* 100303 [FHO, MBK, RAF]).

Strobilanthes rufescens (Roth) T.Anderson (1867: 472) subsp. **rufescens**
Ruellia rufescens Roth (1821: 304).
Buteraea rufescens (Roth) Nees (1832: 84).

DISTRIBUTION. Myanmar: Bago Region (*Brandis* 835 [K], Pegu Yoma, *Lace* 2874 [E, K]); Kachin State (Bhamo, *Cubitt* 212 [E]); Sagaing Region (Layshi, Naga Zone, *Kingdon Ward* 11232 [BM-013860126], Shwebo, Kanza Laga Reserve, *Rogers* 671 [E]); Shan State (Ruby Mines, Kunchaung Reserve, *Lace* 5062 [E, K]). India; Bangladesh.

NOTE. There is an extensive discussion of the characteristics and peculiarities of this species together with a map of its wider distribution in Wood & Scotland (2003a: 85 – 89). There is also a very interesting discussion of its mass flowering in an anonymous paper in *Indian Forester* 21: 47 – 48 (Anon. 1895). This species is remarkable for specimens, such as *Cubitt* 212, which have a distinctive reddish shaggy indumentum on its stems. This is a rare phenomenon in *Strobilanthes* but also a feature of some specimens of *S. tomentosa*, but in that species the indumentum is white. The species is quite variable and the following subspecies can usually be recognised by its oblong (vs elliptic to obovate) bracts:

Strobilanthes rufescens subsp. **parishii** (C.B.Clarke) J.R.I.Wood (in Wood & Scotland 2003a: 88).
Strobilanthes parishii C.B.Clarke (1884: 431).
Strobilanthes foetidissima Kurz (1873: 93).

DISTRIBUTION. Myanmar: “Loko Zodge” (unlocalised), *Kurz* 831 (CAL); Naypyitaw Union Territory (Pyinmana Distr., Ngalaik Reserve, *Lace* 4550 [E, K]); Tanintharyi Region (“Donat” (?Dawna) Range, *Parish* 412* [K], *Beddome* 93 [K], Yaphyu Township, Tanintharyi Nature Reserve, along ridge trail above Zin Ba stream *Tin Tin Mu et al.* 5 [E, FHO, NY, RAF, TNS], Dawei [Tavoy], *Parker* 2236 [K], Palantaung, *Po Chin* 6073 [CAS, E]); Yangon Region (Okkan Reserve, *Lace* 2897 [E, K]). Thailand.

NOTE. Some specimens are intermediate between the two subspecies, for example *Lace* 2897, and intermediates may prove to be common in some regions of Myanmar.

Strobilanthes serpens (Nees) J.R.I.Wood & Scotland (2021: 834)
Ruellia serpens Nees (1847: 145).
Hemigraphis serpens (Nees) Boerl. (Boerlage 1899: 658).

DISTRIBUTION. Myanmar: Tanintharyi Region (Dawei, *Keenan et al.* 1740 [E]). Thailand; Malaysia; Indonesia.

Strobilanthes serrata J.B.Imlay (1939: 117).
Gutzlaffia glandulosa *Lace* (1915: 406).

DISTRIBUTION. Myanmar: Mandalay Region (Mogok, *Lace* 6019 [CAL, E, K]). Thailand.

Strobilanthes setosa J.R.I.Wood (1994: 259).

DISTRIBUTION. Endemic to Myanmar: Kachin State (*Toppin* 3226 [E], hills E of Putao, *Kingdon Ward* 13572* [BM]).

Strobilanthes shanensis (Bremek.) J.R.I.Wood (1994: 214).
Difflugossa shanensis Bremek. (Bremekamp 1944: 238).

DISTRIBUTION. Endemic to Myanmar: Chin State (Natma Taung, *Murata* 025199 [FHO, MBK], *Law Shine* 096370 [FHO, MBK]); Sagaing Region (Mt Htin Shooe Taung, *Murata* 032388 [FHO, MBK]); Shan State (Gokteik, *Meebold* 8025 [B, K]*), Pindaya, *Tanaka et al.* 0800500 [FHO, TNS]).

NOTE. There are numerous records from Natma Taung suggesting it is locally common.

Strobilanthes simplex J.R.I.Wood (1994: 259).

DISTRIBUTION. Myanmar: Chin State (Natma Taung, *Fujikawa et al.* 094844 [FHO, MBK], *Fujikawa et al.* 094893 [FHO, MBK]). India (Manipur, Nagaland).

Strobilanthes straminea W.W.Sm. (Smith 1918: 200).

DISTRIBUTION. Endemic to Myanmar: Kachin State (south of Putao, *Kingdon Ward* 1986* [E], valley of the N'Mai Hka, *Kingdon Ward* 3726 [E], Nam Tamai, *Kingdon Ward* 9024 [BM, E], N of Myitkyina on road to Kanpti Long, *Toppin* 4207 [E], *Murata et al.* 040812 [FHO, MBK], Putao Distr., Maliraing area, buffer zone of Hkakaborazi National Park, *Armstrong et al.* 2275 [E, FHO, NY, RAF], between Tsuptaung and Kanang, *Keenan* 3014 [E]).

NOTE. This species is unusual in having only two fertile stamens. This might suggest hybrid origin but it is well-characterised.

Strobilanthes tanakae J.R.I.Wood (in Wood & Scotland 2009: 41).

DISTRIBUTION. Endemic to Myanmar: Chin State (Natma Taung, *Murata et al.* 025237* [FHO, K, TI], Mindat, Hilawng, *Gale* 9193 [E]).

Strobilanthes tomentosa (Nees) J.R.I.Wood (in Wood & Scotland 2009: 16).

Aechmanthera tomentosa Nees (1832: 87).

Aechmanthera gossypina Nees (1832: 87).

DISTRIBUTION. Myanmar: Chin State (Natma Taung, *Fujikawa et al.* 094908 [FHO, MBK]); Mandalay Region (Maymyo, *Lace* 5294 [E, K]); Sagaing Region (Hkamti Distr., Layshi, *Abbott & Phoe La Pyae* 27911 [E, FHO, NY, RAF]); Shan State (Lwe Than village, Taunggyi, *Yumiko Baba et al.* 103644 [MBK, RAF], Pyian Che Taung, Ywangan, *Srisanga et al.* 103886 [FHO, MBK, RAF]). Pakistan; India; Nepal; Bhutan; Bangladesh; China; Laos.

NOTE. Discussion about characteristics and variation together with a distribution map are in Wood & Scotland (2009: 16 – 21).

Strobilanthes tonkinensis Lindau (1897: 651).

DISTRIBUTION. Myanmar: Chin State (Natma Taung, Mindat, *Law Shein* 088320 [FHO, MBK]); Tanintharyi Region (*Parkinson s.n.* [CAL]). Thailand; Vietnam; China.

Strobilanthes torrentium Benoist (1922: 188).

Strobilanthes imlayae J.R.I.Wood (1994: 242).

DISTRIBUTION. Myanmar: Chin State (Mount Victoria, *Kingdon Ward* 22662 [BM], Natma Taung, *Tanaka et al.* 030861 [FHO, MBK], Matupi, *Mu Mu Aung et al.* 092542 [FHO, MBK], Mindat township, *Srisanga et al.* 097600 [E, FHO, MBK]); Kachin State (Chaungmaw, *Kingdon Ward* 3525 [E]). India; China.

Strobilanthes wardiana J.R.I.Wood (in Wood & Scotland 2009: 28).

DISTRIBUTION. Endemic to Myanmar: Kachin State (Nam Ti, *Kingdon Ward* 6632* [K]).

Introduced species of unconfirmed occurrence

Strobilanthes alternata (Burm.f.) Moylan ex J.R.I.Wood (2014: 389).

Hemigraphis alternata (Burm.f.) T.Anderson (1864: 114).

Ruellia alternata Burm.f. (Burman 1768: 165).

Hemigraphis colorata (Blume) Hallier f. (1897: 199).

Ruellia colorata Blume (1826: 795).

Listed by Kress *et al.* (2003) as cultivated but no specimen traced. Widely cultivated as red ivy or waffle plant and occasionally naturalised in tropical countries, especially on oceanic islands. It is presumably of South East Asian origin, but not known in the wild. It is usually (always?) sterile and is propagated vegetatively.

Strobilanthes reptans (G.Forst.) Moylan ex Y.F.Deng & J.R.I.Wood (Hu Chia-chi *et al.* 2011: 390).

Ruellia reptans G.Forst. (Forster 1786: 44).

Hemigraphis reptans (G.Forst.) T.Anderson ex Hemsl. (Hemsley 1885: 173).

Reported to be naturalised in Myanmar by Sarma *et al.* (2021) but with no source cited. It is widespread and common in the Asia-Pacific Region, especially on islands, from the Ryukyu Islands through the Philippines and Indonesia south to Micronesia and New Caledonia.

Strobilanthes scabra Nees (1832: 84).

Sericocalyx scaber (Nees) Bremek. (Bremekamp 1944: 163).

Native of North East India and Bangladesh, this species is certainly naturalised in southern India. It was widely distributed in colonial times and is known

to be cultivated in Singapore and Thailand. It has been reported elsewhere, including Myanmar (Clarke 1884). Kurz (1870) may have considered *Strobilanthes scabra* and *S. flava* to be the same species. The distinctions between *S. scabra*, *S. flava* and *S. phyllostachya* are problematic and need study.

Excluded species

Hemigraphis elegans Nees in Kress *et al.* (2003: 128) is a synonym of *Strobilanthes pavala* (Roxb.) J.R.I.Wood but Myanmar material is probably correctly referred to *S. crossandra* (Steud.) J.R.I.Wood

Hemigraphis flaccida (Kurz) C.B. Clarke, *Fl. Brit. India* [J. D. Hooker] 4 (11): 424 (Clarke 1884) = *Strobilanthes crossandra* (or *S. pavala*) but uncertain without sight of capsule. Based on Kurz 2182 (K).

Strobilanthes angustifrons C.B. Clarke in Kress *et al.* (2003: 131) (no specimen traced, a west Himalayan sp.).

Strobilanthes cystolithigera Lindau in Kress *et al.* (2003: 132) (no specimen traced, source unknown).

Strobilanthes glomerata (Nees) T. Anderson (as ‘glomeratus’) in Kress *et al.* (2003: 132) (no correctly named specimen traced).

Strobilanthes glutinosa Kurz = *Strobilanthes andamanensis* Bor — an Indian Andaman endemic.

Strobilanthes kunthiana (Nees) T. Anderson (as ‘kunthianus’) in Kress *et al.* (2003: 133) (no specimen traced, an Indian peninsular species).

Strobilanthes lamiifolia (Nees) T. Anderson (as ‘lamiifolius’) in Kress *et al.* (2003: 133) (no specimen traced, a Sino-Himalayan species that might occur, but not in Kayin).

Strobilanthes mastersii T. Anderson. Specimen at CAL (Dr J. Anderson ex Hotha & ex Hotone) said to be from Myanmar, is probably from Yunnan where J. Anderson was in 1868.

Strobilanthes paucinervia T. Anderson ex C.B. Clarke (as ‘paucinervis’) in Kress *et al.* (2003: 133) — type probably not from Myanmar. Helfer died in 1840, long before his specimens were distributed and many are uncertainly localised. The type is currently mislaid at Kew and its identity needs confirmation, but see under *S. remota* below.

Strobilanthes pentastemonoides (Nees) T. Anderson (as ‘pentastemonoides’) in Kress *et al.* (2003: 133). Presumably an error either for *S. shanensis* or *S. dimorphotricha*.

Strobilanthes perfoliatus T. Anderson in Kress *et al.* (2003: 133) no specimen traced, an Indian peninsular species = *Strobilanthes integrifolia* (Dalzell) Kuntze

Strobilanthes remota T. Anderson. Type: Helfer s.n. (CAL000019627) from “Tenasserim”, the description is minimal and the type is very poor but looks

similar to that of *S. paucinervia*. If the two species are the same, *S. remota* is the accepted name but further study is needed, hopefully to link this name with a known species.

Strobilanthes simonsii T. Anderson in Kress *et al.* (2003: 134), probably an error by Kurz (1877) for *S. echinata* or *S. capitata*.

Strobilanthes yunnanensis Diels in Kress *et al.* (2003: 134) (no specimen traced, source unknown).

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Declarations

Conflict of interest. The authors declare that they have no conflict of interest.

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