Blumea 55, 2010: 21–60
www.ingentaconnect.com/content/nhn/blumea

RESEARCH ARTICLE

doi:10.3767/000651910X499141

Revision and phylogeny of *Acalypha* (*Euphorbiaceae*) in Malesia

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Key words

Acalypha
Euphorbiaceae
Malesia
phylogeny

Abstract Twenty-eight species of *Acalypha* are recognized in Malesia. *Acalypha paniculata* is the sole member of subgenus *Linostachys* in Malesia and the rest of the species belong to subgenus *Acalypha*. Four previously synonymized species are resurrected as distinct species, namely *A. angatensis*, *A. cardiophylla* var. *cardiophylla*, *A. grandis*, and *A. wilkesiana*. Four species names are newly reduced to synonymy. The molecular phylogenetic analyses indicate that *Acalypha* is monophyletic, as is the subgenus *Acalypha*. The early-diverging lineages in the genus, and its closest outgroup, consist of African species. The Malesian species do not form a monophyletic group although the molecular data strongly support two small clades within the region that are morphologically homogeneous. The classification system that Pax and Hoffmann applied to subgenus *Acalypha*, which is based primarily on inflorescence morphology, appears to be unsatisfactory and incongruent with the phylogenetic analyses.

Published on 16 April 2010

INTRODUCTION

Acalypha L. is the third largest genus in the *Euphorbiaceae* s.s. after *Euphorbia* L., and *Croton* L., having about 450 species worldwide (Webster 1994, Radcliffe-Smith 2001). In the Malesian region, 28 species of *Acalypha* are recognized herein. There is a marked lack of detailed taxonomic descriptions and working diagnostic keys for the Malesian species. Although there are several taxonomic treatments available, these are mostly in the form of checklists that cover small island groups in separate treatments (Airy Shaw 1966, 1975, 1978, 1980a, 1981, 1983). The descriptions and keys found in these treatments often lack useful detail and employ unreliable characters, impeding species delimitation and recognition. A modern taxonomic revision, as presented here, is needed to address these issues.

SYSTEMATIC POSITION OF *ACALYPHA*

Acalypha is classified in the subfamily *Acalyphoideae*, tribe *Acalypheae*, subtribe *Acalyphinae* (Webster 1994, Radcliffe-Smith 2001). *Acalypha* is the sole genus in its subtribe due to its distinct set of morphological characters (see below; Webster 1994, Radcliffe-Smith 2001). There are three subgenera recognized in the system of Pax & Hoffmann (1924): *Linostachys* (Klotzsch) Pax & K.Hoffm., *Acalypha* (incorrectly as *Euacalypha* Müll.Arg.) and *Androcephala* Pax & K.Hoffm. In Malesia, one species represents the subg. *Linostachys* whereas the rest belong to subg. *Acalypha*. The monotypic subg. *Androcephala* is composed of only *A. diminuta* Baill., which is endemic to Madagascar.

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Molecular systematics confirms the placement of *Acalypha* in *Acalyphoideae* s.s. and shows a close relationship between *Acalypha* and *Mareya* Baill. (Wurdack et al. 2005, Tokuoka 2007). Their relationship is supported by similar morphological characteristics, including laciniate styles, pendulous anther thecae, pollen morphology and ultrastructure (Nowicke & Takahashi 2002, Sagun et al. 2006) and seed characters (Tokuoka & Tobe 2003, Tokuoka 2007). *Crotonogynopsis* Pax is weakly supported as sister to the *Mareya* + *Acalypha* clade and shares some features with the clade (Wurdack et al. 2005, Tokuoka 2007). Morphologically, *Acalypha* can be easily identified by its unisexual anemophilous flowers, which lack petals, disks, staminodes and pistillodes. Staminate flowers bear distinctly pendulous anthers that become vermiform at anthesis and produce small pollen with compound apertures that are inconspicuous or brevicolporate. The pistillate flowers usually have highly laciniate styles (Sagun & Levin 2007: 352, fig 1g). The anther (Sagun & Levin 2007: 352, fig 1f) (Webster 1994) and pollen morphology (Sagun et al. 2006) are synapomorphies for the genus and adaptations for wind pollination, which are unusual in the *Euphorbiaceae* (even when the family is considered in the wide sense).

TAXONOMIC HISTORY OF *ACALYPHA*

The genus *Acalypha* was first described by Linnaeus (1753) and included three species. He coined the name from the Greek *akaluphē* (ακαλύφη), which means ‘nettle-like’, in apparent reference to a resemblance to *Urtica*. The first infrageneric classification was made by Willdenow (1805), who delimited unnamed species groups based on plant sexuality and position of the inflorescence. Sprengel (1826) used a similar system but included plant habit as additional character to classify the 40 species then recognized. The number of species increased to 215 as a result of the taxonomic treatments of Baillon (1858, 1863) and Müller (1865, 1866, 1874), who also produced the first formal classification of the genus, recognizing two sections, *Linostachys* and *Acalypha* (or *Euacalypha*). More than half a century later, Pax & Hoffmann (1924) produced a taxonomic

treatment containing 390 species. Their classification was strongly influenced by the work of Müller (1866) and included three subgenera: *Linostachys*, *Acalypha* (as *Euacalypha*) and *Androcephala*. This work is the only comprehensive taxonomic treatment of *Acalypha* available to date. It provides keys for identifying species, but these keys are difficult to use and include only about 80 % of the species currently recognized. Their treatment followed earlier workers in using inflorescence morphology to subdivide the genus into sections and series. These characters were later found to be highly homoplasious and do not validly reflect relationships within the genus (Seberg 1984, Steinmann & Levin 2003).

MORPHOLOGY OF MALESIAN *ACALYPHA*

Habit and plant sexuality

Most *Acalypha* species are shrubs, herbaceous annuals and perennials, and a few are small trees. Most species are monoecious, whereas a few species appear to be strictly dioecious, although this is unconfirmed.

Indumentum

Most Malesian *Acalypha* have simple, straight or recurved hairs, except for *A. zollingeri* Müll.Arg., which has stellate hairs on the stem as well as yellow refringent glands, which are also unique to this species among Malesian *Acalypha*. Secretory trichomes are also observed in many species. These are capitate trichomes, which may be subsessile or long stalked, and are found usually on the stipules, pistillate bracts and ovaries. Another type of trichomes are those with a pointed distal end and a bulbous base, which we describe as bulbous-based trichomes. These are usually found only on the fruits (e.g., *A. novoguineensis* Warb.).

Stipules

Stipule morphology can also be used as a diagnostic character (Fig. 3). Shapes vary from linear or needle-like to broadly ovate. Stipules may also be glabrous or densely hairy with either straight or recurved simple hairs. Typical is having hairs restricted to the midrib of the stipule. Some species have caducous stipules; the stipules can only be observed on young, actively growing branches.

Leaves

Leaves are simple and alternate without glands on the leaf blade (Fig. 6). A pair of glands on the leaf base is only observed in *A. amentacea* Roxb. var. *amentacea*. Petiole length, compared to the blade size, varies from very short to exceeding blade length. Leaf dimensions differ markedly among some species and may serve as important diagnostic characters. Indumentum type varies from glabrous to densely hairy, usually with straight or recurved hairs. Palminerved basal veins are the most common nervation pattern in Malesian species, though *A. nervulosa* Airy Shaw exhibits a penninerved pattern.

Inflorescences

Inflorescences show a variety of form and may be unisexual or bisexual; axillary and/or terminal; and racemose, spicate or paniculate. Staminate, pistillate and bisexual inflorescences can be either single or fasciculate. Staminate inflorescences are never terminal in Malesian species. The staminate inflorescence is technically a spike-like thyrse in which the staminate flowers are shortly pedicellate and clustered in cymes along a rachis. However, for simplicity the term 'spicate' is used here to describe the staminate inflorescence. Excluding allomorphic flowers, the bisexual inflorescences in Malesian species are all androgynous, with the pistillate flowers distal to the staminate flowers. Single pistillate flowers usually appear at the base of staminate inflorescences of some species (e.g., *A. cardiophylla* Merr. var. *cardiophylla*, *A. hellwigii* Warb.). In *A. balgooyi* Sagun & G.A.Levin, some staminate flowers are found in the axil of the leaf together with the pistillate inflorescence, but the inflorescences are not gynandrous.

Inflorescence lengths vary from short (e.g., 1.5–6 cm in *A. zollingeri*) to long (e.g., up to 30 cm in *A. amentacea* var. *amentacea*). Long inflorescences can be either laxly or densely flowered. Solitary pistillate flowers usually occur in *A. phyllonomifolia* Airy Shaw, *A. spectabilis* Airy Shaw, and often in Australian *A. capillipes* Müll.Arg.

Staminate bracts

Staminate bracts are small and occluded by the developing flowers and are often difficult to observe. There is considerable variation in shape ranging from the typical narrowly ovate to broadly ovate (*A. siamensis* Oliv. ex Gage var. *siamensis*) to obovate (*A. balgooyi*).

Pistillate bracts

The majority of the species have foliaceous and in fruit, accrescent pistillate bracts that vary in size, number and shape of the teeth/lobes. Capitate trichomes and sessile glands can also be observed in some species. However, *A. hispida* Burm.f. and *A. paniculata* Miq. exhibit non-foliaceous, inconspicuous bilobed bracts that are not accrescent in fruit. *Acalypha cardiophylla* var. *cardiophylla*, *A. caturus* Blume and *A. longispica* Warb. share similar 3-partite, non-foliaceous bracts (Fig. 2).

Flowers

Staminate flowers are small, pedicellate, apetalous and actinomorphic and are almost uniform in Malesian *Acalypha* with differences restricted to the degree of hairiness, shape of the bract and presence of verrucae on the distal half of the calyx. The staminate calyx is always 4-lobed. The stamens are always 8 in number, and have a pointed connective with 2 pendulous anther thecae, which become vermiform at anthesis. Pistillate flowers are pedicellate or subsessile, and actinomorphic. The stigmas are often dissected and feathery in appearance. The ovary may be 2- or 3-locular with one ovule per locule. Pistillate calyces of subg. *Acalypha* are 3-lobed and in subg. *Linostachys* they are 5-lobed. Petals, pistillodes, staminodes and discs are absent in both staminate and pistillate flowers.

Fruit morphology

The typical euphorb explosively dehiscent capsule (e.g., sometimes termed rhegma) is the common fruit type in *Acalypha.* The capsules may be bilocular or trilocular. Most fruits are small (2–2.5 mm diam), with the biggest observed on *A. cardiophylla* var. *cardiophylla* (up to 3.5 mm diam), which also exhibits sinus thickenings on its fruit (Fig. 5). Various types of fruit indumentum can be observed, including straight hairs, capitate trichomes (*A. paniculata*), bulbous-based trichomes (several species including *A. novoguineensis*), or elongated spiny processes (*A. siamensis* var. *siamensis*) (Fig. 5).

Allomorph morphology

A remarkable feature of *Acalypha* floral morphology is the presence of dimorphic pistillate flowers in many species. In addition to the 'normal' pistillate flowers described above, the same plants produce a second pistillate flower type, referred to as allomorphic (Radcliffe-Smith 1973) (Fig. 4). In most species, including all the Malesian ones, allomorphic flowers are much less common than the 'normal' type. Allomorphic flowers generally have only one or two carpels, and their ovaries are

deeply lobed so that the styles appear to arise basally. The fruits are schizocarps (if multilocular) with the individual locules indehiscent and bearing bristles and frequently also fringed or lobed appendages, suggesting an adaptation for animal and/or wind dispersal. Thus, the allomorphs may provide different seed dispersal from the regular flowers, although the ecology of the fruits and seeds has not been studied.

For most annual species, allomorph morphology provides some of the most important diagnostic characters next to pistillate bract morphology. Three annual species (*A. brachystachya* Hornem., *A. indica* L., and *A. lanceolata* Willd. var. *lanceolata*) exhibit differences in appendage structure as well as position of the allomorphs on the inflorescence. However, allomorphs can also be observed in shrub species like *A. angatensis* Blanco and *A. grandibracteata* Merr. These are characterized by being terminal on the inflorescence, ebracteate, and producing fruits that lack appendages.

Seeds

The seeds are prolate to spheroidal in shape, usually carunculate and with an indistinct patterning of the seed coat. *Acalypha* seeds are characterized by a palisadal structure of exotegmen, presence of vascular bundles in the inner integument, an inner integument less than 6 cells thick, no aril and no vascular bundles in the outer integument (Tokuoka & Tobe 2003, Tokuoka 2007).

Pollen

With a light microscope, *Acalypha* pollen is quite uniform although there may be differences in the number of apertures (Sagun et al. 2006). The size is generally small and the shape is spherical to oblate in equatorial view. Pollen surface ornamentation cannot be resolved by light microscopy and appears either psilate or scabrate. However, scanning electron microscopy shows that exine ornamentation is rugulate to microrugulate or areolate with distinct scabrae localized on the margins of the muri or scattered over the pollen surface (Sagun et al. 2006).

Chromosome numbers

According to Hans (1973), the predominant chromosome base number in *Acalypha* for both diploids and tetraploids is $x = 10$, with a few highly polyploid species, such as *A. wilkesiana* Müll. Arg. (2n = c. 224) and *A. hispida* (2n = c.112), having very high chromosome counts. Other karyological studies also confirm these chromosome counts (Perry 1943, Löve 1966, 1967, 1980, 1981, 1982, Miller & Webster 1966, Sanjappa 1979).

ECONOMIC USES

Acalypha has several economic uses in Malesia. Both *A. hispida* and *A. wilkesiana* are widely cultivated as ornamentals in South East Asia. Brown-leaved or variegated specimens of *A. wilkesiana* are popular and often are grown as hedges, and *A. hispida* is grown for its very showy red pistillate inflorescences. In Papua New Guinea, leaves of *A. hellwigii* are used as cigarette wrappers. Leaves of *A. caturus* are eaten cooked in Minahassa (Sulawesi; Siemonsma & Piluek 1994), and *A. indica* is eaten as a vegetable in Indonesia and India (Jansen 2004). Several species are also used in traditional medicine and have been clinically tested for anti-cancer, anti-fungal and anti-protozoal activity. (Caceres et al. 1993, 1998, Calzada et al. 1998, Bussing et al. 1998, 1999, Adesina et al. 2000, Gutierrez-Lugo et al. 2002, Hernandez et al. 2003, Navarro et al. 2003, Oyelami et al. 2003, Astudillo et al. 2004). Siregar (2001) reports local medicinal use against various ailments for *A. australis*, *A. grandis*, *A. hellwigii*, *A. hispida*, *A. indica*, *A. lanceolata*, *A. siamensis* and *A. wilkesiana*.

DISTRIBUTION AND ECOLOGY

Acalypha is widespread geographically, with its greatest diversity in the tropics and subtropics, and only a few annual species in temperate regions. There are two primary centres of diversity, one in Central America, especially Mexico, and a second in tropical East Africa. Early-diverging lineages in *Acalypha* and its sister groups, *Crotonogynopsis* and *Mareya*, are African, thus suggesting an African origin of the genus. Most species are woody, but the genus also includes perennial herbs and annuals, some of which are common widespread weeds (e.g., *A. brachystachya*, *A. indica*, *A. lanceolata* var. *lanceolata*) and have wide geographic and altitudinal ranges. Most species can be found in open or waste areas, riversides and primary forests. However, *A. capillipes* is found in dry coastal habitats, where its axillary spines may serve as an adaptation to arid habitats.

Among the 28 Malesian *Acalypha*, 2 species are exclusively West Malesian, 20 species are East Malesian, while 6 species exhibit a widespread distribution in the region. Within Malesia, Papua New Guinea shows the highest species endemicity, with four species. Most species, especially in Papua New Guinea, are rarely collected and are known only from one or few specimens.

PHYLOGENY

The most recent comprehensive classification of *Acalypha* was by Pax & Hoffmann (1924), who used the position and sexuality of the inflorescence to divide the genus into three subgenera, 11 ‘series’ and 39 ‘sections’ (Pax & Hoffmann used these ranks opposite to how they are used today, with ‘series’ as a more inclusive rank than ‘section’). To assess this classification and the evolution within the genus, a phylogenetic analysis is presently being conducted (Steinmann et al. in prep.), which incorporates more than 100 species using DNA sequence data from the nuclear ribosomal internal transcribed spacers (ITS) and the chloroplast *ndhF* and *trnL-F* regions. These regions have been valuable in resolving relationships within *Acalypha* (Steinmann & Levin 2003, Levin et al. 2005) and other *Euphorbiaceae* (*Euphorbieae*: Steinmann & Porter 2002; *Mercurialis*: Krahenbuhl et al. 2002; *Croton*: Berry et al. 2005; *Euphorbiaceae*: Wurdack et al. 2005).

Although this work is still in progress, preliminary results indicate that *Acalypha* is monophyletic with strong support from both maximum parsimony (MP) and Bayesian analyses (not shown). Most of Pax & Hoffmann’s (1924) infrageneric groups are not monophyletic, with closely related species segregated into separate series/sections, and distantly related species placed together in the same groups (Steinmann & Levin 2003, Levin et al. 2005). In addition, habit and inflorescence morphology are shown to be homoplasious and not good indicators of relationships. The results of phylogenetic analyses of the Malesian species of *Acalypha* in the context of the whole genus are briefly presented here. The dataset included nuclear ITS and the chloroplast *ndhF* and *trnL-F* sequences from 17 Malesian *Acalypha* species, 12 other *Acalypha* species selected to represent the geographical, morphological and phylogenetic diversity in the genus, and three outgroups. Details of material and methodology are given/provided in Sagun (2008).

The monophyly of genus *Acalypha* is strongly supported with a bootstrap (BS) of 100 % and posterior probability (PP) of 1.00 in analyses of the separate gene regions (Sagun 2008) and the combined analysis of all 3 gene regions (Fig. 1). Monophyly of subg. *Acalypha* has significant PP (1.00) in Bayesian analyses of all datasets and strong BS support (95 %) in the MP combined analysis (Fig. 1) and in the *trnL-F* region (85 %) (Sagun 2008). However, BS support for subg. *Acalypha* is weak to moderate

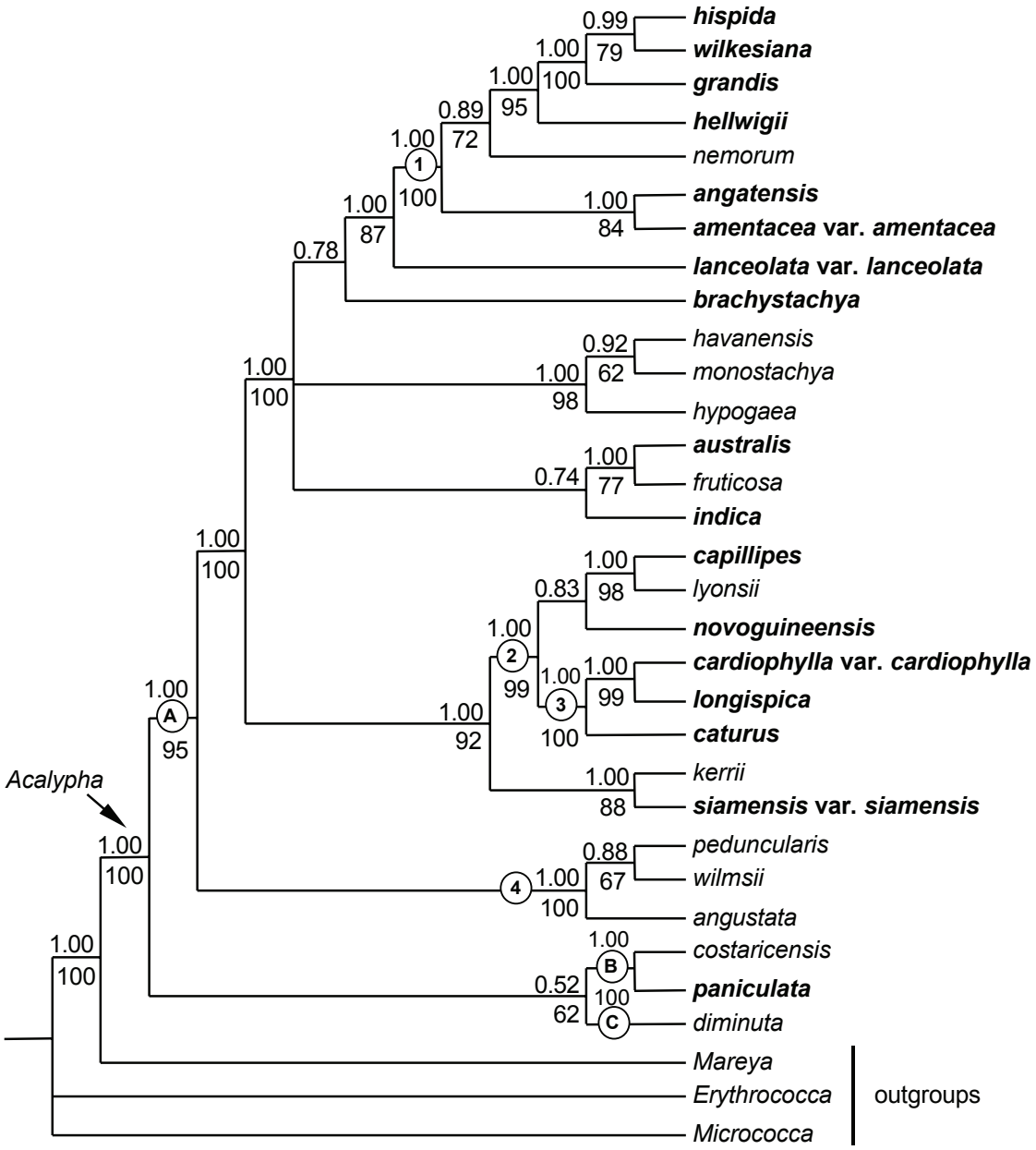


Fig. 1 Cladogram of the 50 % Majority-rule consensus based on a Bayesian analysis of nuclear ITS and chloroplast *ndhF* and *trnL-F* sequences. Bayesian posterior probabilities are indicated above the branches and parsimony bootstrap proportions below. Malesian species are in boldface text and outgroup taxa are marked by a vertical bar (1: Clade 1; 2: Clade 2; 3: Clade 3; 4: Capitatae; A: subgenus *Acalypha*; B: subgenus *Linostachys*; C: subgenus *Androcephala*).

in the MP analyses of the *ndhF* and ITS gene regions (Sagun 2008), reflecting generally lower support for the main backbone of the trees using individual gene regions. The monophyly of subg. *Linostachys* is strongly supported by MP analyses of all datasets except the ITS dataset, where support is moderate, and in all Bayesian analyses (Sagun 2008); because only two species were included in this analysis, this should be tested with more extensive sampling of the subgenus. Subgenera *Androcephala* (*A. diminuta*) and *Linostachys* are poorly supported sister groups but both lie outside subg. *Acalypha* (Sagun 2008). Within subg. *Acalypha* there is strong support for the basal position of the African clade corresponding to 'series' *Capitatae* (*A. angustata* Sond., *A. peduncularis* E.Mey. ex Meisn. and *A. wilmsii* Pax ex Prain ex Hutch.), shown as Clade 4 in Fig. 1. The monophyly of *Capitatae* is strongly supported in all analyses (BS = 100, PP = 1.0), and the relatively early-diverging position of this clade within subg. *Acalypha* is strongly supported by the chloroplast and combined datasets (Sagun 2008). Members of this clade share (also other dioecious *Capitatae* that were not sampled for this study) similar pollen (Sagun et al. 2006) and style morphology (G. Levin, pers. obs.).

Among the Malesian species sampled, the majority belong to two well-supported clades. The first of these, referred to as Clade 1, consists of *A. amentacea* var. *amentacea*, *A. angatensis*, *A. grandis* Benth., *A. hellwigii*, *A. hispida*, *A. wilkesiana* and the Australian endemic *A. nemorum* Müll.Arg. For the *ndhF* (which did not include *A. hellwigii*), ITS and combined datasets, Clade 1 has strong BS and PP support (BS = 91 %, 98 % and 100 %, respectively; PP = 1.00 for all). Although *A. nemorum* appears to belong to Clade 1, its position within the clade is poorly supported. Because there is limited sampling for Malesia and/or Oceania, the relationship of *A. nemorum* with the Malesian species cannot be determined with confidence. Although it might appear that Clade 1 could be expanded to include *A. lanceolata* and perhaps even *A. brachystachya* (Fig. 1), a larger analysis with more extensive taxon sampling (Steinmann et al. in prep.) shows that any expansion would require including many species from Africa and other parts of Asia.

In the classification of Pax & Hoffmann (1924), the species in Clade 1 are placed in various 'sections' and 'series' and their classification therefore does not agree with the results of the phylogenetic analyses. Morphologically the Malesian species in

Clade 1 are very similar, although the similarities (large chartaceous ovate to elliptic leaves and serrate or toothed pistillate bracts that are foliaceous and accrescent in fruit) are almost certainly not synapomorphies. The highly similar morphology led Fosberg & Sachet (1980) to lump *A. angatensis*, *A. grandis* and *A. wilkesiana* as subspecies or varieties of *A. amentacea*. This treatment is not supported by the molecular data. Not only are some of these taxa more closely related to species Fosberg & Sachet did not include in *A. amentacea*, but also the molecular divergence among the taxa is what appears to be typical for species within *Acalypha* (Sagun 2008).

The second clade, referred to as Clade 2, consists of the Malesian species *A. capillipes* (which also grows in Australia), *A. cardiophylla* var. *cardiophylla*, *A. caturus*, *A. longispica*, and *A. novoguineensis*, and the Australian endemic *A. lyonsii*. Although relationships among these species are weakly supported by *ndhF* and *trnL-F*, this clade is strongly supported by the ITS and combined datasets, although some of the internal nodes remain weakly supported (Sagun 2008). There are no clear morphological synapomorphies supporting Clade 2. Within Clade 2 is a subclade (Clade 3 in Fig. 1) consisting of *A. cardiophylla* var. *cardiophylla*, *A. caturus* and *A. longispica.* Pax & Hoffmann (1924) placed these three species in 'series' *Pantogynae-Pleurogynae* 'section' *Caturoideae*, which they based mainly on its unisexual inflorescences, small pistillate bracts and leaves with three basal veins. However, Pax & Hoffmann (1924) also included *A. hispida* in this grouping, and this is not supported by the results of the phylogenetic analyses; instead *A. hispida* appears to be embedded in Clade 1. The monophyly of Clade 3 is also supported by morphological characters, including the presence of tripartite, non-foliaceous, non-accrescent pistillate bracts, which is a distinctive synapomorphy for these three species. Although Pax & Hoffmann (1924) were correct in interpreting the small pistillate bracts as an indication of relationship among these three species, they incorrectly stated that the bracts are entire, not tripartite (*A. hispida*, however, does have entire pistillate bracts). Expanding Clade 2 to include *A. kerrii* and *A. siamensis* would require including a variety of Asian and African species not found in Malesia (Steinmann et al. in prep).

The remaining Malesian species are scattered throughout the phylogeny. *Acalypha paniculata* is the sole member of subg. *Linostachys* in Malesia. It is not endemic to Malesia but ranges from Africa through S Asia to Malesia. Similarly widespread are *A. australis*, *A. brachystachya*, *A. indica* and *A. lanceolata* var. *lanceolata*. *Acalypha siamensis* var. *siamensis*, the remaining Malesian taxon sampled, also grows in continental Asia and appears closely related to *A. kerrii* from continental Asia.

For this study it was possible to obtain DNA sequences from only 17 of the 28 *Acalypha* species known from Malesia. Although this limited taxon-sampling precludes strong statements about the evolution and biogeography of Malesian *Acalypha*, it appears that the species belong to multiple clades and have spread to Malesia primarily from mainland Asia. Some of these clades, notably Clades 1 and 2, subsequently have speciated within the Malesian archipelago. In addition, there appears to have been interchanges between Malesia and Australia, but their direction is impossible to determine at this time.

SYSTEMATIC TREATMENT

Acalypha

Acalypha L. (1753) 1003; L. (1754) 436; A.Juss. (1824) 45; Baill. (1858) 440; Müll.Arg. (1866) 799; Benth. (1879) Pl.13, t.1291; (1880) 311; Pax (1890) 60; Pax & K.Hoffm. (1924) 12; (1931) 134; Hurus. (1954) 295; Backer & Bakh.f. (1963) 489; Airy Shaw (1972) 205; Whitmore (1973) 51; Airy Shaw (1974) Pl.38, t.3719; (1975) 23; (1980a) 13; (1981) 246; (1982) 2; (1983) 2; Radcl.-Sm. (1990) 677; P.I.Forst. (1994) 209; G.L.Webster (1994) 90; Govaerts et al. (2000) 43; Radcl.-Sm. (2001) 234. — *Acalyphes* Hassk. (1844) 235, orth. var. — Lectotype species (Small 1913): *Acalypha virginica* L.

Mercuriastrum Heist. ex Fabr. (1759) 202; fide Dandy (1967) 64. — Typus: none designated.

Cupameni Adans. (1763) 356, nom. illeg., later synonym. — Lectotype species (Váczy 1980): *A. indica* L. (Radcliffe-Smith 2001, mentions *A. chamaedrifolia* as lectotype, but no evidence was found for this selection).

Caturus L. (1767) 19. — *Galurus* Spreng. (1817) 364, nom. illeg. — Type species: *Caturus spiciflora* L. [= *Acalypha hispida* Burm.f.].

Cupamenis Raf. (1838) 67, nom. illeg., later synonym, non *Cupameni* Adans. (Nicolson et al. 1988). — Lectotype species (Váczy 1980): *Acalypha indica* L.

Linostachys Klotzsch ex Schltdl. (1847) 235. — Type species: *Linostachys padifolia* Schltdl. [= *Acalypha schlechtendahliana* Müll.Arg.].

Odonteilema Turcz. (1848) 587. — Type species: *Odonteilema clausseni* Turcz. [= *Acalypha clausseni* (Turcz.) Baill.].

Calyptrospatha Klotzsch ex Baill. (1858) 440. — Type species: *Calyptrospatha pubiflora* Klotzsch [= *Acalypha pubiflora* (Klotzch) Baill.].

Gymnalypha Griseb. (1858) 2. — Type species: *Gymnalypha jacquinii* Griseb. [= *Acalypha villosa* Jacq.].

Corythea S.Watson (1887) 451. — Type species: *Corythea filipes* S.Watson [= *Acalypha filipes* (S.Watson) McVaugh].

Ricinocarpus Burm. (1737) 202, ex Kuntze (1891) 615, non Desf. (1817) 459. — Type species: maxina thes. zeyl. 203/5 t. 93 f. 1, p.p., non t. 92 (Burman 1737) [= *Acalypha lanceolata* Willd. var. *lanceolata*].

Schizogyne Ehrenb. ex Pax & K.Hoffm. (1924) 98, pro syn. — Type species: *Schizogyne ciliata* Ehrenb. [= *Acalypha ciliata* Forssk.].

Acalyphopsis Pax & K.Hoffm. (1924) 178. — Type species: *Acalyphopsis celebica* Pax & K.Hoffm., nom. dub. [= *Acalypha hoffmanniana* Hurus.].

Herbs, shrubs and rarely trees, monoecious or dioecious. *Indumentum* of dense velvety hairs, sparse simple straight or recurved hairs, stellate hairs, capitate trichomes, sessile glands or absent. *Stipules* persistent or caducous, narrow to broadly triangular, elliptic or ovate. *Leaves* alternate, simple, symmetric; petioles short to exceeding blade length, blade surface without glands; base acute, obtuse or cordate, sometimes with a pair of glands; margin serrate, crenate or subentire; apex acute to acuminate; venation distinct, penninerved or palminerved at base, looped and closed near margin (semicraspedodromous), tertiary veins and veinlets scalariform to reticulate. *Inflorescences* unisexual or bisexual, axillary, terminal or both, solitary or less commonly fasciculate, spicate or paniculate; bisexual inflorescences usually pistillate below and staminate above; staminate flowers in groups per node, pistillate ones generally single. *Flowers* petals and disc absent. *Staminate flowers*: pedicel short, elongating on maturity; calyx 4-lobed, midrib usually verrucate on upper half; stamens 8, thecae 2, pendulous and vermiform at anthesis; pollen small, oblate-spheroidal to suboblate in meridional outline, apertures 2–8-colporate, ectocolpi 1–5 µm; pistillode absent. *Pistillate flowers:* pedicel present or absent, subtended by a bract, latter either chartaceous and non-accrescent or foliaceous and accrescent, if foliaceous then with minute bract stipules; calyx 3- (or 4-) or 5-lobed; ovary 2- or 3- (or 4-)locular; stigmas 2, 3 (or 4), smooth, usually laciniate; ovules 1 per locule. *Allomorphic flowers* sometimes present, ebracteate, ovary 1-locular, variously fringed, styles subbasal. *Fruits* capsules, lobed, thin-walled, dehiscing partly loculicidal and completely septicidal and leaving a persistent columella. *Allomorphic fruits* nutlets. *Seeds* carunculate or not, caruncle if present covering up to basal half of seed, seed coat patterning indistinct. (This description pertains to the Malesian species only).

Distribution — A pantropical genus of 450 species, with centres of diversity in Central America and Africa, and including 28 species in Malesia. The infrageneric classification follows Pax & Hoffmann (1924), with subg. *Linostachys* represented by 1 species in Malesia and subg. *Acalypha* by 27 species.

KEY TO THE SPECIES

Notes

1. The staminate inflorescence technically is a spike-like thyrse in which the staminate flowers are shortly pedicellate and clustered in cymes along a rachis. However, for simplicity the term 'spicate' is used here to describe the staminate inflorescence.
2. The term 'dots' is used to refer to small light-coloured circular patches in the epidermis, less than 0.1 mm, that may represent druse crystals, but this was not confirmed anatomically.
3. Paired appendages flank the base of each foliaceous pistillate bract. Because the bracts are modified leaves, the subtending paired appendages appear to be homologous to stipules; hence the term 'bract stipules' is used for these structures.
4. Pistillate flowers in subg. *Acalypha* generally are subtended by two orders of bracts, first order 'bracts' and second order 'bracteoles'. Bracteoles in subg. *Acalypha* are usually minute, bifid, membranous structures. In subg. *Linostachys* the pistillate flowers are subtended only by a single order of bracts. These are minute, bifid, membranaceous organs that structurally appear to be homologous to the bracteoles of subg. *Acalypha*. Despite this homology, we consistently refer to first order bracts in both subgenera as bracts. Bracteoles are difficult to observe in subg. *Acalypha* and are not included in the descriptions of species in that subgenus.
5. The following abbreviations are used for the floristic areas in Malesia: Bor. = Borneo, Jav. = Java, LSI. = Lesser Sunda Islands, Mal. = Malay Peninsula, Mol. = Mollucas, NG = New Guinea, Phil. = Philippines, Sul. = Sulawesi, Sum. = Sumatra.

1. Pistillate inflorescences racemose or paniculate; pistillate flowers with pedicels 0.5–1 mm long; pistillate bracts 0.5 by 0.5 mm, bifid; pistillate calyx 5-lobed; herbaceous perennials. — Jav., LSI. (Flores) . . . . . 1. *A. paniculata* . . . . . (Subg. *Linostachys*)
1. Pistillate inflorescences spicate (or sometimes branched and the branches spicate) or the flowers solitary (*A. spectabilis*); pistillate flowers with pedicels < 0.5 mm long; pistillate bracts at least 1–1.5 by 1.5–2 mm and generally much larger (if smaller (*A. hispida*) then entire), entire or with 3 or more teeth or lobes; pistillate calyx 3- (or 4-)lobed; habit various . . . . . 2 (Subg. *Acalypha*)
2. Annual or perennial herbs 3
2. Shrubs or trees 7
3. Pistillate bracts deeply lobed, lobes ≤ 5, 3–6 mm long. — Sum., Jav., LSI. . . . . 7. *A. brachystachya*
3. Pistillate bracts shallowly toothed, teeth > 5, 0.5–2 mm long 4
4. Leaf blades narrowly elliptic, at least 3 times longer than wide; pistillate bracts glabrous throughout. — Phil. . . . . 5. *A. australis*
4. Leaf blades ovate to elliptic, no more than 2 times longer than wide; pistillate bracts with hairs at least along the margins 5
5. Pistillate bracts glabrous on their surfaces, hairy only on the margins, teeth obtuse. — Malesia . . . . . 16. *A. indica*
5. Pistillate bracts hairy on their surfaces and margins, teeth acute 6
6. Pistillate bracts 5.5–6 by 6–7 mm; staminate portion of inflorescences 20–35 by c. 2 mm; inflorescences sometimes branched. — Sul. . . . . 4. *A. argentii*
6. Pistillate bracts 2–3 by 4–6 mm; staminate portion of inflorescences 3–7 by 1—2 mm; inflorescences unbranched. — Malesia . . . . . 17. *A. lanceolata* var. *lanceolata*
7. Leaves and pistillate bracts bearing sessile yellowish refringent glands; stems with stellate hairs. — LSI. . . . . 28. *A. zollingeri*
7. Leaves and pistillate bracts without refringent glands; stems with simple hairs or glabrous 8
8. Pistillate inflorescences extremely densely flowered, rachises usually hidden by flowers; stigmas 5–8 mm long; exotic plants (usually cultivated). — Malesia (cult.) . . . . . 15. *A. hispida*
8. Pistillate inflorescences laxly flowered, rachises visible; stigmas up to 5 mm long; native plants growing outside cultivation (except *A. wilkesiana*) 9
9. Fruits with elongate spiny processes 1–2 by 0.2–0.5 mm. — Sum., Mal., Jav., Sul. 23. *A. siamensis* var. *siamensis*
9. Fruits verrucate, hairy or glabrous, but without spines (fruits unknown for Malesian *A. capillipes*, *A. hispida*, *A. spectabilis*, *A. stenophylla*) 10
10. Leaf blade upper surfaces bullate (with blister-like swellings between the veinlets). Pistillate bracts entire, ovate to obovate. — NG . . . . . 24. *A. spectabilis*
10. Leaf blade upper surfaces flat or slightly sunken between the veinlets. Pistillate bracts toothed or lobed, ovate to orbicular 11
11. Pistillate inflorescence pseudoscorpioid, bent at each node; a few staminate flowers sometimes present as a cluster in same axil as pistillate inflorescence. — Mol. . . . . 6. *A. balgooyi*
11. Pistillate inflorescence straight, not bent at the nodes. Staminate flowers (unknown for *A. floresensis*, *A. hispida*) absent from the same axil as pistillate inflorescence, or if present then forming an elongate spicate inflorescence (*A. capillipes*, *A. phyllonomifolia*) 12
12. Pistillate bracts 1 or 2 per inflorescence 13
12. Pistillate bracts 3 or more per inflorescence 14
13. Plants with axillary spines. Leaves without drip-tips. — Sul. . . . . 8. *A. capillipes*
13. Plants without axillary spines; leaves with drip-tips. — NG . . . . . 21. *A. phyllonomifolia*
14. Pistillate bracts distinctly petiolate, bract petiole 1–2 mm long. — LSI. (Flores) . . . . . 11. *A. floresensis*
14. Pistillate bracts sessile to subsessile, bract petiole < 0.25 mm long 15
15. Pistillate bracts 3-lobed, chartaceous, non-accrescent 16
15. Pistillate bracts with more than 3 lobes or teeth, foliaceous, accrescent 18
16. Ovaries/fruits bilocular, styles 2. — Malesia . . . . . 10. *A. caturus*
16. Ovaries/fruits trilocular, styles 3 17
17. Stipules usually recurved, ovate to broad elliptic, apex obtuse. Stigmas each 4–6 times divided. Fruits without densely hairy longitudinal ridges. — Mol., NG . . . . . 18. *A. longispica*
17. Stipules straight, broadly ovate to elliptic, apex acute. Stigmas each > 20 times divided. Fruits with a densely hairy longitudinal ridge on each locule. — Bor., Phil. . . . . 9. *A. cardiophylla* var. *cardiophylla*
18. Leaf blades narrowly elliptic, length/width ratio 4–7. — NG . . . . . 25. *A. stenophylla*
18. Leaf blades ovate to (broadly) elliptic to cordate, length/width ratio 1–3.5 19
19. Leaf venation penninerved (1-nerved at base). — NG . . . . . 19. *A. nervulosa*
19. Leaf venation palminerved (3- or 5-nerved at base) . . 20
20. Leaves 5-nerved at base 21
20. Leaves 3-nerved at base 24
21. Stipule width 1.5–5 mm. Fertile portion of pistillate inflorescences 6–9 cm long, always less than length of leaf blade — Phil. . . . . 12. *A. grandibracteata*
21. Stipule width 0.5–1.5 mm. Fertile portion of pistillate inflorescences 9–30 cm, often exceeding the leaf blade length 22

22. Fruits with both straight hairs and hairs with enlarged bases. Pistillate bracts 2–3.5 by 1.5–4 mm. — NG . . . . . 20. *A. novoguineensis*
22. Fruits with straight hairs only; pistillate bracts 4–12 by 4–11 mm 23
23. Leaf blades serrate. Pistillate inflorescences laxly flowered, internodes usually visible; staminate inflorescences of constant width. Pistillate bract teeth 9–11. — NG . . . . . 13. *A. grandis*
23. Leaf blades subentire to weakly crenate. Pistillate inflorescences densely flowered, internodes usually not visible; staminate inflorescences with bulbous apex when young. Pistillate bract teeth 11–15. — NG . . . 26. *A. subintegra*
24. Leaves variegated or brown-coloured, often twisted and aberrant. — Malesia (cult.) . . . . . 27. *A. wilkesiana*
24. Leaves green, not variegated, flat and normal 25
25. Stipules 1–1.5 mm wide, linear or needle-like. — NG . . . . . 14. *A. hellwigii*
25. Stipules 2–5 mm wide, ovate to narrowly elliptic 26
26. Leaves with dense velvety indumentum; stipules densely hairy inside and outside. — Phil. . . . . 3. *A. angatensis*
26. Leaves sparsely pubescent to nearly glabrous; stipules hairy only on outside of midrib 27
27. Leaf blade margins serrate on both staminate and pistillate branches; bases with a pair of glands and scattered glandular trichomes. — Bor., Mol., NG, Phil., Sul. . . . . 2. *A. amentacea* var. *amentacea*
27. Leaf blade margins crenate to undulate on pistillate branches and serrate on staminate branches; leaf without glands or glandular trichomes. — Phil. 22. *A. pulogensis*

Acalypha subgenus *Linostachys*

Acalypha L. subg. *Linostachys* (Klotzsch) Pax & K.Hoffm. (1924) 13. — *Linostachys* Klotzsch ex Schltdl. (1847) 235. — *Acalypha* L. sect. *Linostachys* (Klotzsch ex Schltdl.) Müll.Arg. (1865) 8. — Type: *Linostachys padifolia* Schltdl. [= *Acalypha schlechtendahliana* Müll.Arg.].

Perennial herbs. *Stipules* persistent or caducous. *Leaves* petiolate, margin serrate. *Staminate inflorescences* axillary, spicate. *Pistillate inflorescences* terminal or axillary, racemose or paniculate in Malesian species; bracts minute, non-accrescent in fruit. *Pistillate flowers* pedicellate, calyx 5-partite. *Bisexual inflorescences* (in Malesian species) like pistillate inflorescences, but with clusters of staminate flowers at lower nodes.

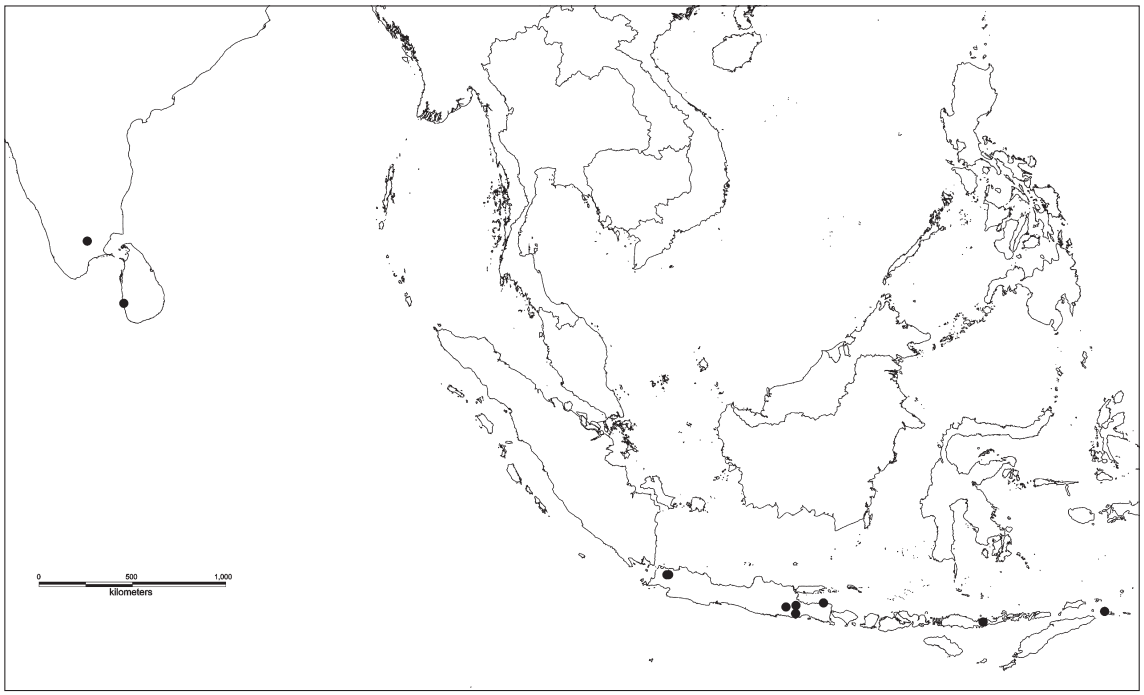
1. *Acalypha paniculata* Miq. — Map 1

Acalypha paniculata Miq. (1859) 406; Müll.Arg. (1865) 8; (1866) 802; Hook.f. (1887) 415; Boerl. (1900) 286; J.J.Sm. (1910a) 509; Koord. (1912) 497; Pax & K.Hoffm. (1924) 14; De Wild. (1926) 493; Backer & Bakh.f. (1963) 489; Govaerts et al. (2000) 84, pro syn.; Rani & N.P. Balakr. (2007) 96. — Type: *Zollinger 2991* (holo U barcode U0001842; iso A), Indonesia, Java, Bandung (Bandong).

[*Acalypha racemosa* B.Heyne in Wall. (1828) no. 7784C, nom. nud.; Baill. (1858) 443, nom. nud.; Airy Shaw (1982) 4; Govaerts et al. (2000) 84.] — *Acalypha wallichii* Thwaites (1861) 271. — *Ricinocarpus villosus* (Jacq.) Kuntze var. *racemosus* B.Heyne ex Kuntze (1891) 616. — Lectotype (selected here): *Wallich Cat. 7784C* (holo K), India, Madras? See note 2.

Acalypha paniculata Miq. forma *depauperata* Müll.Arg. (1865) 8. — Type: *G. Thomson 120* (holo G-DC; iso K), India, Madras.

Herbaceous perennials, c. 1 m tall, monoecious; flowering branches 15–28 cm long, 2–5 mm diam. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs, 0.3–0.5 mm long. *Stipules* persistent, elliptic, 1.5–2.5 by c. 0.5 mm, densely hairy, without capitate trichomes. *Leaves*: petiole 1.5–10 cm long, with dense straight hairs c. 1 mm long; blade ovate to elliptic, 3.5–8.5 by 2–5.5 cm, length/width ratio 1.5–1.8, chartaceous; base obtuse to cordate; margin serrate to crenate, teeth 1–3 by 3–8 mm, with a gland on tooth tips; apex acute to acuminate; upper surface sparsely hairy; lower surface glabrous to sparsely hairy, denser on midrib and veins; veins at base 3, upper secondaries c. 5 per side. *Staminate inflorescences* axillary, 1 per axil, spicate, in different axils than pistillate ones; peduncle 10–12 mm long, indumentum of simple recurved hairs, 0.1–0.5 mm long; fertile portion 15–95 by 1–1.5 mm; internodes 1–3 mm long. *Staminate flowers:* bract elliptic, c. 0.5 by 1 mm, hairy outside with straight hairs of c. 0.25 mm long; pedicel 0.25–0.5 mm long, glabrous; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.25 by 0.2 mm, with straight hairs to 0.25 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.2 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary or terminal, solitary, racemose or paniculate, in different axils than staminate ones; peduncle 13–15 mm long, indumentum dense with simple recurved hairs, 0.5–0.75 mm



Map 1 Distribution of *Acalypha paniculata* Miq.

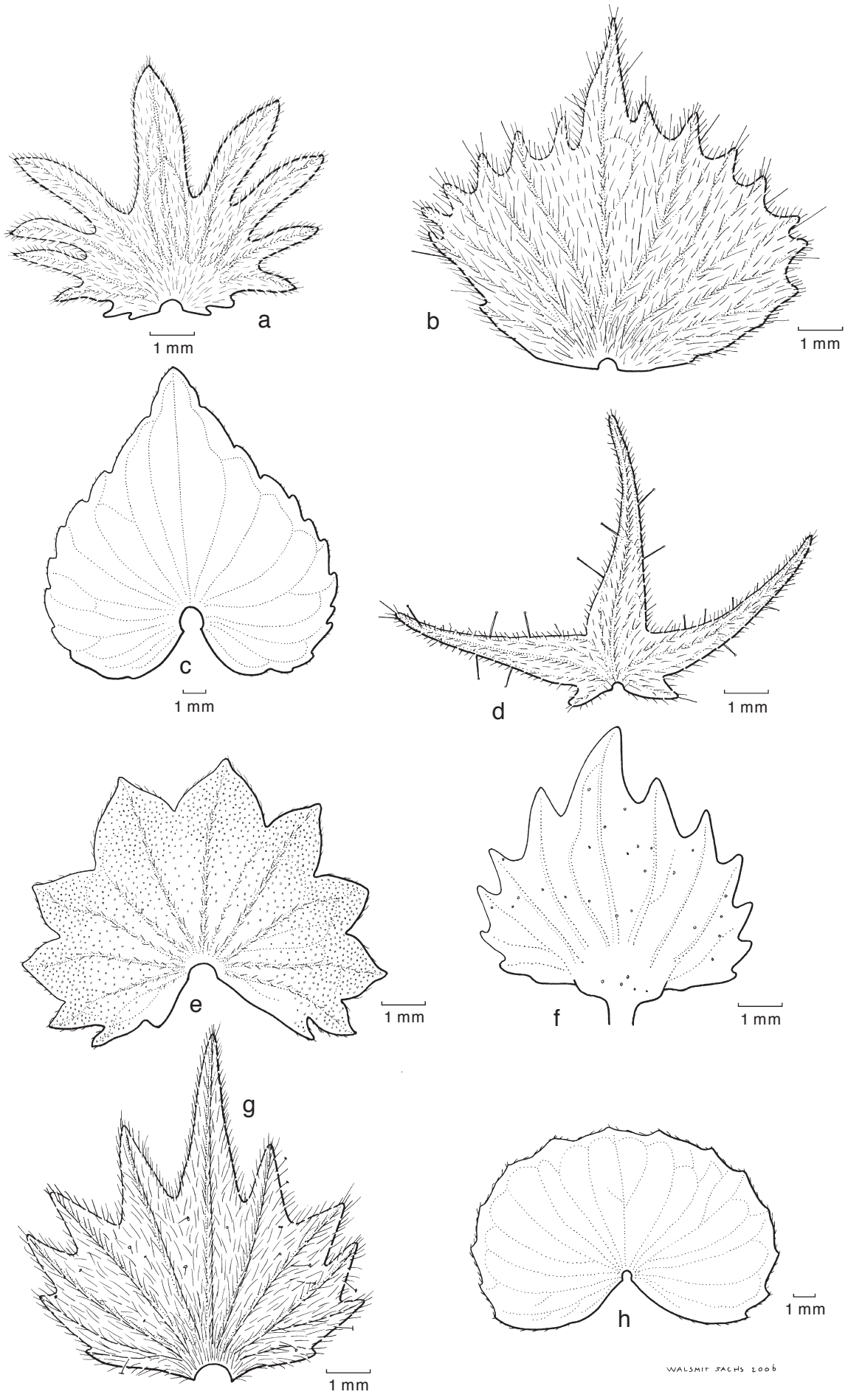
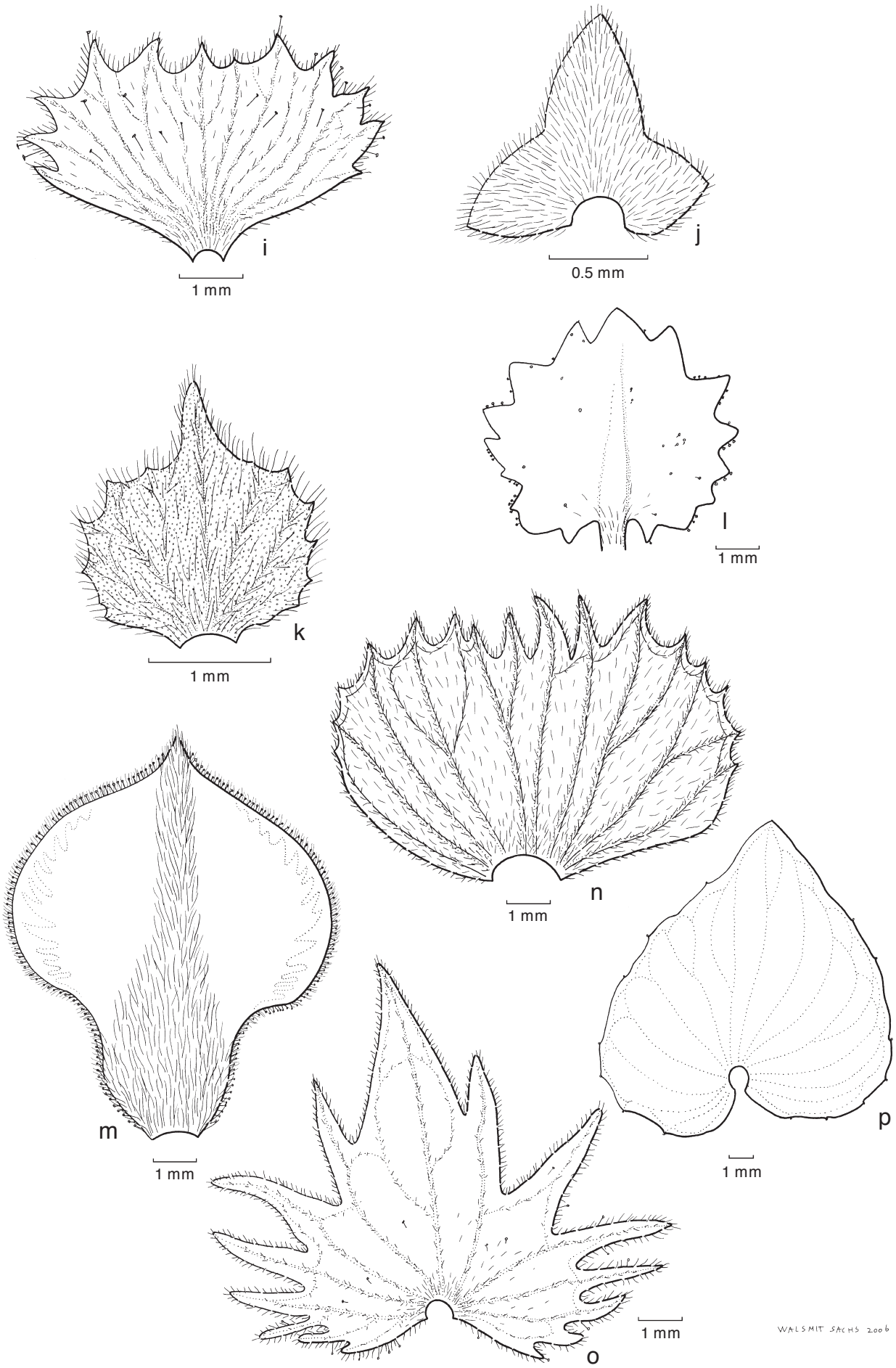


Fig. 2 Pistillate bract morphology. – a. *Acalypha amentacea* Roxb. var. *amentacea*. – b. *A. angatensis* Blanco. – c. *A. australis* L. – d. *A. brachystachya* Hornem. – e. *A. capillipes* Müll.Arg. – f. *A. phyllonomifolia* Airy Shaw. – g. *A. hellwigii* Warb. – h. *A. indica* L. . – i. *Acalypha lanceolata* Willd. var. *lanceolata*. – j. *A. longispica* Warb. – k. *A. novoguineensis* Warb. – l. *A. siamensis* Oliv. ex Gage var. *siamensis*. – m. *A. spectabilis* Airy Shaw. – n. *A. subintegra* Airy Shaw. –



o. *A. wilkesiana* Müll.Arg. – p. *A. zollingeri* Müll.Arg. (a: *Sagun & Risna SR54*, L; b: *Elmer 21969*, L; c: *Ramos 7800*, K; d: *Elbert 1523*, L; e: *Elbert 2946*, L; f: *Hartley 13048*, L; g: *Schodde 1411*, L; h: *Sagun & Risna SR58*, L; i: *Stomps s.n.*, L; j: *Brass 25945*, L; k: *Robbins 877*, L; l: *Sagun & Risna SR52*, L; m: *Katik LAE74947*, L; n: *Brass 27620*, L; o: *Sagun & Risna SR50*, L; p: *Zollinger 3419*, L).

long; fertile portion 7–9 by 2–4 cm, internodes 2–5 mm long. *Pistillate flowers* 0.5–1 mm diam; 2 or 3 per node; bract stipules none; bracts 0.5 by 0.5 mm, bifid; bracteoles conspicuous; pedicel 0.5–1 mm long; calyx 0.5–1 mm diam, sepals 5, ovate, c. 0.5 by 0.25 mm, hairy on margins with verrucae in distal half, and with capitate trichomes of c. 0.1 mm long, glabrous inside; ovary globose, c. 0.5 by 0.5 mm, trilocular; stigmas 3, 0.5–0.75 mm long, each divided 5 times, base verrucate. *Bisexual inflorescences* like pistillate inflorescences, but with clusters of staminate flowers at lower nodes. *Fruits* globose to oblate, 0.75–1.75 by 1–2.5 mm, verrucate, covered with bulbous-based trichomes, columella c. 1 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1 by 0.75 mm.

Distribution — Africa, India, Sri Lanka, in Malesia: Java, Lesser Sunda Islands (Flores).

Habitat & Ecology — Unknown. Altitude: 300–600 m. Flowering: March–July.

Vernacular names — Lesser Sunda Is.: Flores: Masu Kedhi; Wunu paka-do.

Notes — 1. The leaves of *A. paniculata* are similar to the leaves of herbaceous annuals like *A. indica* or *A. lanceolata* var. *lanceolata*. However, it is easily distinguished by its racemose or paniculate pistillate inflorescences, pedicellate pistillate flowers without foliaceous pistillate bracts, 5-partite pistillate calyx and fruits with capitate trichomes. The staminate inflorescences are also notably thin (1–1.5 mm wide), which also adds to its distinct appearance. This is the sole Malesian species from subg. *Linostachys* and could hardly be confused with other Malesian *Acalypha* species.

2. The name *Acalypha racemosa* was published twice without description (Wallich 1828, Baillon 1858). Thwaites (1861) cited Wallich's name when he validly described *A. wallichii* (often incorrectly spelled '*wallichiana*'), apparently as a substitute for *A. racemosa.* Thwaites cited several specimens as syntypes, but the selection of the Wallich collection as lectotype is the most logical choice.

3. The name *Usteria racemosa* Dennst. (1818: 31), usually interpreted as *A. paniculata*, has been determined to be *Symplocos cochinchinensis* S.Moore (Nicolson et al. 1988).

4. The specific epithet refers to the paniculate pistillate inflorescences.

Acalypha subgenus *Acalypha*

Acalypha L. subg. *Euacalypha* Müll.Arg. (1865) 8, nom. inval. — Type: as genus.

Small trees, shrubs or perennial/annual herbs. *Stipules* persistent or caducous. *Indumentum* of simple or stellate hairs. *Leaves* petiolate, margin serrate, crenate or subentire. *Staminate inflorescences* spicate, always axillary in Malesian species, or unknown. *Pistillate inflorescences* spicate; bracts foliaceous or not, serrate, lobed or entire, non-accrescent or accrescent in fruit. *Pistillate flowers* (sub)sessile, calyx 3- (or 4-)partite. *Bisexual inflorescences* spicate, sometimes branched and the fertile portions spicate, usually pistillate below and staminate above, if staminate below then with a solitary terminal pistillate flower; pistillate bracts as in the pistillate inflorescences.

2. *Acalypha amentacea* Roxb. var. ***amentacea*** — Fig. 2a, 3a, 6a1-a2; Map 2

Acalypha amentacea Roxb. (1832a) 676; Miq. (1859) 406; Merr. (1917) 322; (1921a) 343; (1923) 444; Holth. & H.J. Lam (1942) 199; Airy Shaw (1980a) 15 in obs.; (1983) 2. — *Acalypha amentacea* Roxb. subsp. *amentacea*: Fosberg in Fosberg & Sachet (1980) 8; Govaerts et al. (2000) 47. — *Acalypha amentacea* Roxb. var. *amentacea*: Fosberg in Fosberg & Sachet (1980) 8. — Type: *Herbarium Roxburghii/Herbarium Martii 2615* (holo BR; probable iso BM barcode BM000926683).

Acalypha amboynensis Benth. (1843) 233; Miq. (1859) 406. — *Acalypha grandis* Benth. var. *amboinensis* (Benth.) Müll.Arg. (1865) 10; (1866) 806; Fern.-Vill. (1880) 193; Pax & K.Hoffm. (1924) 150. — Type: *Barclay s.n.* (holo K), Indonesia, Maluku, Ambon (Amboyna).

Acalypha stipulacea Klotzsch (1843) 416; Müll.Arg. (1865) 10; (1866) 807; Fern.-Vill. (1880) 193; S. Vidal (1885) 143; K.Schum. & Hollrung (1889) 75; Stapf (1894) 226; Koord. (1898) 579; Boerl. (1900) 286; K.Schum. & Lauterb. (1900) 403; Merr. (1903a) 119; (1903b) 32; (1905) 77; (1906) 81; (1908) 417; (1910) 192, pro obs.; Elmer (1911) 1275; Merr. (1912) 293; Hutch. (1914) 135. — *Ricinocarpus stipulaceus* (Klotzsch) Kuntze (1891) 618. — Type: *Cuming 621* (holo B; iso A, BM, G, K, L, LE, MO), Philippines, Manila.

Acalypha affinis Klotzsch (1843) 416. — Type: None designated, Philippines, Luzon, Manila.

Acalypha glandulosa Blanco (1837) 749; (1845) 516, non Cav. (1800) 141; Müll.Arg. (1866) 888; Blanco (1879) 149; Merr. (1905) 77. — *Ricinocarpus blancoanus* Kuntze (1891) 617. — Neotype (designated here): *Merrill Species Blancoanae 20* (holo L; iso A, US), Philippines, Samar.

Acalypha centromalayca Pax & K.Hoffm. (1924) 150; Airy Shaw (1980a) 14; (1982) 3; Govaerts et al. (2000) 55. — Syntypes: *Warburg 15573*, *15574*, *18198* (B†), Indonesia, Sulawesi (Celebes).

Acalypha luzonica Pax & K.Hoffm. (1924) 153; Airy Shaw (1983) 2. — Lectotype (designated here): *Curran et al. 18219* (holo K), Philippines, Luzon, Benguet, Mt Pulog.

Acalypha warburgii Pax & K.Hoffm. (1924) 155; Airy Shaw (1983) 3; Govaerts et al. (2000) 93. — Type: *Warburg 13135* (holo B†), Philippines, Luzon, Tayabas, Sampalok.

Acalypha meyeri Pax & K.Hoffm. (1924) 165; Hurus. (1954) 301; Airy Shaw (1983) 165; Govaerts et al. (2000) 76. — Lectotype (designated here): *Meyer 2847* (holo SING; iso US), Philippines, Luzon, Bataan, Mt Mariveles.

Acalypha grandis auct. non Benth.: Miq. (1859) 405.

Large shrubs, 2–5 m tall, monoecious; flowering branches 25–30 cm long, 2–5 mm diam. *Indumentum* glabrous to hairy, denser on young parts, with simple straight hairs. *Stipules*

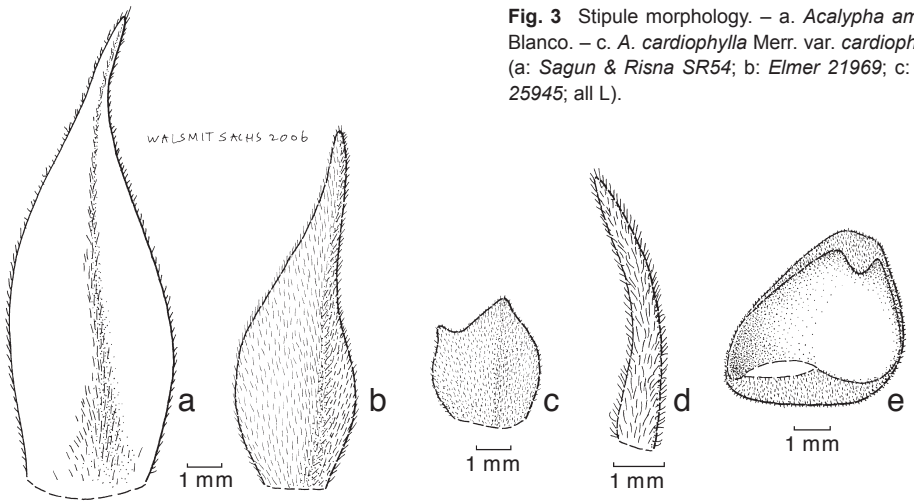
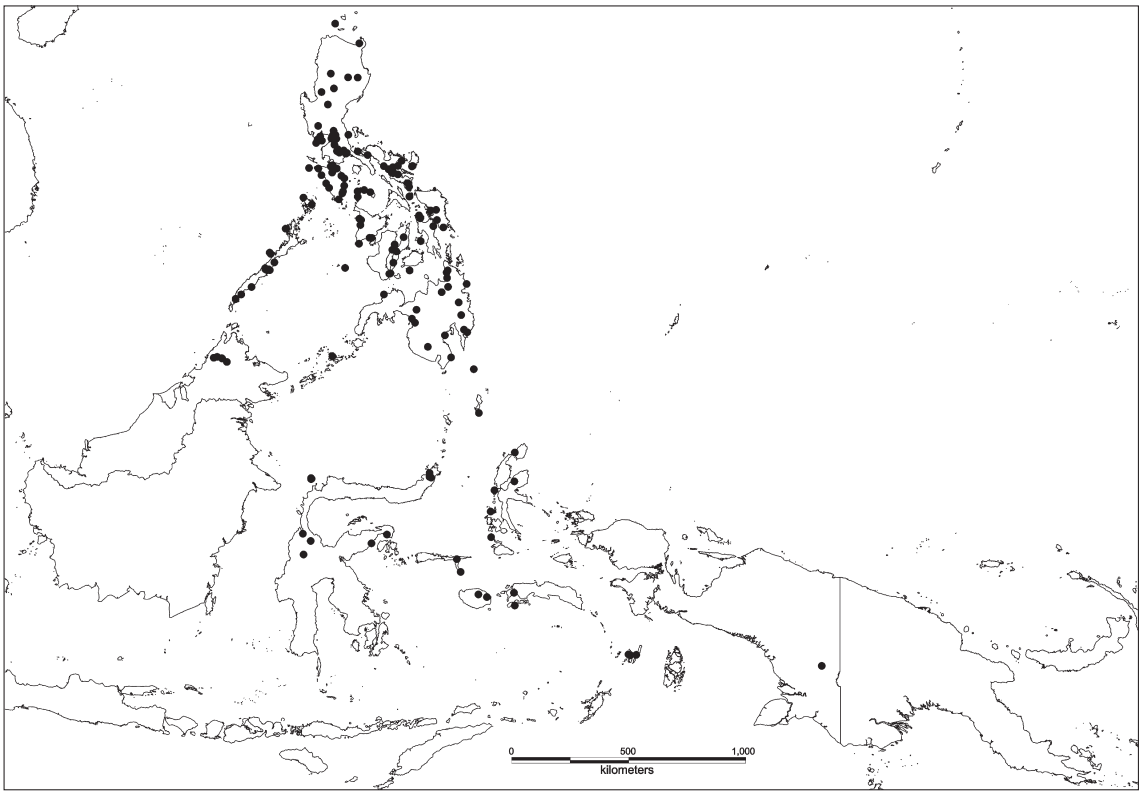


Fig. 3 Stipule morphology. – a. *Acalypha amentacea* Roxb.var. *amentacea.* – b. *A. angatensis* Blanco. – c. *A. cardiophylla* Merr. var. *cardiophylla*. – d. *A. hellwigii* Warb. – e. *A. longispica* Warb. (a: *Sagun & Risna SR54*; b: *Elmer 21969*; c: *Mendoza PNH 10447*; d: *Schodde 1411*; e: *Brass 25945*; all L).



Map 2 Distribution of *Acalypha amentacea* Roxb. var. *amentacea*.

persistent, ovate to narrowly elliptic, 10–25 by 2–5 mm, midrib outside hairy and with capitate trichomes. *Leaves*: petiole 2–15 cm long, glabrous or with sparse straight hairs of 0.5–1 mm long; blade ovate to elliptic, 9–20 by 5–8 cm, length/width ratio 1–2.5, chartaceous, not variegated, green when fresh; base acute to weakly cordate, with a pair of glands of 1–2 by c. 0.5 mm, and scattered glandular trichomes; margin serrate, teeth 1–2 by 2–3 mm, with a gland on tooth tip; apex acute to acuminate; upper surface nearly glabrous, lower surface sparse to densely hairy, surfaces flat or slightly sunken between the veinlets; base 3-nerved, upper secondaries 5–8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate, in different axils than pistillate ones; peduncle 5–40 mm long, indumentum velvety, hairs to 0.2 mm long; fertile portion 80–245 by 1.5–2.5 mm, internodes 1–3 mm long. *Staminate flowers*: bract ovate, 0.5–1 by 0.3–0.5 mm, with outside sparse hairs of c. 0.2 mm long; pedicel 0.5–1 mm long, with straight hairs to c. 0.2 mm long; calyx 0.5–1 mm diam, sepals ovate to elliptic, c. 0.5 by 0.2–0.3 mm, with straight hairs to c. 0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.3 mm long, thecae 0.3–0.4 by c. 0.2 mm. *Pistillate inflorescences* axillary or terminal, solitary, spicate, straight, many-flowered, in different axils than staminate ones; peduncle 8–20 by 1.5–2 mm long, nearly glabrous; fertile portion 9–30 by 0.3–1 cm, internodes 2–10 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract; bract stipules ovate to elliptic, 0. 5–1 by 0.25–0.5 mm; bracts sessile, 4–10 by 4–9 mm, foliaceous, accrescent, strongly veined outside, without dots, sparsely hairy outside, sometimes with short capitate trichomes, inside with sparse sessile glands; bract teeth 9–13, apical tooth 0.75–1 by c. 0.5 mm, apex acute to obtuse, lateral teeth 0.5–1 by 0.75–1 mm, apex acute; pedicel 0(–0.5) mm long; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, 0.75–1.5 by c. 1 mm, hairy outside, without verrucae, glabrous inside; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 2.5–5 mm long, each 4–6 times divided, base hairy. *Bisexual inflorescences* absent. *Fruits* globose, 2–2.5 by c. 1.5 mm, verrucate, covered with bulbous-based trichomes, columella 1.5–2 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, 1–1.5 by c. 1 mm.

Distribution — Borneo, Philippines, Sulawesi, Moluccas, Papua New Guinea.

Habitat & Ecology — Disturbed lowland mixed forest; roadsides; riversides; young secondary forest on limestone with thin clay cover. Flowering: November. Altitude 74 m.

Vernacular names — Philippines: Balingud (Palawan); Toongtoong (Cebuano); Pameti (Cebuano); Lantayakan (Bundu Tuhan); Langanassi. Moluccas: Laransiàn'a (Talaud). Papua New Guinea: Semur (Maibrat).

Uses — Stem sap used to treat eye wounds or cataracts; tree used for fencing.

Notes — 1. Key characters include long petioles exceeding the blade length, large chartaceous leaves, and long male and female inflorescences that also exceed leaf length (see note 1 under *A. hellwigii* and note 2 under *A. pulogensis*).

2. The staminate inflorescences sometimes terminate with a single pistillate flower in Ambon specimens (*Reinwardt s.n.*, barcode L0240672; *Zippelius s.n.*, barcode L0240838).

3. Müller Argoviensis (Müller 1866: 822) mistakenly synonymized *A. fruticosa* Forssk., an Arabian species, under *A. amentacea*, a treatment also followed by Pax & Hoffmann (1924: 169) (see discussion of Fosberg & Sachet 1980).

4. Three other varieties are recognized: *A. amentacea* Roxb. var. *palauensis* Fosberg (in Fosberg & Sachet 1980) and *A. amentacea* Roxb. var. *heterotricha* Fosberg (in Fosberg & Sachet 1980) from Palau; and *A. amentacea* Roxb. var. *trukensis* (Pax & Hoffm.) Fosberg from Micronesia.

5. The specific epithet refers to the amentaceous or catkin-like inflorescences.

3. *Acalypha angatensis* Blanco — Fig. 2b, 3b, 4a, 6b1-b2; Map 3

Acalypha angatensis Blanco (1837) 750; (1845) 516; Müll.Arg. (1866) 805; Blanco (1879) 150; Fern.-Vill. (1880) 193; Merr. (1905) 77; (1918) 227; (1923) 445; Pax & K.Hoffm. (1924) 153; Airy Shaw (1983) 2; T.C.Huang

(1993) 416; (2003) 68. — *Ricinocarpus angatensis* (Blanco) Kuntze (1891) 617. — Neotype (designated here): *Merrill Species Blancoanae 333* (holo L; iso A, US), Philippines, Luzon, Bulacan, Angat.

Acalypha tomentosa Blanco (1837) 750, non Sw. (1788) 99; Müll.Arg. (1866) 888; Blanco (1879) 151. — *Ricinocarpus philippinensis* Kuntze (1891) 617. — Type: None designated.

Acalypha grandis Benth. var. *velutina* Müll.Arg. (1864) 441; (1865) 10; (1866) 608; Fern.-Vill. (1880) 193; S. Vidal (1885) 143; Merr. (1908) 417; (1910) 357; Pax & K.Hoffm. (1924) 150. — *Acalypha amentacea* Roxb. var. *velutina* (Müll.Arg.) Fosberg in Fosberg & Sachet (1980) 10; Govaerts et al. (2000) 48. — Type: *Cuming 1159* (holo G-DC; iso A, BM, K, L, LE), Philippines, Luzon.

Acalypha akoensis Hayata (1911) 266; (1920) 100 in obs.; H.Keng (1955) 31; T.C.Huang (1993) 416. — *Acalypha grandis* Benth. var. *akoensis* (Hayata) Hurus. (1954) 300; Govaerts et al. (2000) 46; T.C.Huang (2003) 68. — Type: *Nakahara 537* (holo TI), Taiwan (Formosa), Ako, Kotansho.

Acalypha formosana Hayata (1911) 267; H.Keng (1955) 31. — *Acalypha grandis* Benth. var. *formosana* (Hayata) Hurus. (1954) 300. — Type: *Kawakami*, *Hayata & Mori 7085* (holo TI), Taiwan, Randaisan.

Acalypha longe-acuminata Hayata (1920) 100; H.Keng (1955) 31; T.C.Huang (1993) 421; Govaerts et al. (2000) 73; T.C.Huang (2003) 68. — *Acalypha grandis* Benth. var. *longe-acuminata* (Hayata) Hurus. (1954) 300. — Type: *Soma s.n.* (holo TI), Taiwan Ako, Naiho.

Large shrubs or small trees, 5–6 m tall, monoecious; flowering branches 10–20 cm long, 3–5 mm diam. *Indumentum* velvety with simple recurved hairs. *Stipules* persistent, ovate to elliptic, boat-shaped, 10–12 by 2–5 mm, densely hairy, without capitate trichomes. *Leaves*: petiole 4–10 cm long, with short velvety hairs, c. 0.25 mm long; blade ovate to elliptic, 10–15 by 5–10 cm, length/width ratio 1.4–2.5, chartaceous; base emarginate; margin serrate to weakly crenate, teeth 1–2 by 2–5 mm, with a gland on tooth apex; apex acute; upper surface hairy, lower surface densely hairy with velvety indumentum, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 5–8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate, in different axils than pistillate ones; peduncle 3–8 mm long, indumentum simple, of yellowish velvety hairs to 0.2 mm long; fertile portion 5–16 by 0.2–0.5 cm, internodes 1–2 mm long. *Staminate flowers*: bracts ovate, 0.5–0.75 by c. 0.5 mm, densely hairy outside, c. 0.25 mm long; pedicel 0.5–1 mm long, with straight hairs to 0.5 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, 0.5–0.75 by c. 0.5 mm, with straight hairs to 0.5 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary or terminal, solitary, straight, spicate, many-flowered, in different axils than staminate ones; peduncle 8–25 mm long, indumentum velvety with simple recurved hairs to 1 mm long; fertile portion 9–11 by 0.3–1 cm, internodes 3–4 mm long. *Pistillate flowers* c. 1 mm diam; 1 or 2 per bract; bract stipules elliptic, 0.75–1 by 0.2–0.3 mm; bracts sessile, 3–4 by 4–5 mm, foliaceous, accrescent, strongly veined outside, without dots, densely hairy outside, with short capitate trichomes, glabrous inside, teeth 13, apical and lateral teeth 1–1.5 by 0.75–1 mm, apices acute; pedicel 0(–0.5) mm long; calyx c. 1 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.5 mm, hairy outside, without verrucae, glabrous inside, hairy on margins with some capitate trichomes; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 2–3 mm long, each divided 8–11 times, smooth. *Bisexual inflorescences* like the staminate ones, but terminated by a single, ebracteate pistillate flower, much more common than truly staminate inflorescences.

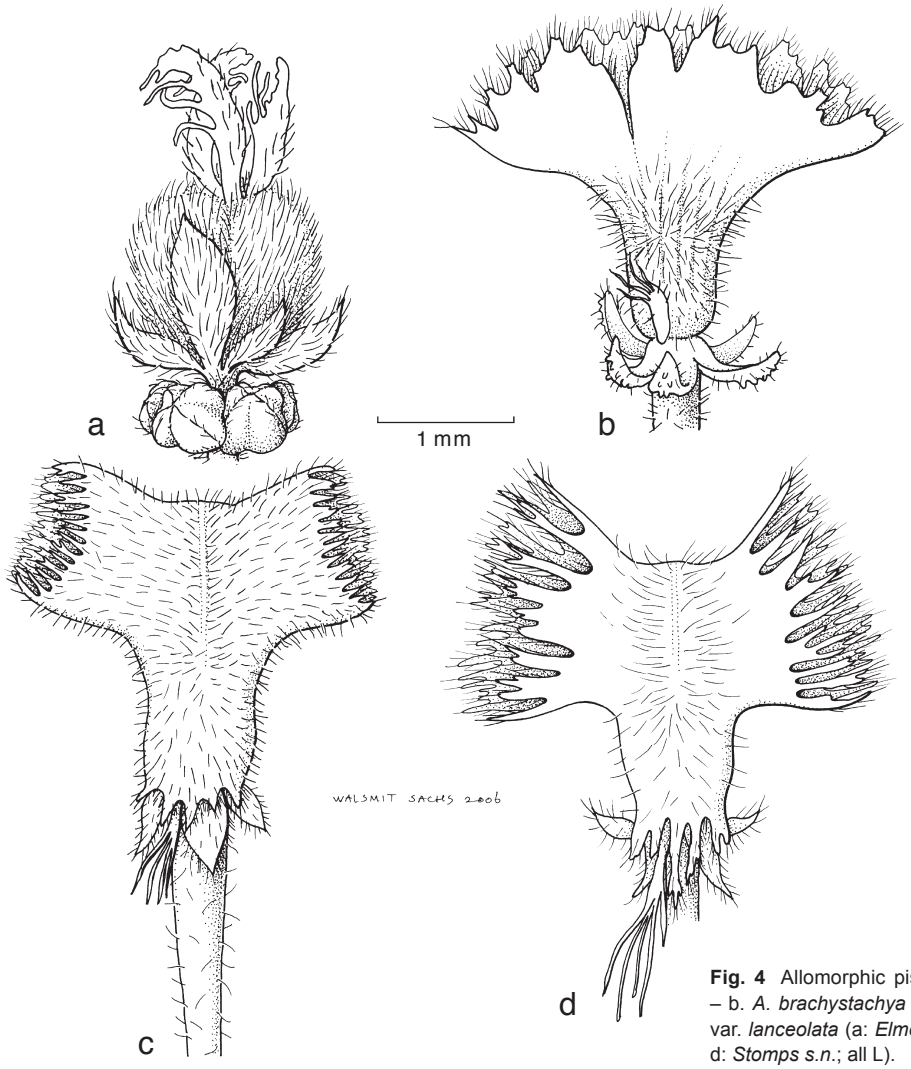
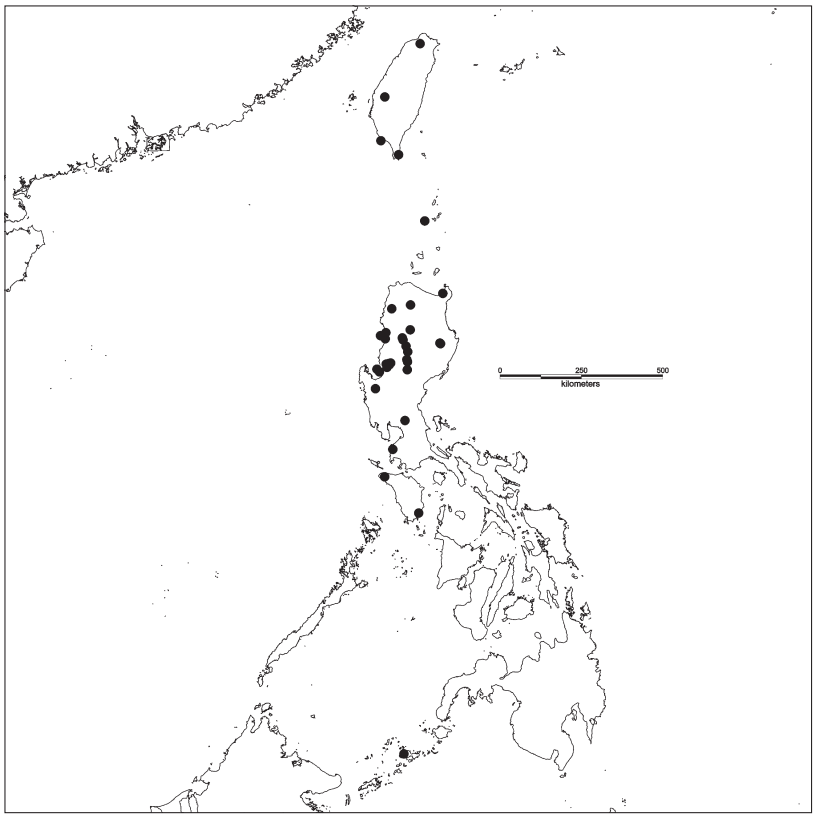


Fig. 4 Allomorphic pistillate flowers. – a. *Acalypha angatensis* Blanco. – b. *A. brachystachya* Hornem. – c. *A. indica* L. – d. *A. lanceolata* Willd. var. *lanceolata* (a: *Elmer 21969*; b: *Elbert 1523*; c: *Sagun & Risna SR 58*; d: *Stomps s.n.*; all L).



Map 3 Distribution of *Acalypha angatensis* Blanco.

Fruits globose, c. 2 by 2 mm, verrucate, distal half covered with bulbous-based trichomes, columella c. 1 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.5 by 1 mm.

Distribution — Taiwan, Malesia: Philippines.

Habitat & Ecology — Secondary forest; riversides.

Notes — 1. Key characters include yellowish velvety hairs, shortly pedunculate inflorescences and bisexual inflorescences usually terminated by a single pistillate ebracteate flower; completely staminate inflorescences are rare (see note 1 under *A. grandibracteata* and note 2 under *A. pulogensis*).

2. *Ramos BS 44392* from Sulu, Philippines, is the only specimen of this species from outside the North Luzon-Taiwan cluster.

3. The specific epithet refers to type locality of Angat, Bulacan Province, Philippines.

4. *Acalypha argentii* Sagun & G.A.Levin — Map 4

Acalypha argentii Sagun & G.A.Levin (2007) 351. — Type: *Meijer 10198* (holo L; iso A, BO, KY, MO, US), Indonesia, Sulawesi, Kulasi near Palu.

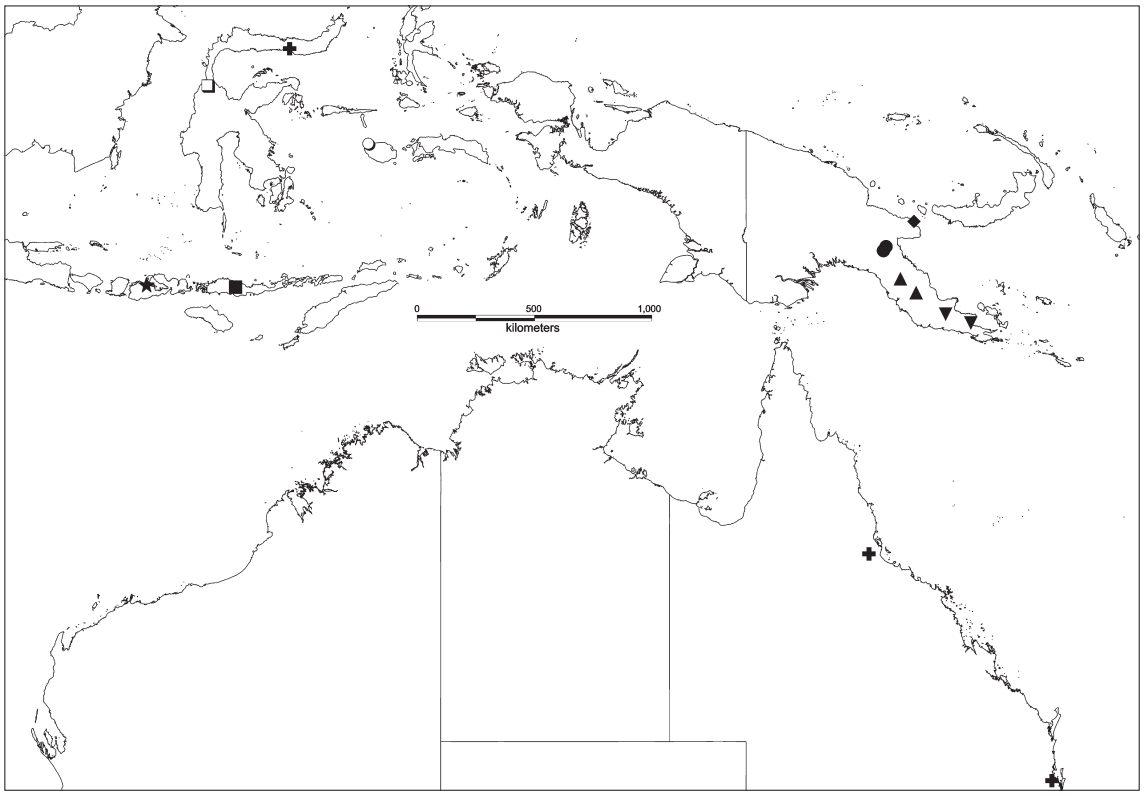
Herbaceous annuals, c. 0.4 m tall, monoecious; flowering branches c. 40 cm long, 2–4 mm diam. *Indumentum* velvety, with simple recurved hairs. *Stipules* persistent, elliptic, 3–5 by 0.2–0.5 mm, with capitate trichomes of c. 0.1 mm long. *Leaves*: petiole 5–40 mm long, with simple straight hairs of 0.5–0.75 mm long; blade ovate to elliptic, 2–5.4 by 1–2.7 cm, length/width ratio 1.6–2, chartaceous; base acute to obtuse; margin serrate, teeth c. 1 by 1–2.5 mm, with a gland on tooth tip; apex acute to acuminate; upper surface pubescent, hairs on lamina 0.25–1 mm long, straight; lower surface densely pubescent; veins at base 3, upper secondaries c. 4 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate, sometimes branched and the branches spicate; peduncle 8–15 mm long, sometimes with a single pistillate flower at the base, indumentum of simple recurved hairs of 0.2–0.5 mm long; fertile portion 50–150 by 5–10 mm, pistillate below and staminate above, simple to 2- or 3-branched, branches 7–15 mm apart, subtended by persistent bracts, latter elliptic, 2–5 by 0.2–0.5 mm; pistillate portion 22–70 by 7–10 mm, internodes 2–10 mm long; staminate portion 20–35 by c. 2 mm, internodes 0.5–0.1 mm long. *Staminate flowers*: bracts elliptic, c. 1 by 0.25 mm, with sparse hairs of 0.2 mm long outside; pedicel 0.5–0.75 mm long, with straight hairs of 0.1–0.5 mm long; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.5 by 0.3 mm, with straight hairs of c. 0.2 mm long, midrib sparsely verrucate in upper half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate flowers* 1 or 2 per bract; bract stipules elliptic 0.2–0.5 by c. 0.2 mm; bracts sessile, 5.5–6 by 6–7 mm, strongly veined outside, with dots, densely hairy outside, sparsely hairy inside, with simple trichomes of 0.5–1 mm long, sometimes with solitary capitate trichomes of c. 0.1 mm long on bract tooth apex and sinus, teeth 15, the apical tooth c. 2 by 1.5–2 mm, lateral teeth 0.75–1 by 0.5–1 mm, apices acute; pedicel 0(–0.3) mm long; calyx 1–1.5 mm diam, 3- (or 4-)lobed, sepals ovate to elliptic, c. 1 by 0.25 mm, densely hairy on margins with sparse verrucae on upper half of midrib; ovary globose to oblate, c. 0.5 by 0.75 mm, trilocular; stigmas 3, 3.5–4 mm long, each divided 4–6 times, smooth. *Fruits* not seen. *Allomorphic fruits* unknown.

Distribution — Endemic in Central Sulawesi (area of Kulasi near Palu).

Habitat & Ecology — Flowering: May. Altitude 700–800 m.

Notes — 1. Similar to the widespread *A. lanceolata* Willd. var. *lanceolata*, but hairy all over with velvety leaves, spicate to paniculate inflorescences with longer more robust staminate portions, and female bracts that are larger and very hairy. *Acalypha lanceolata* var. *lanceolata* has practically glabrous leaves, spicate inflorescences that are never branched and with short staminate portions, the pistillate bracts are comparatively smaller and only sparsely hairy. *Acalypha argentii* is a rare species from Central Sulawesi and known only from the type collection.

2. The specific epithet is assigned in honour of Dr. George Argent, former head of Tropical Botany at the Royal Botanic Garden Edinburgh, who has done extensive floristic work in Malesia, particularly in Indonesia and the Philippines.



Map 4 Distribution of *Acalypha argentii* Sagun & G.A.Levin (❑), *A. balgooyi* Sagun & G.A.Levin (❍), *A. capillipes* Müll.Arg. (✚), *A. floresensis* Sagun & G.A.Levin (■), *A. phyllonomifolia* Airy Shaw (▲), *A. spectabilis* Airy Shaw (●), *A. stenophylla* K.Schum. (◆), and *A. zollingeri* Müll.Arg. (★).

5. *Acalypha australis* L. — Fig. 2c; Map 5

Acalypha australis L. (1753) 1004; (1763) 1424; (1770) 634; (1774) 721; Murray (1784) 863; Willd. (1805) 530; Poir. (1816) 685; Spreng. (1827) 315; D.Dietr. (1852) 376; F.B.Forbes & Hemsl. (1894) 437; Diels (1900) 429; Hayata (1904) 50; Merr. (1910) 192; Pampanini (1910) 408; Merr. (1923) 445; Pax & K.Hoffm. (1924) 35; Merr. (1935) 238; Hurus. (1954) 298; H.Keng (1955) 31; C.F. Hsieh (1977) 441; Airy Shaw (1980b) 584; (1983) 2; S.F.Huang & T.C.Huang (1991) 82; T.C.Huang (1993) 416; Govaerts et al. (2000) 50; T.C.Huang (2003) 68; Rani & N.P.Balakr. (2007) 96. — *Ricinocarpus australis* (L.) Kuntze (1891) 617. — Lectotype (Airy Shaw 1980b): *Herb. Linn. No. 1139.5* (LINN), China.

Urtica gemina Lour. (1790) 558; (1793) 682. — *Acalypha gemina* (Lour.) Spreng. (1826) 880. — *Acalypha gemina* (Lour.) Spreng. var. *genuina* Müll. Arg. (1865) 41, nom. inval.; (1866) 866. — Type: Not located.

Acalypha sessilis Poir. (1804) 204. — Type: l'Herbier de Jussieu (P n.v.).

Acalypha pauciflora Hornem. (1807) 1; Willd. (1809) 992; Hornem. (1815) 909. — Type: Herb. Vahl (holo C), China.

Acalypha chinensis Roxb. (1832b) 677; Hook. & Arn. (1837) 213. — Type: *Roxburgh 2099* (holo K n.v.).

Acalypha lanceolata Wall. (1828) n. 7789, nom. nud., non Willd. (1805) 524.

Acalypha australis L. var. *lanceolata* Hayata (1904) 51; Fedde (1906) 57. — *Acalypha australis* L. forma *lanceolata* (Hayata) Hurus. (1954) 298. — Type: *Makino s. n.* (holo TI), Taiwan (Formosa), Kelung, anno 1876.

Acalypha virgata auct. non L.: Thunb. (1784) 268.

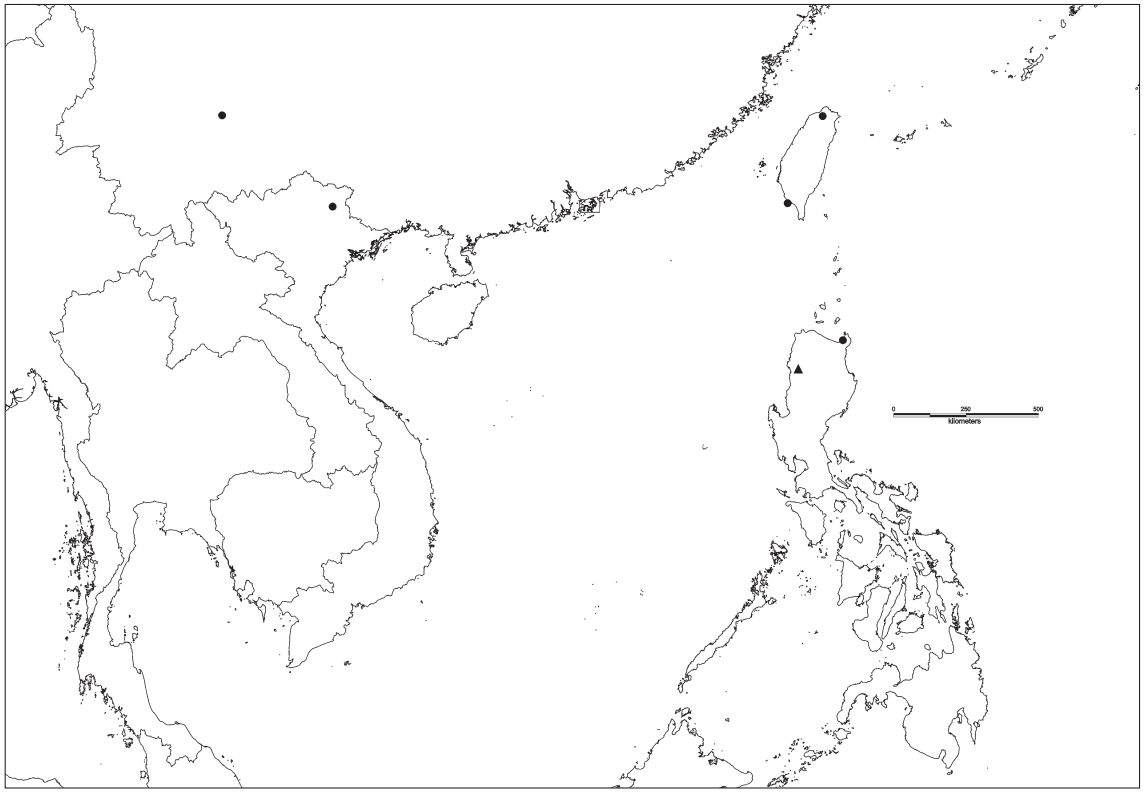
Herbaceous annuals, c. 0.35 m tall, monoecious; flowering branches 6–20 cm long, 1–2 mm diam. *Indumentum* sparsely hairy, with simple recurved hairs. *Stipules* persistent, elliptic, 0.5–1 by c. 0.2 mm, nearly glabrous. *Leaves*: petiole 2–20 by 0.5–1 mm long, with simple straight hairs to c. 0.5 mm long; blade narrowly elliptic, 2.5–3.5 by 0.6–1 cm, length/width ratio 3–5.8, chartaceous; base acute; margin weakly serrate, teeth 0.2–0.5 by 2–3 mm, with a gland on tooth tip; apex acute; upper surface nearly glabrous, hairs straight, 0.5–1 mm long; lower surface sparsely hairy with similar hairs; veins at base 3, upper secondaries 3–5 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate; peduncle 5–10 mm long, glabrous; fertile portion 10–20 by 5–10 mm, pistillate below and staminate above; pistillate portion 10–15 by 5–10 mm, internodes 3–5 mm long; staminate portion 3–5 by 1.5–2 mm, internodes 0.5 mm long. *Staminate flowers*: bracts ovate, c. 0.3 by 0.3 mm, glabrous; pedicel c. 0.2 mm long, glabrous; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.5 by 0.3 mm, glabrous, midrib sparsely verrucate in upper half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate flowers* c. 1 mm diam; up to 6 per bract; bract stipules elliptic, 0.2–0.3 by c. 0.2 mm; bracts sessile, ovate to elliptic, 8–10 by 7–9 mm, tapering on distal end, weakly veined outside, without dots, glabrous, teeth c. 15, the apical tooth 1.5–2 by 1.5–2 mm, lateral teeth c. 0.5 by 1.5 mm, apices acute to acuminate; pedicel 0(–0.5) mm long; calyx c. 1 mm diam, sepals 3, ovate, c. 0.5 by 0.5 mm, glabrous; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 3.5–4 mm long, each divided 4–6 times, smooth. *Fruits* globose to oblate, c. 2 by 2.5 mm, verrucate, distal half covered with bulbous-based trichomes, columella c. 1 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.5 by 1 mm.

Distribution — Russia, China, Taiwan, Malesia: Philippines (Northern Luzon, Cagayan Province).

Habitat & Ecology — Roadsides; open areas.

Notes — 1. *Acalypha australis* is similar to *A. zollingeri* with its large pistillate bracts, but *A. australis* has narrowly elliptic leaves and pistillate bracts with a distinct acute apex. It also does not possess the yellow refringent sessile glands and stellate hairs of *A. zollingeri*. Furthermore, *A. australis* is an annual herb whereas *A. zollingeri* is a shrub.

2. A widespread weed in East Asia, but known in the Philippines only from a single collection, *Ramos 7800*. This specimen has narrowly elliptic leaves and was considered a separate variety or forma from the ovate-leaved species commonly found in East Asia (Hayata 1904, Honda 1931). Differences in leaf width might be attributed to the varying light conditions in habitat, where narrow-leaved specimens tend to grow in light intense areas. No infraspecific categories in *A. australis* are therefore recognized in this revision.



Map 5 Distribution of *Acalypha australis* L. (●), and *A. pulogensis* Sagun & G.A.Levin (▲).

3. See note 1 under *A. indica*.

4. The specific epithet refers to 'south', perhaps southern China, the type locality for the species.

6. *Acalypha balgooyi* Sagun & G.A.Levin — Map 4

Acalypha balgooyi Sagun & G.A.Levin (2007) 353. — Type: *Nooteboom 5327* (holo L), Indonesia, NW Buru, N of Bara, Waeduna River.

Shrubs, c. 1 m tall, fertile branches exclusively staminate or with pistillate inflorescences, sometimes bearing some staminate flowers at their bases; flowering branches 30–36 cm long, 2–3 mm diam, subglabrous. *Indumentum* nearly absent except simple straight hairs on young parts. *Stipules* caducous, ovate to elliptic, 1.75–2 by 0.3–0.5 mm, midrib hairy, with short stalked trichomes. *Leaves*: petiole 1–3 cm long, with short sparse straight hairs of c. 0.5 mm long; blade elliptic, 6–12 by 1.5–3 cm, length/width ratio 4–4.5, chartaceous; base obtuse to acute; margin crenate, teeth 0.5–1 by 4–5 mm, with a gland on tooth tip; apex acuminate; upper and lower surfaces glabrous, flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 7–9 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 4–7 mm long, indumentum simple straight hairs to 0.2 mm long; fertile portion 25–100 by 1.5–2 mm, internodes 1–1.5 mm long; sometimes a cluster of staminate flowers present in same axil as pistillate inflorescence. *Staminate flowers*: bracts elliptic, c. 0.75 by 0.25–0.3 mm, with dense hairs to 0.1–0.25 mm long outside, apex with gland; pedicel 0.5–0.75 mm long, with straight hairs to 0.2 mm long; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.5 by 0.25 mm, with straight hairs to 0.1–0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, spicate; peduncle 1–2 cm long, indumentum nearly absent; fertile portion pseudoscorpioid, 25–40 by 4–7 mm, internodes 7–12 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules elliptic, c. 0.75 by 0.2 mm; bracts sessile, 5–6 by 8–11 mm, strongly veined outside, with dots, nearly glabrous outside and inside, with capitate trichomes to 0.1 mm long on margin, teeth 9–11, apical tooth 2–3 by 1.5–2 mm, lateral teeth 0.75–1.5 by 0.75–1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate, c. 0.75 by 0.75 mm, sparsely hairy outside with no verrucae, glabrous inside; ovary globose to oblate, c. 1 by 1 mm, trilocular; stigmas 3, 3–5 mm long, each divided 7–9 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 2.5 by 3.5 mm, verrucate, distal half covered with inconspicuous trichomes, columella 1.5–1.75 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 2 by 1.5 mm.

Distribution — Endemic in Malesia: Moluccas (NW Buru).

Habitat & Ecology — Riverine forest; in river valley with steep slopes; limestone mixed with gravel and stones. Flowering: November. Altitude 100–300 m.

Notes — 1. *Acalypha balgooyi* is endemic to Buru and is similar to *A. hainanensis* Merr. & Chun in terms of having elliptic leaves with crenate margins, but differs in its exclusively staminate inflorescences and pseudoscorpioid pistillate inflorescences, and the presence of a few staminate flowers in some leaf axils that bear pistillate inflorescences. Unlike *A. hainanensis*, *A. balgooyi* does not exhibit pistillate flowers at the base of the predominantly staminate inflorescences.

2. A paratype is assigned: *Van Balgooy 4861* (holo L; iso A, BO, KY, MO, US), Indonesia, NW Buru, SE of Bara, Waeduna River.

3. The specific epithet is assigned in honour of M.M.J. van Balgooy, one of the world's experts on Malesian plants.

7. *Acalypha brachystachya* Hornem. — Fig. 2d, 4b; Map 6

Acalypha brachystachya Hornem. (1807) 1; Willd. (1809) 992; Hornem. (1815) 909; Poir. (1816) 685; Spreng. (1826) 880; D.Dietr. (1852) 376; Müll.Arg. (1866) 870; Hook.f. (1887) 416; F.B.Forbes & Hemsl. (1894) 437; Pamp. (1910) 408; J.J.Sm. (1910a) 756; Koord. (1912) 498; Pax & K.Hoffm. (1924) 101; Koord.-Schum. (1913) 67; De Wild. (1926) 488; Backer & Bakh.f. (1963) 489; Radcl.-Sm. (1973) 526, f. 1A; Airy Shaw (1981) 247; (1982) 2; S.F.Huang & T.C.Huang (1991) 83; T.C.Huang (1993) 419; (2003) 68; Rani & N.P.Balakr. (2007) 96. — *Ricinocarpus brachystachyus* (Hornem.) Kuntze (1891) 617. — Type: *Herb. Hornemann* (holo C), China.

Acalypha conferta Roxb. (1832b) 686. — Type: *Roxburgh 2550/2557* (holo K n.v.).
Acalypha calyciformis Wight ex Wall. (1828) n. 7786, nom. nud. — Representative specimen: *Wall. Cat. 7786C* (LE, NY), India.
Acalypha fissa Wall. (1828) n. 7786B, nom. nud. — Representative specimen: *Wall. Cat. 7786B* (LE), India.
Tragia tenuis Wall. (1828) n. 7787, nom. nud. — Representative specimen: *Wall. Cat. 7787* (n.v.), India.
Nanocnide closii H.Lév. & Vaniot (1904) cxliv. — Type: *Cavalerie 2732* (holo E), China, Kouy-Tchéou, Environs de Tou-chau, September 1899.

Herbaceous annuals, 0.2–0.45 m tall, monoecious; flowering branches 5–15 cm long, 1–3 mm diam. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, elliptic, 0.5–1 by c. 0.25 mm, sparsely hairy. *Leaves*: petiole 6–95 mm long, with simple recurved hairs of c. 1 mm long; blade ovate to elliptic, 3–5.5 by 1.2–3.5 cm, length/width ratio 1.6–2.5, chartaceous; base obtuse to emarginate; margin serrate, teeth 1–2 by 2–8 mm, with a gland on tooth tip; apex acute to acuminate; upper surface sparsely hairy, hairs on lamina straight, 0.5–1.5 mm long, hairs on nerves short, recurved; lower surface nearly glabrous, with few hairs of 0.5–1 mm long, slightly denser on midrib and veins; veins at base 3, upper secondaries 3–5 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1–4 per axil, spicate; peduncle 2.5–9 mm long, indumentum of simple straight hairs with sparse capitate trichomes of 0.1–0.5 mm long; fertile portion 7–50 by 4–10 mm, pistillate below and staminate above; pistillate portion 5–25 by 3–12 mm, internodes 1.5–5 mm long; staminate portion 3–17 by 1 mm, internodes 0.5–1.5 mm long. *Staminate flowers*: bracts ovate, c. 0.5 by 0.25 mm, hairy on margins; pedicel 0.2–0.75 mm long, hairy; calyx 0.5–0.75 mm diam, sepals ovate, 0.3–0.5 by c. 0.2 mm, glabrous to sparsely hairy, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.2 by 0.1 mm long. *Pistillate flowers* 0.5–0.75 mm diam; 4–6 per bract, maturing singly or doubly; bract stipules not seen; bracts sessile, 3.5–7 by 5–11 mm, weakly veined outside, without dots, sparsely hairy outside with hairs of 0.25–0.5 mm long, with capitate trichomes of 0.5–1 mm long, glabrous inside, lobes 3–5, apical and lateral lobes 3–6 by 0.75–1 mm, apices acute; pedicel 0–0.3 mm long; calyx 0.5–0.75 mm diam, sepals 3, ovate, 0.5–1 by 0.25–0.5 mm, sparsely hairy on margins with verrucae in upper half of midrib; ovary globose to ellipsoid, 0.3–0.5 by c. 0.3 mm, trilocular; stigmas 3, 1–2 mm long, each divided 4 or 5 times, smooth. *Fruits* 1–1.5 by 1.5–2 mm, verrucate, distal half covered with trichomes of 0.6–1 mm long, lower half with sparse hairs of 0.2 mm long; columella 0.5–0.75 mm long. *Allomorphic fruits* terminal, pedicel 0.5–0.75 mm long, indumentum simple, sparse; mericarp obovoid, 1–2 by 1–3 mm, ribbed, longitudinally sutured, distally with 2 opposite whorled, basally fused fringes whorls distally, fringes sometimes fused to form 1 whorl, fringes c. 1 by 1.5 mm, longer than half of mericarp length, proximal end of mericarp not fringed, hairs simple on ribs and fringes; stigma 0.5–1 mm long, 2 or 3 times divided. *Seeds* prolate, 0.75–1.5 by 0.5–1 mm.

Distribution — Africa, India, China, Taiwan, Malesia: Sumatra, Java, Lesser Sunda Is.

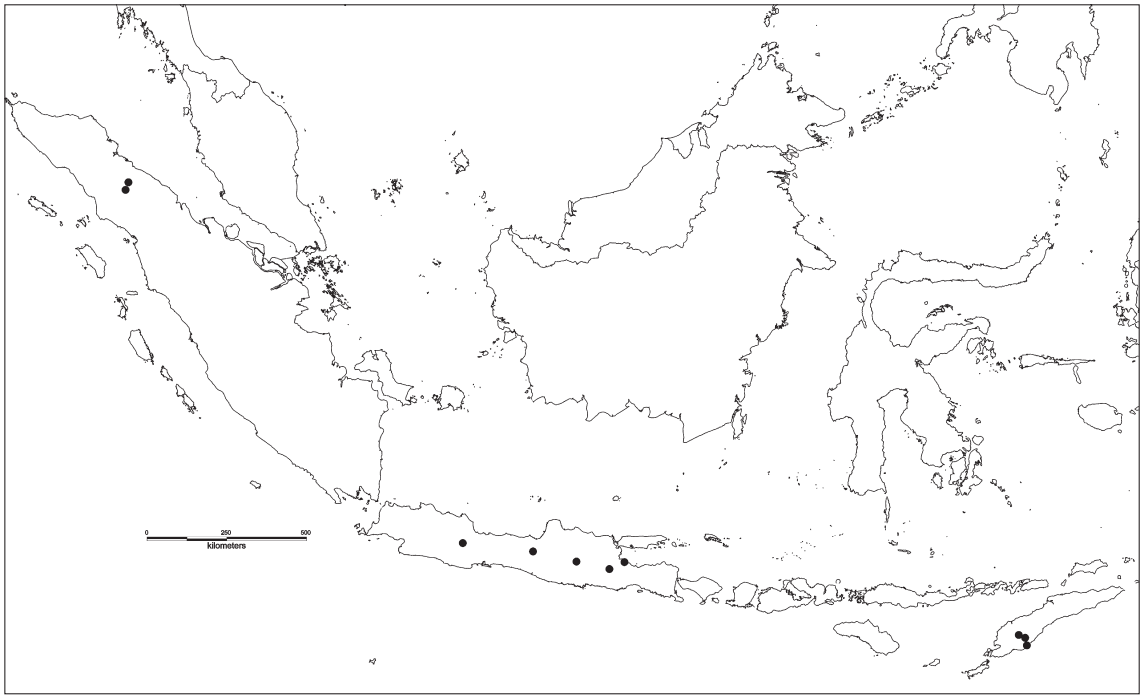
Notes — 1. *Acalypha brachystachya* bears superficial similarity to *A. lanceolata* var. *lanceolata* and *A. indica*, which are also weedy annuals, but it is distinct by its deeply lobed pistillate bracts. *Acalypha lanceolata* var. *lanceolata* has shallowly toothed pistillate bracts, whereas *A. indica* has obtuse to subentire pistillate bracts. Allomorph morphology also differs among the three species. The allomorphs of *A. brachystachya* have lateral fringes that appear fused forming a single distal fringe, whereas the two other species exhibit distinctly separate lateral fringes. See also note 1 under *A. indica*.

2. *Acalypha supera* Forssk. (1775) is interpreted by Govaerts et al. (2000) from its description as synonymous with *A. brachystachya*, as it is an older name it should have priority over *brachystachya*. However, the description is vague and no type was designated nor can any original material be found, so we are proposing that this name should be rejected (Sagun in prep.).

3. The specific epithet refers to the usually short inflorescences.

8. *Acalypha capillipes* Müll.Arg. — Fig. 2e, 6c1-c2; Map 4

Acalypha capillipes Müll.Arg. (1865) 40; (1866) 823; P.I.Forst. (1994) 212; Govaerts et al. (2000) 54. — *Ricinocarpus capillipes* (Müll.Arg.) Kuntze (1891) 617. — Lectotype (Forster 1994): *Beckler 19* (holo MEL; iso G-DC, K), Australia, New South Wales.
Acalypha spinescens Benth. (1879) 72, t. 1291; P.I.Forst. (1994) 214. — Type: *Riedel s.n.* (holo K; iso L), Indonesia, Sulawesi, Gorontalo.



Map 6 Distribution of *Acalypha brachystachya* Hornem.

Shrubs, 1–1.5 m tall, monoecious; flowering branches 6–15 cm long, 2–4 mm diam, with axillary spines of 7–11 by c. 1 mm. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, ovate to elliptic, c. 0.75 by 0.5–0.75 mm, midrib hairy, without capitate trichomes. *Leaves*: petiole 2–4 mm long, with sparse straight hairs of 0.2–0.3 mm long; blade ovate to elliptic, 1.3–3.5 by 0.5–2 cm, length/width ratio 1.8–3, chartaceous; base emarginate to cuneate; margin entire in lower 1/3 and crenate above, teeth 1–2 by 2–6 mm, with a gland on tooth tip; apex acute to obtuse, without drip-tip; upper surface glabrous, lower surface sparsely hairy, both surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 4 or 5 per side. *Staminate inflorescences* axillary, solitary, 1 per axil, spicate; peduncle 1–1.5 mm long, sparsely hairy; fertile portion 6–20 by c. 0.5 mm, internodes 0.5–5 mm long. *Staminate flowers*: bracts ovate, c. 0.5 by 0.5 mm, sparsely hairy outside with straight hairs of c. 0.1 mm long; pedicel 0.5–0.75 mm long, with straight hairs of c. 0.2 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, c. 0.5 by 0.2 mm, with straight hairs of c. 0.1 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.2 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate; peduncle 10–17 mm long, glabrous; fertile portion 1–2 cm long, bearing only 1 or 2 bracts, internodes c. 5 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract; bract stipules not seen; bracts sessile, 3–5 by 3–8 mm, apices acute, weakly veined outside, with dots, glabrous, teeth 11–13, apical tooth c. 2 by 3 mm, lateral teeth c. 1 by 2 mm; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.5 mm, hairy outside, hairs 0.5–0.75 mm long, without verrucae, glabrous inside, margins with sparse hairs; ovary globose, c. 1 by 1–1.25 mm, trilocular, verrucate; stigmas 3, 2–3 mm long, each divided 8–10 times, smooth. *Bisexual inflorescences* absent. *Fruits* not seen. *Allomorphic fruits* unknown.

Distribution — Malesia: Sulawesi; Australia (Queensland).

Habitat & Ecology — Dry, coastal areas.

Notes — 1. Key characters include axillary spines and pistillate inflorescences with an elongated peduncle bearing one or two flowers. This species is similar to *A. siamensis* var. *siamensis* with its crenate leaf margins, but *A. capillipes* does not have the bisexual inflorescences and fruits with spiny appendages found in *A. siamensis* var. *siamensis*.

2. This is a species known primarily from north-eastern Australia, and there are only two collections of *A. capillipes* known from Malesia, on Gorontalo (North Sulawesi), and Moena (Central Sulawesi).

3. The specific epithet refers to the long, thin peduncle of the pistillate inflorescence.

9. *Acalypha cardiophylla* Merr. var. ***cardiophylla*** — Fig. 5a, 6d1-d2; Map 7

Acalypha cardiophylla Merr. (1906) 80; Pax & K.Hoffm. (1924) 141; Fosberg (in Fosberg & Sachet 1980) 11. — Lectotype (designated here): *Merrill 2506* (holo SING; iso BM, G, GH, MO, US). — Syntype: *Ahern's collector 1249* (BM, G, US), Philippines, Luzon, Bataan, Lamao Forest.

Acalypha subcinerea Elmer (1915) 2631. — Type: *Elmer 13329* (holo PNH†; iso BM, BO, G, L, MO, NY, U), Philippines, Mindanao, Agusan, Cabadbaran, Mt Urdaneta.

Acalypha suirebiensis Yamam. (1933) 178; H.Keng (1951) 205; (1955) 32; T.C.Huang (1993) 422; (2003) 68. — Type: *Yamamoto 813* (holo TAI), Taiwan, Suirenbi, Kwarenko.

Acalypha hontauyuensis H.Keng (1951) 204; Hurus. (1954) 301; H.Keng (1955) 31; T.C.Huang (1993) 419; Govaerts et al. (2000) 67; T.C.Huang (2003) 68. — Lectotype (designated here): *Hosokawa 8047* (holo TAI). — Syntype: *Hosokawa 8165* (TAI), Taiwan, Hontauyu (Botel Tobago), 16 July 1935.

Acalypha caturus auct. non Blume: Merr. (1923) 445; H.Keng (1955) 31; Airy Shaw (1983) 2; T.C.Huang (1993) 419; Govaerts et al. (2000) 55 pro syn.; T.C.Huang (2003) 68.

Large shrubs or small trees, 3–12 m tall, monoecious; flowering branches 20–30 cm long, 3–7 mm diam, glabrous. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, broadly ovate to elliptic, 3–8 by 2–4 mm, apex acute, with velvety hairs, without capitate trichomes. *Leaves*: petiole 5–15 cm long, glabrous; blade ovate to cordate, 9–20 by 7–17 cm, length/width ratio 1.1–1.4, chartaceous; base acute to cordate; margin subentire to weakly crenate, teeth 1–3 by 2–5 mm, without a gland on tooth tip; apex acute; upper surface glabrous, lower surface sparsely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 5–7 per side. *Staminate inflorescences* axillary,

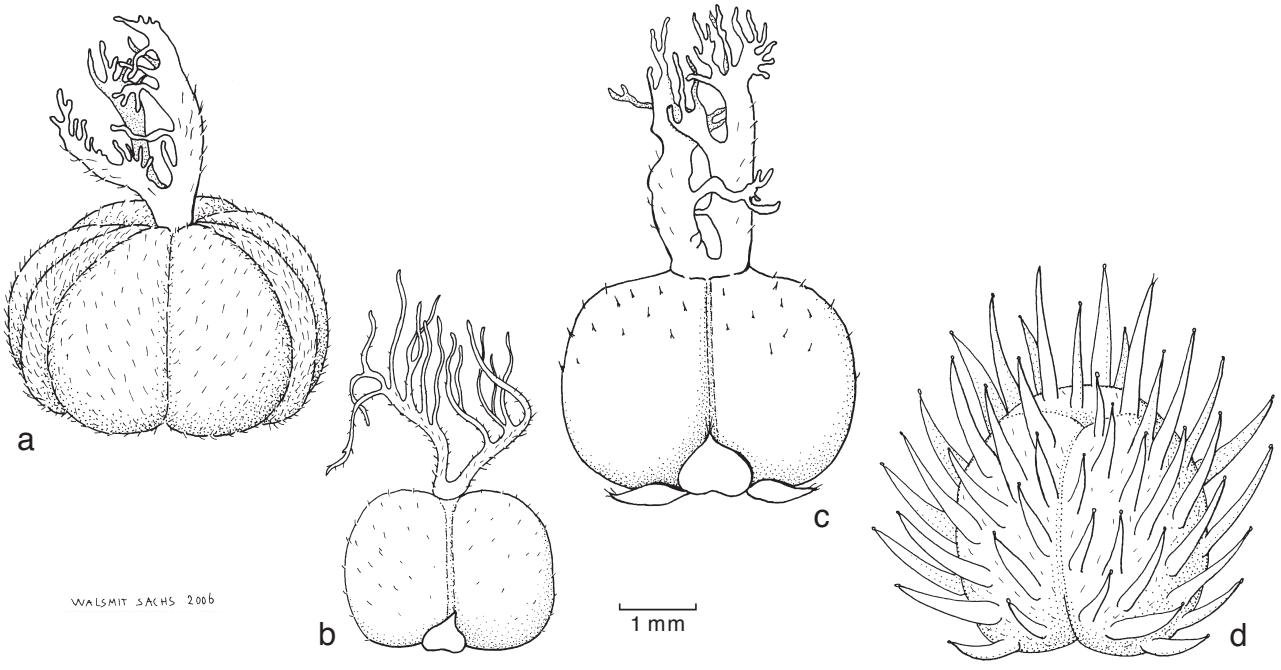
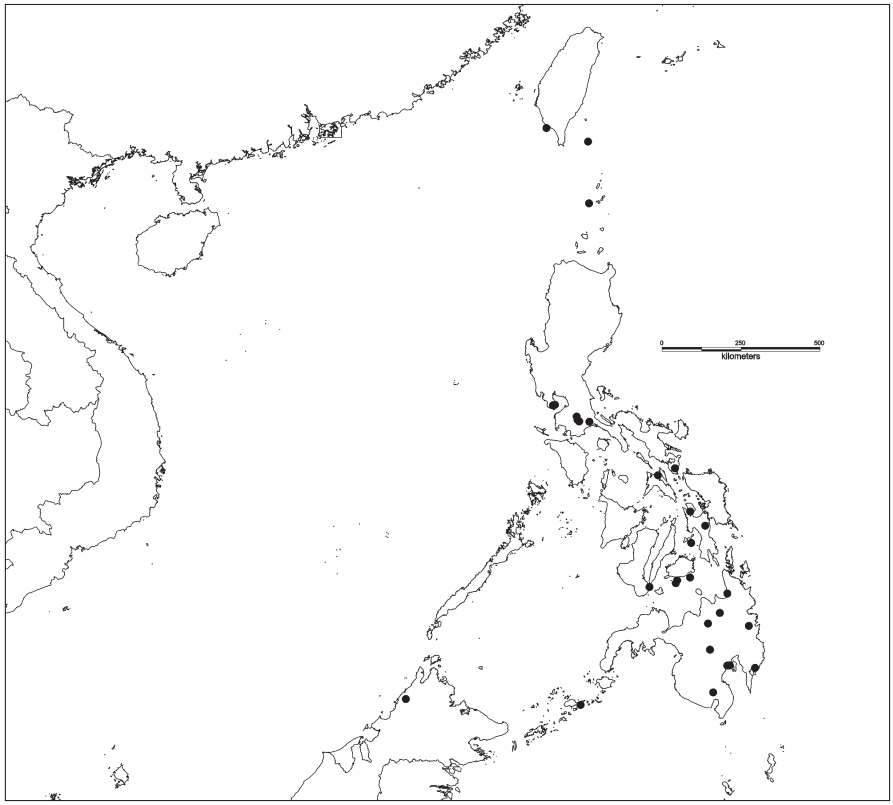


Fig. 5 Fruit morphology. – a. *Acalypha cardiophylla* Merr. var. *cardiophylla*. – b. *A. caturus* Blume (typical of former *A. cinnamomifolia* Pax & K.Hoffm.). – c. *A. caturus* Blume. – d. *A. siamensis* Oliv. ex Gage var. *siamensis* (a: *Mendoza PNH 10447*; b: *Carr 14147*; c: *Kadir A1669*; d: *Sagun & Risna SR 52*, all L).



Map 7 Distribution of *Acalypha cardiophylla* Merr. var. *cardiophylla*.

1 or 2 per axil, spicate; peduncle 5–15 mm long, glabrous; fertile portion 8–30 by 2–4 cm, internodes 1–4 mm long. *Staminate flowers*: bracts ovate to elliptic, 0.2–0.5 by c. 0.1 mm, with sparse hairs outside; pedicel 0.5–1 mm long, nearly glabrous; calyx 1–1.5 mm diam, sepals ovate to elliptic, c. 1 by 0.75 mm, with straight hairs to 0.25 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, spicate, straight, laxly many-flowered, rachis visible, in different axils than staminate ones; peduncle 5–10 mm long, indumentum of short velvety hairs; fertile portion 12–25 by 0.5–1 cm, internodes 5–10 mm long. *Pistillate flowers* 1.5–2 mm diam; 1 per bract; bract stipules not seen; bracts sessile, 1–2 by 3–4 mm, chartaceous, non-accrescent, weakly veined outside, without dots, with velvety hairs outside, glabrous inside, lobes 3, apical and lateral lobes 0.5–1 by 0.5–1 mm, apices acute; pedicel absent; calyx 1.5–2 mm diam, sepals 3, ovate, c. 1 by 1 mm, hairy outside without verrucae, glabrous inside; ovary globose, c. 2 by 2 mm, trilocular; stigmas 3, 2–3 mm long, each more than 20 times divided, base hairy. *Bisexual inflorescences* like the staminate ones but with a single pistillate flower at the base, much more common than truly staminate inflorescences. *Fruits* globose to oblate, 3–3.5 by 2.5–3 mm, verrucate, each locule with a longitudinal ridge covered with velvety hairs, columella c. 2 mm long. *Allomorphic fruits* unknown. *Seeds* globose, c. 2 by 2 mm.

Distribution — Taiwan, Malesia: Borneo, Philippines.

Habitat & Ecology — Open fields; secondary growth; semi-open forest.

Vernacular names — Philippines: Candilla (Cebuano)

Uses — Leaves applied for headache (*PNH (Frake) 38322*).

Notes — 1. Key characters include 3-partite, non-accrescent pistillate bracts, and 3-locular fruits with septal thickenings. This species is similar to *A. longispica* and *A. caturus*, and a number of authors have subsumed *A. cardiophylla* into *A. caturus*. All three species have 3-partite, non-accrescent pistillate bracts, neither *A. caturus* nor *A. longispica* has densely hairy longitudinal ridges on the fruit, and *A. caturus* has bilocular fruits.

2. The variety *A. cardiophylla* Merr. var. *ponapensis* (Kaneh. & Hatus.) Fosberg (in Fosberg & Sachet 1980) occurs in Pohnpei, in the Caroline Islands.

3. The specific epithet refers to the cordate leaves.

10. *Acalypha caturus* Blume — Fig. 5b-c, 6e1-f2; Map 8

Acalypha caturus Blume (1825) 629; Miq. (1859) 406; Baill. (1862) 224; Müll. Arg. (1866) 805; Scheffer (1869) 121; Stapf (1894) 225; Boerl. (1900) 286; J.J.Sm. (1910a) 510; Koord.-Schum. (1913) 67; (1914) 71; Hutch. (1914) 135; Merr. (1921a) 343; (1923) 445; Pax & K.Hoffm. (1924) 141; S.Moore (1925) 101; Merr. (1929) 160; Holth. & H.J.Lam (1942) 199; Backer & Bakh. f. (1963) 489; Whitmore (1973) 51; Airy Shaw (1975) 23; (1981) 247; (1982) 3; Govaerts et al. (2000) 55. — *Ricinocarpus caturus* (Blume) Kuntze (1891) 615. — Lectotype (selected here): *Blume 2130* (L, barcodes L0240994, L0241027, L0241031), Indonesia, Greater Sunda Is., Java, Mt Salak.

Acalypha minahassae Koord. (1898) 579; Boerl. (1900) 286; K.Schum. (1901) 348; Koord.-Schum. (1912) 2. — Type: *Koorders 16785* (BO), Sulawesi (Celebes).

Acalypha similis Koord. (1898) 579; Boerl. (1900) 286; K.Schum. (1901) 348. — Typus: None designated .

Acalypha caturus forma *angustifolia* J.J.Sm. (1910a) 511, nom. nud.

Acalypha cinnamomifolia Pax & K.Hoffm. (1924) 142; Airy Shaw (1980a) 15; (1982) 3; Govaerts et al. (2000) 56. — Type: *Schlechter 17982* (holo B†; iso G, K?, L), Papua New Guinea, Kaiser Wilhelmsland, Finisterre.

Acalypha cinnamomifolia Pax & K.Hoffm. var. *induta* Airy Shaw (1980a) 15; Govaerts et al. (2000) 56. — Type: *Stevens LAE 55670* (holo K; iso A, L), Papua New Guinea, Milne Bay District, Raba Raba subdistrict.

Acalypha wilkesiana auct. non Müll.Arg.: Koord. (1898) 579.

Large shrubs or small trees, 7–10 m tall, monoecious; flowering branches 8–20 cm long, 4–8 mm diam, nearly glabrous to velvety. *Indumentum* sparsely hairy, denser on young parts, with simple straight hairs. *Stipules* persistent, ovate to elliptic, 6–7 by 1.5–2 mm, hairy, without capitate trichomes. *Leaves*: petiole 3–12 cm long, with short velvety hairs of c. 0.25 mm long; blade ovate to elliptic, 9–16 by 7–10 cm, length/width ratio 1.2–1.6, chartaceous; base obtuse to acute; margin serrate to crenate, teeth 1–2 by 2–3 mm, with a gland on tooth tip; apex acute to acuminate; upper surface glabrous, lower surface sparsely to densely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 4–7

per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–8 mm long, indumentum of simple velvety hairs; fertile portion 10–24 by 2–4 cm, internodes 1–3 mm long. *Staminate flowers*: bracts ovate, c. 1 by 0.5 mm, outside with dense hairs of 0.2–0.3 mm long; pedicel 0.5–1 mm long, with straight hairs to 0.2 mm long; calyx 0.5–1 mm diam, sepals ovate to elliptic, c. 0.75 by 0.5 mm, glabrous, midrib not verrucate, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, solitary per axil, spicate, straight, laxly many-flowered (rachis visible); peduncle 5–8 mm long, indumentum velvety; fertile portion 10–30 by 0.5–1 cm, internodes 2–5 mm long. *Pistillate flowers* 1.5–2 mm diam; 1 per bract; bract stipules not seen; bracts sessile, 1–2 by 3–4 mm, chartaceous, non-accrescent, densely hairy outside, without dots, glabrous inside, lobes 3, apical and lateral lobes 0.75–1 by 0.5 mm, apices acute; pedicel absent; calyx 1.5–2 mm diam, sepals 3, ovate to narrowly elliptic, 1–1.5 by c. 0.5 mm, hairy outside with no verrucae, glabrous inside; ovary globose, c. 1 by 1 mm, bilocular; stigmas 2, 3–3.5 mm long, each divided 6–10 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 2 by 3–3.5 mm, verrucate, columella 1.5–2 mm long. *Allomorphic fruits* unknown. *Seeds* globose, c. 1.5 by 1.5 mm.

Distribution — Malesia: Peninsular Malaysia, Sumatra, Java, Borneo, Sulawesi, Lesser Sunda Is., Moluccas, Papua New Guinea.

Habitat & Ecology — Primary and secondary forest, riverine forest, often on limestone and along rivers, also in open or cleared areas.

Vernacular names — Sulawesi: Membea hutan (Gorontalo); Abas (Central Sulawesi).

Notes — 1. Key diagnostic characters include bilocular fruits and 3-partite non-accrescent pistillate bracts. This species is similar to *A. cardiophylla* var. *cardiophylla* and *A. longispica* (see note 1 under *A. cardiophylla* var. *cardiophylla*).

2. The type for *A. cinnamomifolia* (*Schlechter 17982*) is a peculiar specimen with long and sparsely branched stigmas, which rarely occur in Malesian *Acalypha*, but in all other characters considered it is scarcely different from *A. caturus*. Until more specimens are available that show consistent differences between *A. cinnamomifolia* and *A. caturus*, the former name is synonymized and not considered as distinct species.

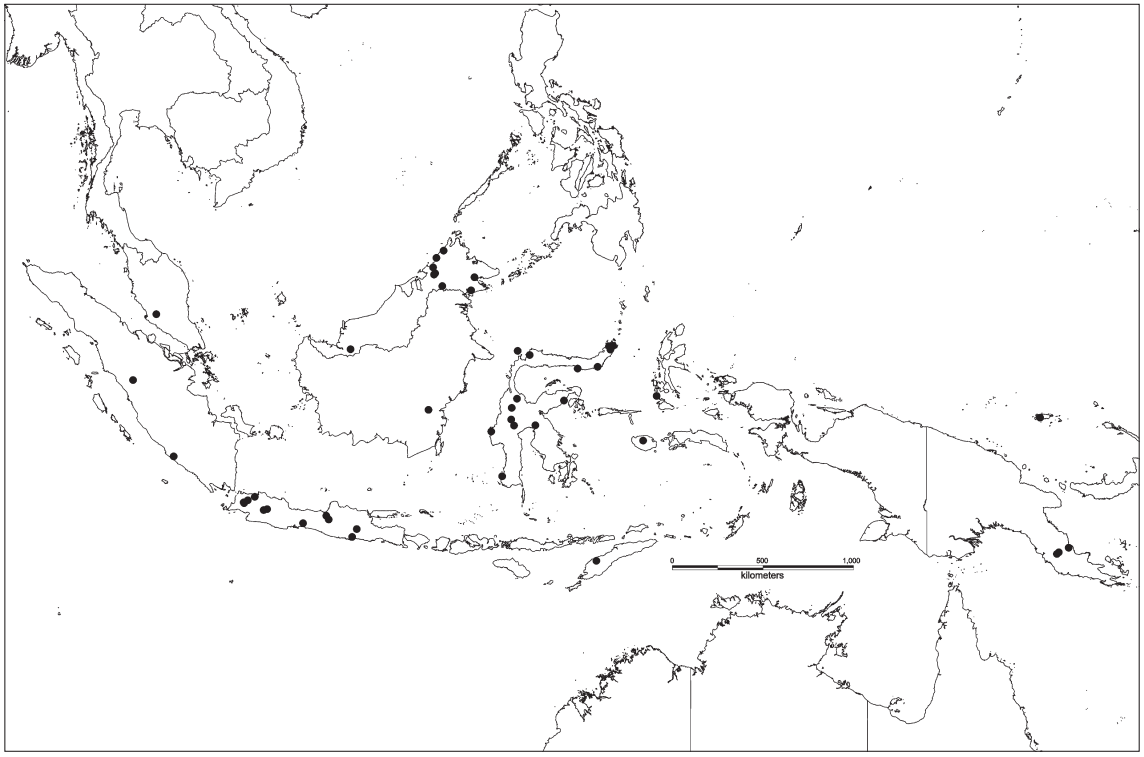
3. See also note 1 under *A. floresensis*.

4. The specific epithet is after the genus *Caturus* L. (*Euphorbiaceae*), which was later subsumed into *Acalypha*.

11. ***Acalypha floresensis*** Sagun & G.A.Levin — Map 4

Acalypha floresensis Sagun & G.A.Levin (2007) 356. — Type: *Loeters 1840* (holo L), Indonesia, Flores, Lesser Sunda Islands.

Shrubs or trees, only pistillate branches seen; flowering branches c. 15 cm long, c. 3 mm diam. *Indumentum* velvety, with simple recurved hairs. *Stipules* persistent, linear, c. 4 by 0.75 mm, with straight hairs of 0.5–0.75 mm long, without capitate trichomes. *Leaves*: petiole 3–6 cm long, with sparse straight hairs of c. 0.5 mm long; blade elliptic, 8–10.5 by 4–5.5 cm, length/width ratio 1.9–2, chartaceous; base slightly obtuse to acute; margin serrate, teeth 1.5–2 by 3–4 mm, without a gland on tooth tip; apex acuminate; upper surface glabrous, lower surface velvety, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 6 or 7 per side. *Staminate inflorescences* and *flowers* unknown. *Pistillate inflorescences* axillary, 1 per axil, spicate, straight; peduncle 3–5 cm long, indumentum velvety with simple straight hairs of c. 0.25 mm long; fertile portion 70–100 by 7–10 mm, many-flowered, internodes 5–11 mm long. *Pistillate flowers* 0.5–1 mm diam; 1 per bract; bract stipules not seen; bracts with a petiole 1–2 mm long, blade 4–5 by 5–6 mm, indistinctly veined outside, without dots, practically glabrous, lobes 11–15, the apical lobe 1.5–2 by 1.5–2 mm, lateral lobes 1.5–2 by 1–2 mm, apices acute; pedicel absent; calyx 0.5–1 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.75 mm, densely hairy on margins, otherwise glabrous outside and inside, verrucae absent; ovary globose to oblate, 0.5–1 by c. 1 mm, trilocular; stigmas 3, 5–6 mm long, each divided 9–14 times, smooth. *Bisexual inflorescences* unknown. *Fruits* globose to oblate, c. 2.5 by 3 mm, verrucate, distal half covered with trichomes, columella c. 1.75 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 2 by 1.75 mm.



Map 8 Distribution of *Acalypha caturus* Blume.

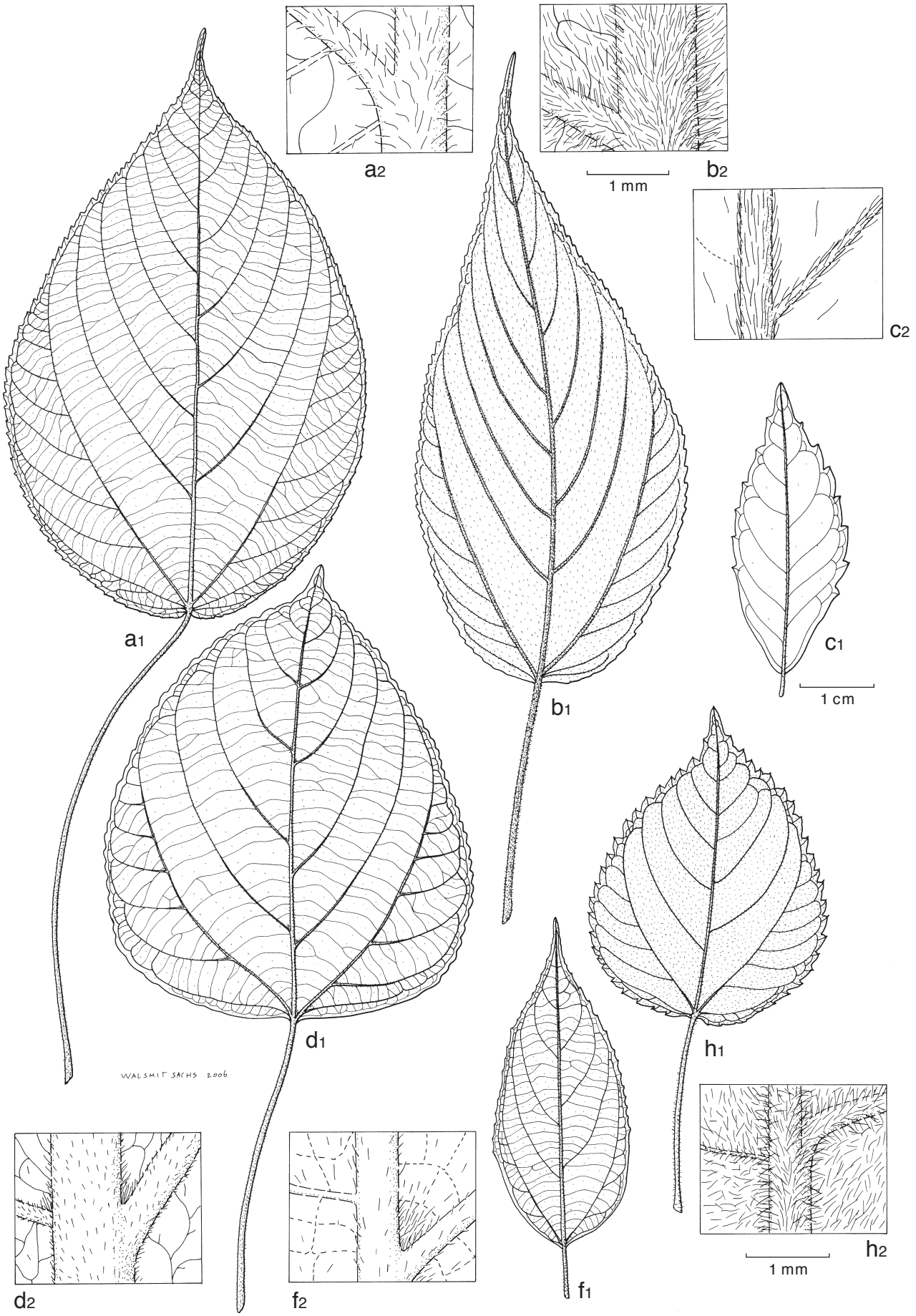
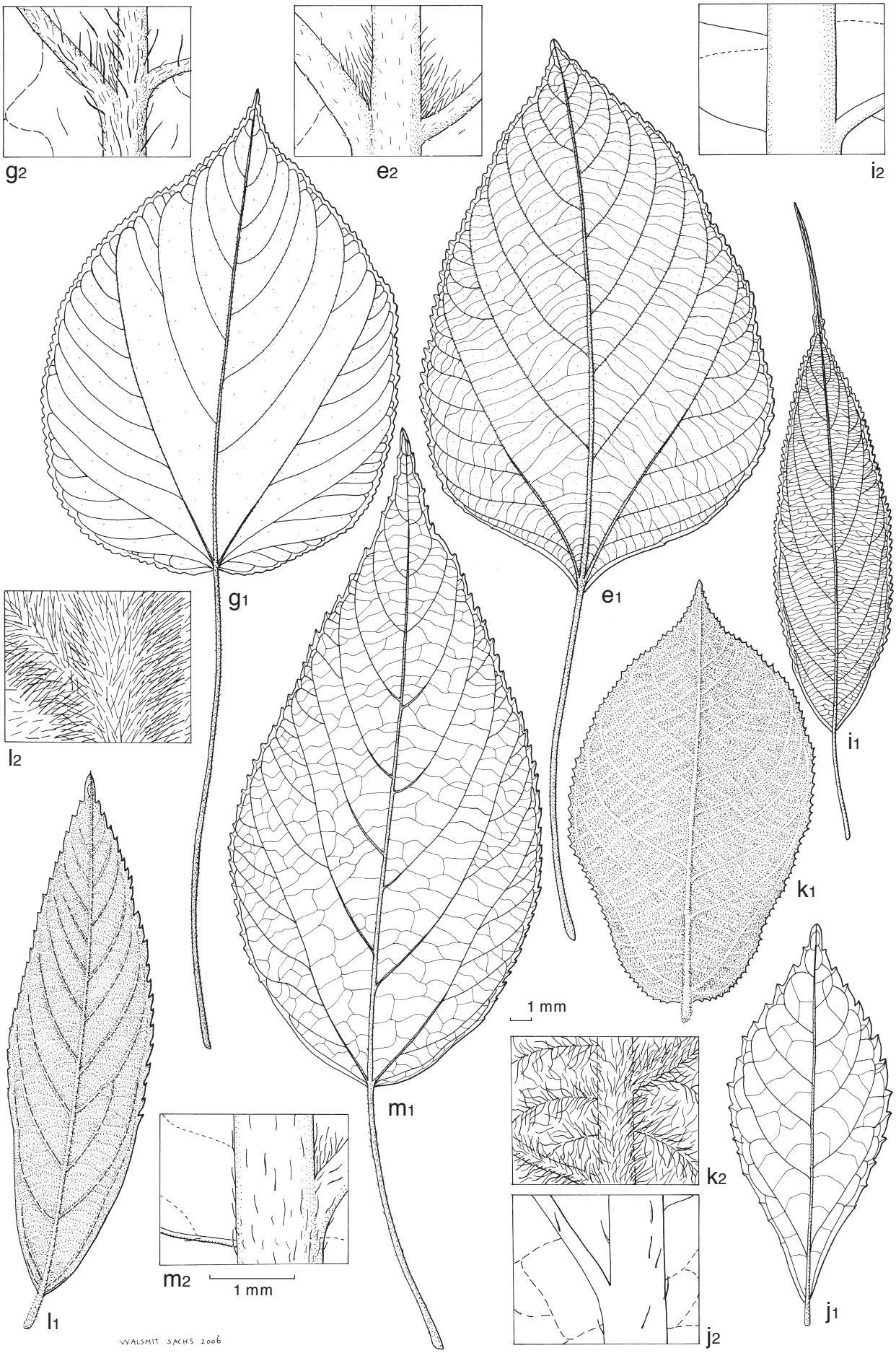


Fig. 6 Leaf morphology. – a1. *Acalypha amentacea* Roxb. var. *amentacea*; a2. Detail of indumentum. – b1. *A. angatensis* Blanco; b2. Detail of indumentum. – c1. *A. capillipes* Müll.Arg.; c2. Detail of indumentum. – d1. *A. cardiophylla* Merr. var. *cardiophylla*; d2. Detail of indumentum. – e1. *Acalypha caturus* Blume.; e2.Detail of leaf. – f1. *A. caturus* Blume (typical of former *A. cinnamomifolia* Pax & K.Hoffm.); f2. Detail of indumentum. – g1. *A. grandibracteata* Merr.; g2. Detail of leaf. – h1. *A. novoguineensis* Warb.; h2. Detail of indumentum. – i1. *A. phyllonomifolia* Airy Shaw; i2. Detail of leaf – j1. *A. siamensis* Oliv. ex Gage var. *siamensis*; j2. Detail of leaf. – k1. *A. spectabilis* Airy Shaw; k2. Detail of leaf. – l1. *A. stenophylla* K.Schum.; l2. Detail of leaf. – m1. *A. wilkesiana* Müll.Arg.;



m2. Detail of leaf (a1, a2: *Sagun & Risna SR54*; b1, b2: *Elmer 21969*; c1, c2: *Elbert 2946*; d1, d2: *Mendoza PNH 10447*; e1, e2: *Kadir A1669*; f1, f2: *Carr 14147*; g1, g2: *Madulid PPI 23796*; h1, h2: *Robbins 877*; i1, i2: *Carr 13953*; j1, j2: *Sagun & Risna SR 52*; k1, k2: *Katik LAE 74947*; l1, l2: *Henty NGF 49789*; m1, m2: *Sagun & Risna SR50*, all L).

Distribution — Malesia: Lesser Sunda Islands (Flores).

Notes — 1. *Acalypha floresensis*, from Flores in the Lesser Sunda Islands, possesses distinctly petiolate pistillate bracts. This is a distinctive feature not found elsewhere in Malesian *Acalypha* or elsewhere in the genus in so far as we are aware. Airy Shaw (1982) was the first to notice the distinctiveness of the type specimen (*Loeters 1840*) and annotated it as "*Acalypha* inter *A. grandis* et *A. caturus* fers intermedia". *Acalypha floresensis* resembles *A. grandis* Benth. in having velvety hairs on the lower side of the leaves and accrescent foliaceous pistillate bracts. The only similarity between *A. floresensis* and *A. caturus* is their ovate to elliptic leaves. *Acalypha caturus* is distinct by its bilocular fruits and non-accrescent pistillate bracts.

2. The specific epithet refers to the type locality, Flores Island in the Lesser Sunda Islands, Indonesia.

12. *Acalypha grandibracteata* Merr. — Fig. 6g1-g2; Map 9

Acalypha grandibracteata Merr. (1910) 191; (1923) 445; Airy Shaw (1983) 2; Govaerts et al. (2000) 65. — Type: Lectotype (designated here): *BS (Fenix) 3607* (PNH), Batanes Islands, Batan, Santo Domingo de Basco.

Acalypha kotoensis Hayata (1920) 99. — *Acalypha grandis* Benth. var. *kotoensis* Hurus. (1954) 300; Govaerts et al. (2000) 70. — Type: *Miyake s.n.* (holo TI), Taiwan (Formosa), Kotosho.

Large shrubs or small trees, c. 7 m tall, monoecious; flowering branches 10–15 cm long, 3–9 mm diam, velvety. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs, 0.3–0.5 mm long. *Stipules* persistent, ovate to elliptic, 6–25 by 1.5–5 mm, with dense velvety hairs, without capitate trichomes. *Leaves*: petiole 4–15 cm long, with short velvety hairs of c. 0.25 mm long; blade ovate to broadly elliptic, 8–18 by 6–12 cm, length/width ratio 1.2–1.5, chartaceous; base obtuse to cordate; margin serrate to crenate, teeth 1–2 by 1.5–2 mm, with a gland on tooth tip; apex acute; upper and lower surfaces glabrous, flat or slightly sunken between the veinlets; veins at base 5, upper secondaries 6–8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–7 mm long, indumentum of simple velvety hairs; fertile portion 7–12 by 2–3 cm, internodes 1–2 mm long. *Staminate flowers*: bracts elliptic, 0.75–1 by c. 0.3 mm, outside with dense hairs of 0.3–0.5 mm long; pedicel 0.5–1 mm long, with dense hairs to 0.5 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, c. 0.75 by 0.2 mm, with straight hairs to 0.25 mm long, midrib not verrucate, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 or 2 per axil, straight, spicate, many-flowered, in different axils than staminate ones; peduncle 4–15 mm long, indumentum hairy with simple recurved hairs to c. 0.5 mm long; fertile portion 6–9 by 0.6–0.8 cm, internodes 2–5 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract, maturing singly; bract stipules elliptic, 0.5–1 by c. 0.2 mm; bracts sessile, 4–5 by 5–6 mm, foliaceous, accrescent, strongly veined outside, without dots, sparsely hairy outside, with short capitate trichomes, glabrous inside, teeth 11, 1–1.5 by 0.5–1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, elliptic, c. 1 by 0.5 mm, hairy outside without verrucae, glabrous inside; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 2–3 mm long, each divided 6–8 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 1.5 by 2 mm, verrucate, covered with bulbous-based trichomes, columella c. 1 mm long. *Allomorphic fruits* terminal, pedicel 6–10 mm long, with hairs of 0.5–1 mm long, ebracteate, ovary too young to measure (*PNH (Mendoza) 76763*, *PPI (Reynoso) 6998*). *Seeds* prolate, c. 1.5 by 1 mm.

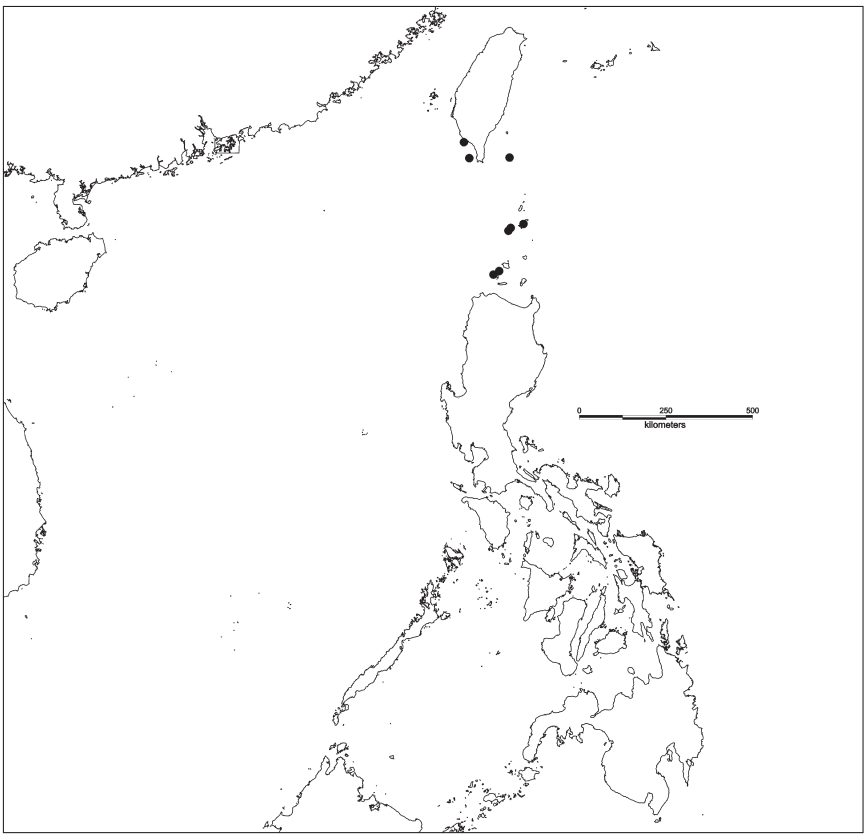
Distribution — Taiwan, Malesia: Philippines (Batanes Islands and Northern Luzon).

Notes — 1. This species is similar to *A. angatensis* but different in having leaves that are 5-nerved at the base and almost orbicular. *Acalypha grandibracteata* also does not have the yellowish hairs of *A. angatensis*, and the otherwise staminate inflorescences do not terminate with a single ebracteate pistillate flower.

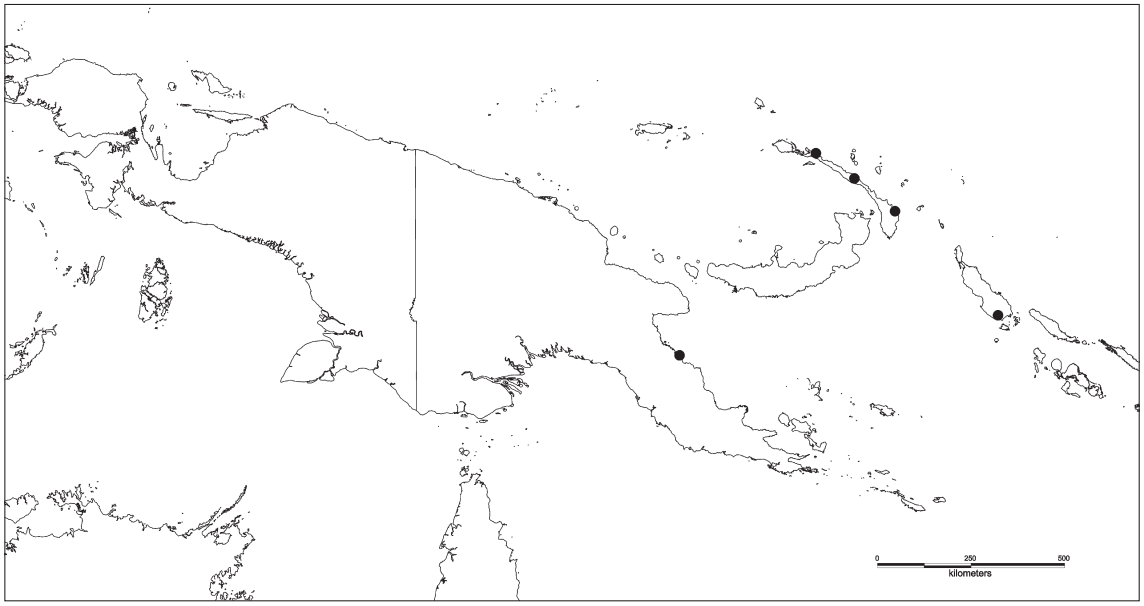
2. The specific epithet refers to the large pistillate bracts.

13. *Acalypha grandis* Benth. — Map 10

Acalypha grandis Benth. (1843) 232; Seem. (1861) 258; (1862) 441; Müll. Arg. (1864) 441; (1865) 10; (1866) 806; Seem. (1867) 224; Engl. (1886) 462; K.Schum. (1888) 206; Warb. (1891) 358; Pax & K.Hoffm. (1924) 149;



Map 9 Distribution of *Acalypha grandibracteata* Merr.



Map 10 Distribution of *Acalypha grandis* Benth.

Fosberg (1940) 114, pro nota; Hurus. (1954) 300; Airy Shaw (1972) 205; (1978) 73, in obs.; (1980a) 16. — *Ricinocarpus grandis* (Benth.) Kuntze (1891) 618. — *Acalypha amentacea* Roxb. var. *grandis* (Benth.) Fosberg (in Fosberg & Sachet 1980) 8. — Type: *Barclay s.n.* (holo K), Fiji.

Acalypha consimilis Müll.Arg. (1866) 807; Seem. (1867) 225. — *Ricinocarpus consimilis* (Müll.Arg.) Kuntze (1891) 617. — Type: *United States Exploring Expedition s.n.* (holo US), Fiji.

Acalypha grandis Benth. forma *atropurpurea* Gilli (1980) 436, nom. nud. — Type: *Gilli 544* (W), Papua New Guinea.

Large shrubs or small trees, c. 2.5 m tall, monoecious; flowering branches 8–15 cm long, 4–9 mm diam, velvety. *Indumentum* sparsely hairy, denser on young parts, with simple straight hairs. *Stipules* persistent, elliptic to needle-like, 7–10 by 1–1.5 mm, hairy, without capitate trichomes. *Leaves*: petiole 14–20 cm long, with straight hairs of c. 1 mm long; blade ovate to broadly elliptic, 14–22 by 11–21 cm, length/width ratio 1.1–1.3, chartaceous; base cordate to obtuse; margin serrate, teeth 1–2 by 3–7 mm, with a gland on tooth tip; apex acute to acuminate; upper surface glabrous, lower surface densely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 5, upper secondaries 7 or 8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–20 mm long, indumentum of simple velvety hairs; fertile portion 70–120 by 3–5 mm, of constant width, internodes 3–5 mm long. *Staminate flowers*: bracts ovate, c. 1.5 by 0.5 mm, outside with dense hairs to 0.5 mm long; pedicel 0.5–1 mm long, with straight hairs to 0.2 mm long; calyx c. 1 mm diam, sepals ovate, c. 0. 5 by 0.5 mm, with straight hairs outside to 0.5 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, laxly many-flowered, internodes usually visible, in different axils than staminate ones; peduncle 0.8–6 mm long, indumentum velvety with simple straight hairs to 1 mm long; fertile portion 10–21 by 1–1.5 cm, internodes 3–6 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract, maturing singly; bract stipules elliptic, c. 0.5 by 0.2 mm; bracts sessile, 4–6 by 7–8 mm, foliaceous, accrescent, strongly veined outside, without dots, hairy outside and inside with hairs to 0.5 mm long, teeth 9–11, apical tooth c. 2 by 2 mm, lateral teeth c. 1 by 1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, elliptic, c. 1 by 0.5 mm, hairy outside without verrucae, glabrous inside; ovary globose, c. 2 by 2 mm, trilocular; stigmas 3, 2–3 mm long, each divided 6–8 times, base hairy. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 2 by 2.5 mm, verrucate, hairy, with straight hairs only; columella 1.5–2 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 2 by 1.5 mm.

Distribution — Malesia: Papua New Guinea; Solomon Is., Fiji, Caroline Is.

Notes — 1. Key characters include leaves with five nerves at the base, long petioles that exceed the leaf blade length and narrowly elliptic or needle-like stipules. It is closely similar to *A. subintegra* in its leaf venation and needle-like stipules, but has serrate (vs subentire) leaves and shorter pistillate inflorescences.

2. The specific epithet probably refers to its habit or its large leaves.

14. *Acalypha hellwigii* Warb. — Fig. 3d; Map 11

Acalypha hellwigii Warb. (1894) 198; K.Schum & Lauterb. (1900) 402; Boerl. (1900) 288; J.J.Sm. (1910b) 239; (1912) 791; Gage (1915) 481; Kalkman (1963) 251, in obs; Airy Shaw (1980a) 16; Govaerts et al. (2000) 66. — *Acalypha scandens* Warb. (1891) 359, non Benth. (1854) 329, nom. inval. — *Acalypha scandens* Warb. var. *glabra* Warb. (1891) 359, nom. inval. — *Acalypha hellwigii* Warb. var. *glabra* (Warb.) K.Schum. & Lauterb. (1900) 402, nom. inval. — Lectotype (designated here): *Lauterbach 629* (holo WRSL), Papua New Guinea, Sattelberg, Hopi. — Syntypes: *Hellwig 395*, *396*, Kaiser Wilhelmsland, Finschhafen, am Waldrand; *Hellwig 553*, Sattelberg.

Acalypha scandens Warb. var. *mollis* Warb. (1891) 360. — *Acalypha hellwigii* Warb. var. *mollis* (Warb.) K.Schum. & Lauterb (1900) 402; Boerl. (1900) 286; J.J.Sm. (1910b) 239; (1915) 546; Airy Shaw (1980a) 17; Govaerts et al. (2000) 66. — Lectotype (designated here): *Hellwig 163* (holo K; iso LE), Papua New Guinea, Kelana. — Syntypes: *Hellwig 508*, Sattelberg, Wankewan; *Lauterbach 1642*, Kaiser Wilhelmsland, Finschhafen.

Acalypha sogerensis S.Moore (1923) 47. — Type: *Forbes PP 13* (holo BM; iso E, L), Papua New Guinea, Sogere.

Acalypha nematorhachis Lauterb. & K.Schum. (in Schumann & Lauterbach 1900) 402; Pax & K.Hoffm. (1924) 168; Airy Shaw (1980a) 19; Govaerts et al. (2000) 77. — Type: *Lauterbach* 605 (holo WRSL), New Guinea, Kaiser Wilhelmsland, Sattelberg.

Acalypha explorationis Airy Shaw (1978) 71; (1980a) 16; Govaerts et al. (2000) 62. — Type: *Docters van Leeuwen 10509* (holo K; iso L), Indonesian New Guinea, 'North New Guinea', Exploration Camp.

Acalypha insulana auct. non Müll.Arg.: Lauterb. & K.Schum. (in Schumann & Lauterbach 1900) 401, p.p.

Acalypha insulana var. *pubescens* auct. non Müll.Arg.: Warb. (1891) 358; Pax & K.Hoffm. (1924) 165.

Acalypha stipulacea auct. non Klotzsch: K.Schum & Hollrung (1889) 75; K.Schum. & Lauterb. (1900) 403.

Acalypha grandis auct. non Benth.: K.Schum & Lauterb. (1900) 401 p.p.

Acalypha insulana Müll.Arg. var. *glabrescens* auct. non Müll.Arg.: Boerl. (1900) 286; Pax & K.Hoffm. (1924) 166.

Large shrubs or small trees, 2–4 m tall, monoecious; flowering branches 25–37 cm long, 3–4 mm diam. *Indumentum* nearly glabrous to densely hairy, with simple straight hairs. *Stipules* persistent, linear and needle-like, 6–11 by 1–1.5 mm, densely hairy, with capitate trichomes of 0.1–0.2 mm long on margin. *Leaves*: petiole 2–10 cm long, with velvety hairs of c. 1 mm long; blade ovate to elliptic, 11–15 by 3.5–8.5 cm, length/width ratio 1.8–3, chartaceous; base weakly cordate to obtuse to acute; margin serrate, teeth 1–1.5 by 3–6 mm, with a gland on tooth tip; apex acute to acuminate; upper surface nearly glabrous, lower surface nearly glabrous to densely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 10 or 11 per side. *Staminate inflorescences* axillary, 1–4 per axil, spicate; peduncle 5–10 mm long, indumentum of simple dense hairs to 0.5 mm long; fertile portion c. 8 by 2 mm, internodes 1–2 mm long. *Staminate flowers*: bracts ovate to elliptic, 0.5–0.75 by c. 0.5 mm, outside with hairs, 0.25–0.5 mm long; pedicel 0.5–0.75 mm long, with straight hairs to c. 0.5 mm long; calyx c. 1 mm diam, sepals ovate, c. 0.75 by 0.5 mm, with straight hairs to c. 0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, many-flowered, in different axils than staminate ones; peduncle 20–30 mm long, indumentum dense with simple straight hairs to 0.3 mm long; fertile portion 19.5–23 by 0.5–1 cm, internodes 3–6 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract; bract stipules elliptic, 0.25–0.75 by 0.1–0.2 mm; bracts sessile, 3–8 by 4.5–9 mm, foliaceous, accrescent, strongly veined outside, sometimes with dots, sparsely hairy outside with hairs to 0.5 mm long, with short capitate trichomes, glabrous inside, teeth 8–19, apical tooth 2.5–3 by 1.5–2 mm, lateral teeth 0.5–1 by 0.75–1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, 1–1.5 by 0.5–0.75 mm, hairy outside with hairs c. 0.2 mm long, with verrucae in distal half, glabrous inside; ovary globose to oblate, 0.75–1 by 0.3–1 mm, trilocular; stigmas 3 (or 4), 2.5–5 mm long, each divided 6–9 times, base glabrous to hairy. *Bisexual inflorescences* absent. *Fruits* globose to oblate, 1.5–2.5 by 1.5–3 mm, verrucate, distal half covered with bulbous-based trichomes, hairs c. 0.5 mm long, columella c. 2 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 2 by 1.5 mm.

Distribution — Malesia: Papua New Guinea, New Ireland; Solomon Is.

Habitat & Ecology — Primary lowland rainforest, secondary forest, clearings, usually along rivers, also on hills and ridges. Flowering: All year round. Altitude: 1–2050 m.

Vernacular names — Papua New Guinea: Betten (Sibil); Biharu (Tairora); Deneng (Hagen); Eil (Mawan); Getogore (Foi language); Giminopa (Asaro: Kefamo); Jiminopa (Asaro: Kefamo); Kararempa (Okapa); Kemalapu (Dunantina); Kepelappa (Dunantina); Ketokole (Kutubu language); Kwarungi (Samu Kundi: Abelam); Liringga (Yali); Managai (Chimbu: Masul); Mandi (Enga language, Yogos); Meloa (Western District); Mingai (Tainde); Mingai Kama (Kuman language); Minja (Wahgi: Mini); Monday (Madang: Saidor); Mondeng (Rawa); Mutani (Garaina); Neng (Hagen: Togoba); Si (Bembi); Talad (Madang); Walopeh (Mekeo language, Maipa).

Uses — Wraps for smokes; leaf smoked, rubbed on wounds to help them heal (*Rifai 6559*).

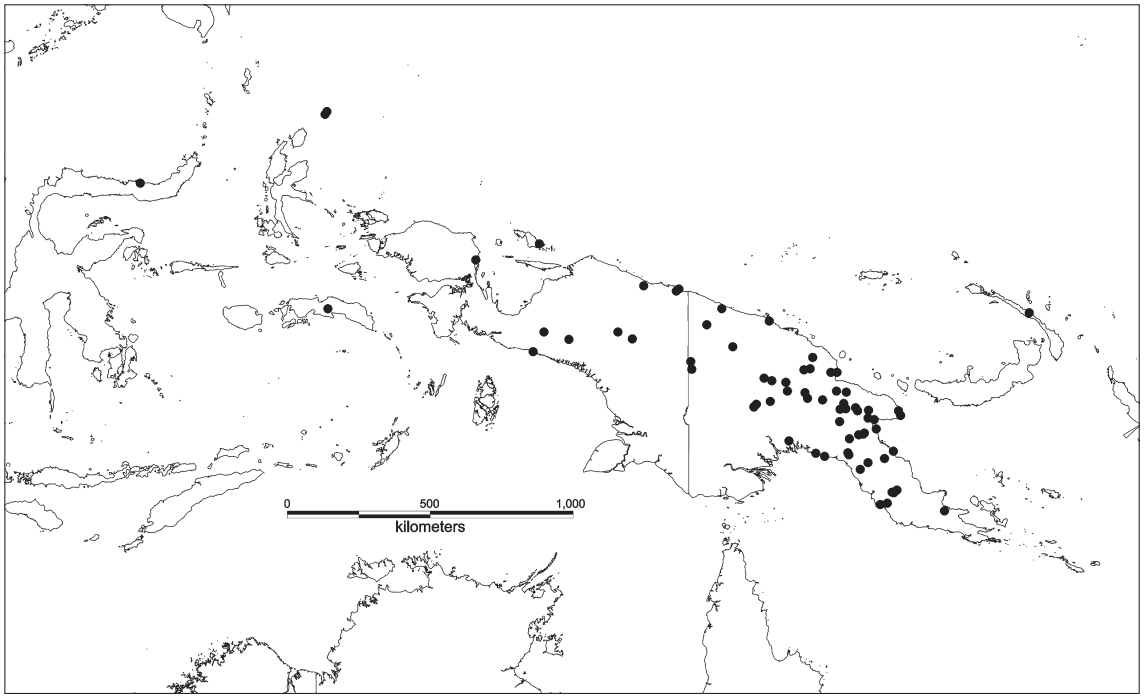
Notes — 1. Key characters include needle-like stipules, short petioles not exceeding half of leaf length, and fasciculate staminate inflorescences. *Acalypha hellwigii* can be confused with *A. amentacea* var. *amentacea* with its chartaceous leaves and long pistillate inflorescences, but can be differentiated from *A. amentacea* var. *amentacea* instantly by its short petioles. For differences with *A. nervulosa*, see note 1 under latter; and for differences with *A. novoguineensis*, see note 1 under *A. novoguineensis*.

2. *Acalypha hellwigii* is usually synonymized under the Fijian species *A. insulana* (*Penninerviae*). *Acalypha insulana* has distinctly penninerved leaves, while *A. hellwigii* has three basal veins.

3. The specific epithet honours botanist Franz Carl Hellwig, who collected in New Guinea in 1888–1889.

15. *Acalypha hispida* Burm.f.

Acalypha hispida Burm.f. (1768) 203; Willd. (1805) 523; (1809) 993; Hornem. (1815) 909; Poir (1816) 685; Spreng. (1826) 880; Wall. (1828) 7780C; Benth. (1843) 232; D.Dietr. (1852) 376; Miq. (1859) 404; Müll.Arg. (1866) 815; Fern.-Vill. (1880) 194; Hook.f. (1887) 417, pro nom. excl.; Warb. (1894) 198, in obs.; K.Schum. & Lauterb. (1900) 402; Boerl. (1900) 286; J.J.Sm. (1910a) 18; Koord. (1912) 497; Merr. (1912) 293; (1917) 323; (1921b) 362; (1923) 445; S.Moore (1923) 47; Pax & K.Hoffm. (1924) 140; De Wild. (1926)



Map 11 Distribution of *Acalypha hellwigii* Warb.

490; Hurus. (1954) 301; Backer & Bakh.f. (1963) 489; Airy Shaw (1972) 206; (1980a) 16; (1983) 2; Chakrab. & N.P.Balakr. (1992) 10. — *Acalypha densiflora* Blume (1825) 628, nom. illeg.; Miq. (1859) 405; Koord. (1898) 578; Koord.-Schum. (1914) 71. — *Ricinocarpus hispidus* (Burm.f.) Kuntze (1891) 618. — Type: Illustration t. 61, f. 1. (Burman 1768).

Caturus spiciflorus L. (1767) 127, non *Acalypha spiciflora* Burm.f.; Dennst. (1818) 31; A.Juss. (1824) 115; Roxb. (1832b) 760. — Lectotype (Radcliffe-Smith 1993): *Herb. Linn. No. 1163.1* (LINN).

Acalypha rubra Noronha ex Hassk. (1844) 216, non Willd. (1809) 992, nom. nud. — Type: None designated.

Acalypha sanderi N.E.Br. (1896) 392; K.Schum (1898) 127 ('*A. sanderiana*'); Merr. (1921b) 362. — *Acalypha hispida* Burm.f. var. *sanderi* (N.E.Br.) J.J.Sm. (1910a) 19. — Type: None designated.

Acalypha wilkesiana auct. non Müll.Arg.: Warb. (1891) 358.

Large shrubs to small trees, 2–4 m tall, possibly dioecious, only pistillate plants known; flowering branches 10–36 cm long, 0.4–0.6 cm diam. *Indumentum* velvety, with simple recurved hairs. *Stipules* persistent, ovate to elliptic, c. 8 by 13 mm, midrib hairy, without capitate trichomes. *Leaves*: petiole 10–15 cm long, with velvety hairs of c. 1 mm long; blade ovate to elliptic, 12–25 by 9–18 cm, length/width ratio 1.3–1.6, chartaceous; base slightly cordate to obtuse; margin serrate to deeply crenate/undulate, teeth 1–3 by 3–6 mm, with a gland on tooth tip; apex acute to acuminate; upper surface glabrous, lower surface glabrous, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 5–8 per side. *Staminate inflorescences* and *flowers* unknown. *Pistillate inflorescences* axillary, 1 per axil, spicate, straight, extremely densely flowered, rachises usually hidden by flowers; peduncle 17–30 mm long, indumentum of simple recurved hairs to c. 0.5 mm long; fertile portion 23–34 by 0.8–1 cm, internodes 2–3 mm long. *Pistillate flowers* c. 1 mm diam; 4–6 per node; bract stipules absent; bracts sessile, 0.5–1 by 0.5–1 mm, hairy outside, entire, apex acute, chartaceous, non-accrescent; pedicel absent; calyx c. 1 mm diam, sepals (3 or) 4, ovate to elliptic, c. 0.5 by 0.3 mm, hairy outside without verrucae, glabrous inside; ovary globose to oblate, c. 1 by 1 mm, trilocular; stigmas 3, 5–8 mm long, each divided 6–16 times, smooth. *Bisexual inflorescences* unknown. *Fruits* unknown. *Allomorphic fruits* unknown. *Seeds* unknown.

Distribution — Malesia; only known from cultivation.

Habitat & Ecology — Cultivated, escaped to secondary forest and roadsides. Flowering: March to November. Altitude 100–1260 m.

Vernacular names — Sumatra: Ikor ikor. Java: Boentot koeching. Philippines: Buntot-pusa (Tagalog).

Uses — Widely cultivated ornamental because of its showy red (due to stigmas), dense pistillate inflorescences.

Notes — 1. Key characters include extremely showy pistillate inflorescences bearing densely packed flowers, each with long, highly laciniate stigmas, usually reddish or crimson coloured.

2. The specific epithet refers to the long and laciniate styles of the pistillate inflorescence.

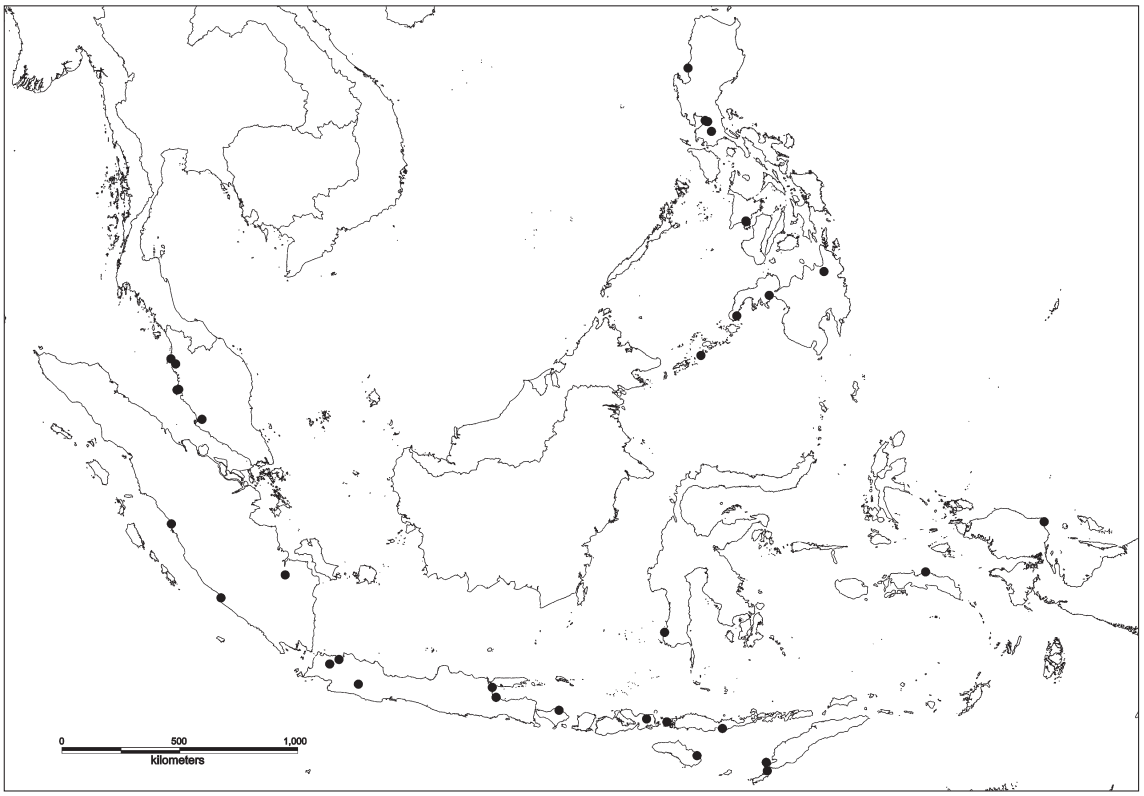
16. *Acalypha indica* L. — Fig. 2h, 4c; Map 12

Acalypha indica L. (1753) 1003; (1770) 634; (1774) 721; Willd. (1805) 523; Hornem. (1807) 1; (1815) 908; Blume (1825) 628; Spreng. (1826) 880; Roxb. (1832b) 675; Span. (1841) 350; Wight (1844) 6, t. 877; Hassk. (1848) 246; Benth. (1861) 303; Müll.Arg. (1866) 868; Fern.-Vill. (1880) 194; S. Vidal (1885) 143; Hook.f. (1887) 416; K.Schum. & Hollrung (1889) 75; F.B.Forbes & Hemsl. (1894) 438; Koord. (1898) 579; Boerl. (1900) 286; Merr. (1908) 417; (1912) 292; Koord. (1912) 498; Koord.-Schum. (1913) 69; (1914) 71; Merr. (1916) 285; (1918) 226; Kenoyer (1919) 3; Merr. (1923) 446; Ridl. (1924) 274; Pax & K.Hoffm. (1924) 33; Backer & Bakh.f. (1963) 490; Sanjappa (1979) 274; Airy Shaw (1972) 206; Radcl.-Sm. (1973) 527; Airy Shaw (1980a) 18; (1981) 247; (1982) 3; (1983) 2; S.F.Huang & T.C.Huang (1991) 83; T.C.Huang (1993) 421; T.C.Huang et al. (1994) 12; Govaerts et al. (2000) 68; T.C.Huang (2003) 68; Rani & N.P. Balakr. (2007) 96. — *Ricinocarpus indicus* (L.) Kuntze (1891) 618. — Lectotype (Radcliffe-Smith 1986): Herb. Hermann Vol. III: 2 (holo BM), Sri Lanka.

Acalypha caroliniana Blanco (1837) 748, non Walter (1788) 238, nec Elliott (1824) 645; Blanco (1845) 515; (1879) 149; Merr. (1905) 77. — Neotype (designated here): *Merrill Species Blancoanae 487* (holo L; iso A, US), Philippines, Luzon, Rizal Province, Guadalupe.

Acalypha ciliata Wall. (1847) n. 7779J, nom. nud. — Representative specimen: *Wall.Cat. 7779J* (n.v.), India.

Acalypha canescens Wall. (1847) n. 7785, nom. nud. — Representative specimen: *Wall.Cat. 7785* (n.v.), India.



Map 12 Distribution of *Acalypha indica* L.

Herbaceous annuals, 0.3–0.8 m tall, monoecious; flowering branches 9–30 cm long, 2–3.5 mm diam. *Indumentum* sparsely hairy, denser on young parts, with simple straight hairs and capitate trichomes. *Stipules* persistent, elliptic, 0.75–1 by 0.2–0.5 mm; sparsely hairy. *Leaves*: petiole 13–60 mm long, glabrous to hairy with hairs c. 0.5 mm long, sometimes with capitate glands; blade ovate to elliptic, 1.5–5 by 1–3 cm, length/width ratio 1.2–1.7, chartaceous; base cuneate to obtuse; margin serrate, teeth 0.5–1 by 2–4 mm, with a gland on tooth tip; apex obtuse to acute; upper surface glabrous to sparsely hairy; lower surface sparsely hairy, more densely on midrib and veins; veins at base 3, upper secondaries 3–5 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate; peduncle 2–10 mm long, sparsely hairy; fertile portion 25–65 by 7–15 mm, pistillate below and staminate above, usually terminating with an allomorphic flower; pistillate portion 15–50 by 10–15 mm, internodes 5–15 mm; staminate portion 5–15 by 1–1.5 mm, internodes 0.5–1 mm long. *Staminate flowers*: bracts elliptic, 0.5–0.75 by 0.2–0.3 mm, with sparse hairs up to 0.5 mm long; pedicel c. 0.5 mm long, with sparse hairs up to 1 mm long; calyx 4–12 by c. 0.5 mm diam, sepals ovate, c. 0.3 by 0.2 mm, hairy outside, midrib verrucate in distal half, apex acute; filaments c. 0.2 mm long, thecae c. 0.2 mm long. *Pistillate flowers* 1–1.5 mm diam; 3 per bract; bract stipules 0.3–0.5 by c. 0.2 mm; bracts sessile, 3.5–8 by 5–12 mm, weakly veined outside, without dots, glabrous outside and inside, sparsely hairy on the margins, teeth 10–14, 0.5–1 by 1–2 mm, apices obtuse; pedicel 0–0.5 mm long; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, 0.5–1 by c. 0.5 mm, hairy; ovary globose to elongate, 0.5–0.75 by 0.5–1 mm; stigmas 3, 2–4 mm long, each divided 1 or 2 times, smooth. *Fruits* 1.75–2 by 1.75–2 mm, distal half covered with trichomes, columella 0.75–1 mm long. *Allomorphic fruits* terminal; pedicel 3.5–15 mm long, with sparse hairs up to 0.5 mm long; mericarp obovoid, 1–2 by 1–3 mm, longitudinally sutured, distal half with 2 opposite whorled, mostly fused fringes that are not broader than half of mericarp length, proximal end with one shallowly fringed whorl. *Seeds* prolate, c. 1.5 by 0.75–1 mm.

Distribution — Palaeotropical weed; Africa, Malesia, Micronesia; introduced in the Neotropics.

Habitat & Ecology — Roadsides and waste places. Flowering: All year round. Altitude 0–250 m.

Vernacular names — Bali: Tumpang pajuk (Samis).

Notes — 1. *Acalypha indica* is similar to the other weedy annuals in Malesia, *A. australis*, *A. brachystachya* and *A. lanceolata* var. *lanceolata*. They all have similar ovate to elliptic leaves (except for *A. australis*), foliaceous pistillate bracts, and bisexual inflorescences, but *A. indica* has shallowly toothed to subentire pistillate bracts and always terminal allomorphs that have shallow lobed lateral fringes and long pedicels. *Acalypha australis* has a distinct acute apical lobe on the pistillate bracts; its allomorphs have not been observed in Malesian specimens. *Acalypha brachystachya* has elongated bract lobes and its allomorphs have seemingly fused lateral fringes that appear as a single distal lobe. *Acalypha lanceolata* var. *lanceolata* has acute pistillate bract teeth and its allomorphs are subsessile, have deeply lobed lateral fringes, and are found laterally on the staminate portion of the inflorescence and are never terminal.

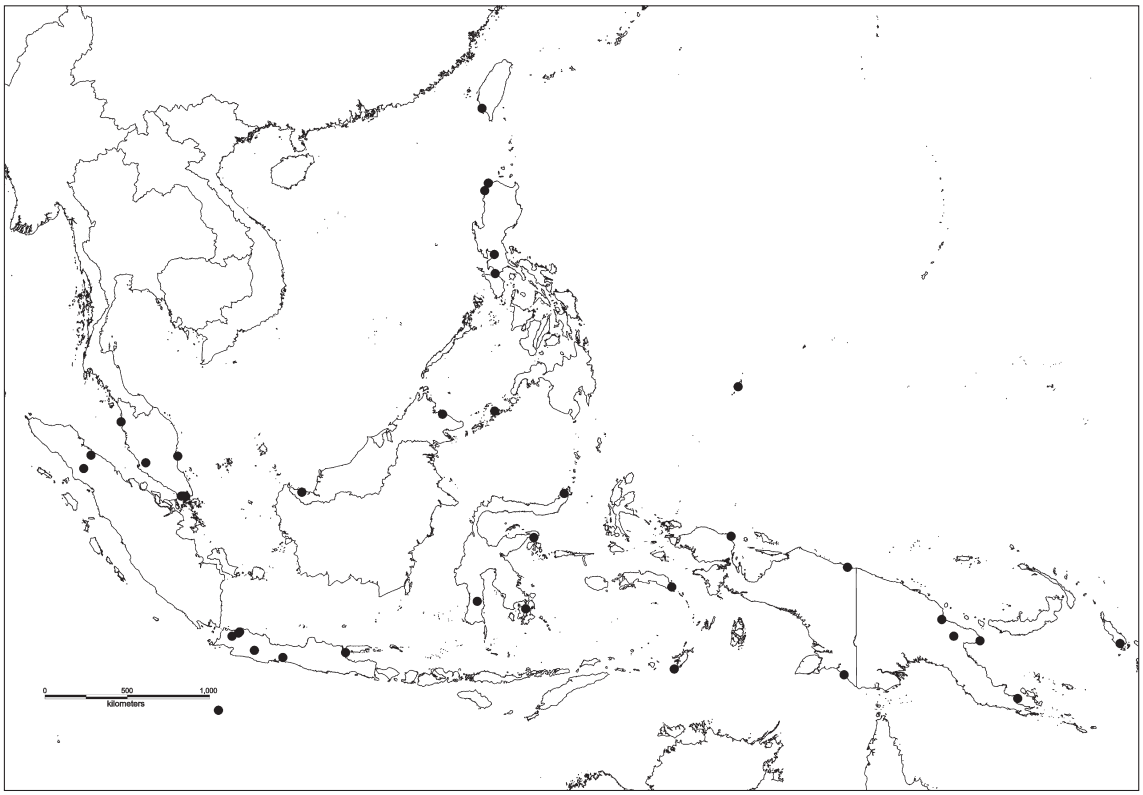
2. Seed development and allomorph morpho-anatomy was studied by Johri & Kapil (1953).

3. Coode (1982: 78) lectotypified *A. indica*, citing *Herb. Linn. No. 1139.3*. This is a specimen of *A. lanceolata* var. *lanceolata*, however, and so should be rejected in favour of Radcliffe-Smith's subsequent lectotypification (Radcliffe-Smith 1986) of the specimen at the Hermann Herbarium in BM, which is also the basis of Flora Zeylanica (Linnaeus 1747).

4. The specific epithet denotes the country India, the presumed locality of the type collection.

17. *Acalypha lanceolata* Willd. var. ***lanceolata*** — Fig. 2i, 4d; Map 13

Acalypha lanceolata Willd. (1805) 524; Spreng. (1826) 881; Wall. (1828) n. 7780B, n. 7789; D.Dietr. (1852) 377; Airy Shaw (1972) 206; Radcliffe-Smith (1973) 526; Whitmore (1973) 51; Airy Shaw (1975) 24; Sanjappa (1979) 274; Airy Shaw (1980a) 18; (1981) 247; (1982) 4; (1983) 2; Govaerts et al. (2000) 71; Rani & N.P.Balakr. (2007) 96. — *Ricinocarpus lanceolatus*



Map 13 Distribution of *Acalypha lanceolata* Willd. var. *lanceolata.*

(Willd.) Kuntze (1891) 617. — Lectotype (designated here, non Radcl.-Sm. 1973, see note 2): L'Herbier de Paul Hermann: 101 (Bibliotheque de l'Institute de France).

Urtica pilosa Lour. (1790) 558; (1793) 682; Merr. (1935) 238, pro syn. — Type: None designated (n.v.).

Acalypha boehmerioides Miq. (1861) 459; Müll.Arg. (1866) 871; Fern.-Vill. (1880) 194; K.Schum. (1898) 127; K.Schum. & Lauterb. (1900) 401; J.J.Sm. (1910b) 240; Merr. (1912) 292; Koord. (1912) 498; Koord.-Schum. (1913) 66; Merr. (1923) 445; Pax & K.Hoffm. (1924) 96; Merr. (1935) 238; Merr. & Chun (1940) 92; Holth. & H.J.Lam (1942) 199; H.J.Lam (1945) 577; Backer & Bakh.f. (1963) 490; T.C.Huang et al. (1994) 12. — *Acalypha boehmerioides* Miq. var. *genuina* Pax & K.Hoffm. (1924) 96, nom. inval. — Type: *Amand s.n.* (holo U, barcode U0001841), Indonesia, Sumatra.

Acalypha hispida Willd. var. *pubescens* Hook. & Arn. (1837) 213. — Type: Not located.

Acalypha fallax Müll.Arg. (1865) 43; (1866) 872; Hook.f. (1887) 416; F.B.Forbes & Hemsl. (1894) 437; Boerl. (1900) 286; Ridl. (1924) 274. — *Ricinocarpus fallax* (Müll.Arg.) Kuntze (1891) 616. — Lectotype (designated here): *Perrottet 462* (lecto G-DC). — Syntype: *Perrottet 463* (G-DC).

Acalypha wightiana Müll.Arg. (1865) 43. — *Acalypha wightiana* Müll.Arg. var. *ovata* Müll.Arg. (1865) 43, nom. inval. — *Acalypha wightiana* Müll.Arg. var. *genuina* Müll.Arg. (1866) 872, nom. inval. — Type: *Wight* in *Wall. 7780C* (holo G-DC; iso K-W), India, Madras.

Acalypha wightiana Müll.Arg. var. *lanceolata* (Willd.) Müll.Arg. (1865) 43; (1866) 872. — Type: *Hb. Willd. Fol. 17817* (holo B-W), India orientali.

Acalypha harmandiana Gagnep. (1924) 873. — Type: *Harmand s.n.* (holo P; iso A), Cambodia (Cambodge).

Acalypha ciliata auct. non Forssk.: Wall. (1828) n. 7780.

Acalypha virginica auct. non L.: Wall. (1828) n. 7779.

Herbaceous annuals, 0.6–0.9 m tall, monoecious; flowering branches 15–30 cm long, 2–3.5 mm diam, hairy. *Indumentum* sparse to densely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, elliptic, 1.5–3 by 0.2–0.3 mm, hairy. *Leaves*: petiole 25–67 by 0.5–1 mm, with simple recurved hairs to c. 0.5 mm long; blade ovate to elliptic, 3–6.5 by 2–4 cm, length/width ratio 1.2–1.8, chartaceous; base obtuse to acute; margin serrate, teeth 1–2 by 2–4 mm, with a gland on tooth tip; apex acute to acuminate; upper surface nearly glabrous, hairs on lamina straight, 0.5–0.75 mm long; lower surface sparsely hairy; veins at base 3, upper secondaries 3 or 4 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate; peduncle 2–10 mm long, hairy; fertile portion 5–40 by 3–4 mm, pistillate below and staminate above; pistillate portion 2–30 by 13–16 mm, internodes 2–5 mm long; staminate portion 3–7 by 1–2 mm, internodes 0.5–1 mm long. *Staminate flowers*: bracts elliptic, 0.5–0.75 by 0.2–0.3 mm, hairy on margins; pedicel 0.3–0.5 mm long, hairy; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.5 by 0.25 mm, glabrous, midrib sparsely verrucate in upper half, apex acute; filaments c. 0.2 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate flowers* c. 1 mm diam; 1 per bract; bract stipules elliptic, c. 1 by 0.5 mm; bracts sessile, 2–3 by 4–6 mm, ovate, strongly veined outside, without dots, sparsely hairy outside, with capitate trichomes 0.5–0.75 mm long, glabrous inside, teeth 11–13, 0.5–0.75 by 0.5–1 mm, apices acute; pedicel 0(–0.5) mm long; calyx c. 1 mm diam, sepals 3, ovate to elliptic, 0.5–0.75 by 0.25–0.3 mm, hairy on margins; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 1–3 mm long, each divided 2 or 3 times, smooth. *Fruits* globose to oblate, 1.5–1.75 by 2–2.5 mm, distal half covered with straight hairs of c. 0.5 mm long, columella 0.75–1 by c. 0.5 mm long. *Allomorphic fruits* borne between pistillate and staminate portions of inflorescence; pedicel 0.1–1 mm long, with sparse hairs up to 0.25 mm long; mericarp obovoid, c. 2 by 2–3 mm, longitudinally sutured, distal half with 2 opposite whorled, essentially free fringes that are broader than half of mericarp length, proximal end of mericarp fringed. *Seeds* prolate, 1.25–1.5 by c. 0.75 mm.

Distribution — Palaeotropical weed; Africa, Malesia, Micronesia.

Habitat & Ecology — Roadsides and waste places. Flowering: All year round. Altitude 0–400 m.

Vernacular names — Malay Peninsula: Mula mani (Tamil); Sasaimutih (Dawan).

Notes — 1. This species is similar to *A. argentii* and *A. indica*; see notes under these species.

2. The earliest effective lectotypification of *A. lanceolata* can be traced to Radcliffe-Smith (1987), but the reference is in conflict with the protologue. The type chosen is an illustration in Thesaurus Zeylanicus: 205, t. 93, f. 2 (Burman 1737), but the figure is a *Phyllanthus*, and f. 1 is the *Acalypha*. However, the caption on the figure does not match the specimen examined by Willdenow. A specimen on page 101 of the Hermann Herbarium in the Bibliotheque de l'Institute de France (Lourteig 1966, Trimen 1887) matches the protologue and is chosen here as the lectotype in accordance with the provisions of the ICBN.

3. Another variety, *A. lanceolata* var. *glandulosa* (Müll.Arg.) Radcl.-Sm. (1989) occurs in Africa.

4. The specific epithet probably refers to the lanceolate or narrowly elliptic leaves.

18. *Acalypha longispica* Warb. — Fig. 2j, 3e; Map 14

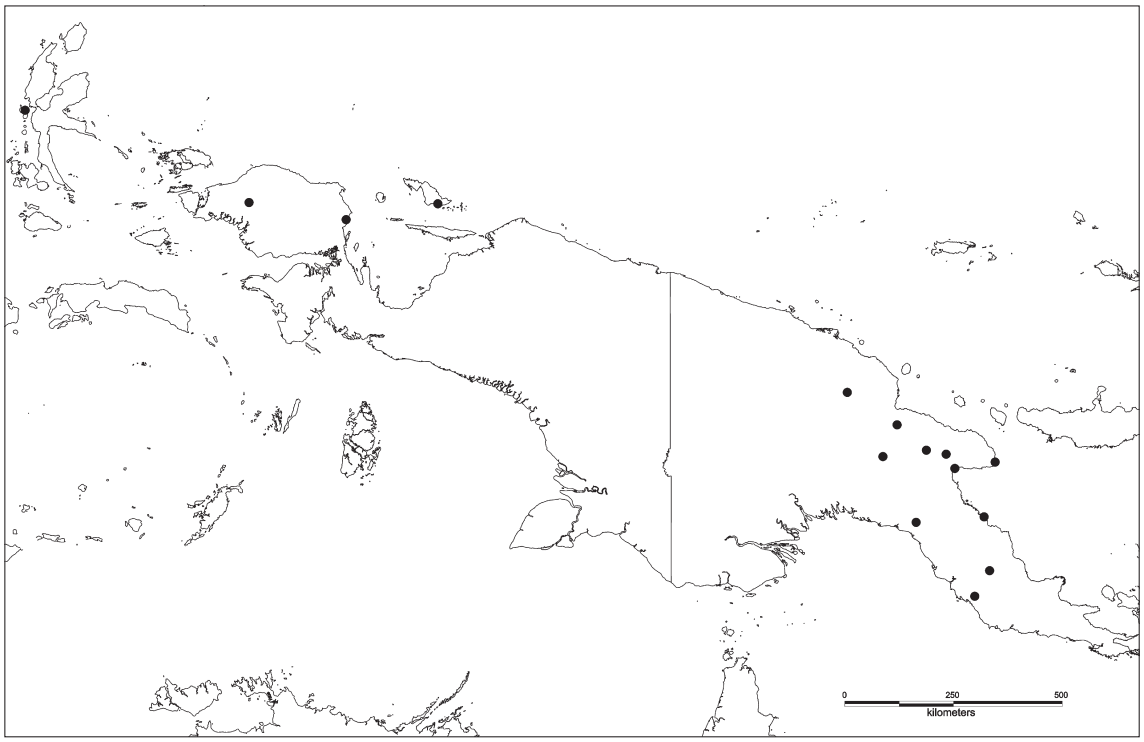
Acalypha longispica Warb. (1894) 197; K.Schum. & Lauterb. (1900) 401; Pax & K.Hoffm. (1924) 141; Airy Shaw (1980a) 19; Govaerts et al. (2000) 73. — Lectotype (designated here): *Hellwig 383* (holo K; iso BO), Papua New Guinea, Kaiser Wilhelmsland, Finschhafen. — Syntype: *Hollrung 98*, Papua New Guinea.

Acalypha caturoides K.Schum & Lauterb. (1905) 298. — Lectotype (designated here): *Schlechter 14270* (holo K; iso BM, BO, LE), Papua New Guinea, Kaiser Wilhelmsland, Konstantinhafen. — Syntype: *Weinland 380* (WRSL), Papua New Guinea, Kaiser Wilhelmsland, Finschhafen.

Acalypha protractra S.Moore (1923) 47. — Type: *H.O. Forbes PP 127* (holo BM; iso E, L), Papua New Guinea, Sogeri.

Acalypha grandis auct. non Benth.: K.Schum. & Lauterb. (1900) 401, p.p.

Large shrubs or small trees, 4–10 m tall, usually monoecious; flowering branches 15–30 cm long, 3–7 mm diam. *Indumentum* velvety, with simple recurved hairs. *Stipules* persistent, ovate to broad elliptic, 2–7 by 2–7 mm, usually recurved, apex obtuse, densely hairy with hairs of c. 0.1 mm long, without capitate trichomes. *Leaves*: petiole 3–15 cm long, with velvety hairs of 0.5–1 mm long; blade broadly ovate to elliptic, 8.5–17 by 9–16 cm, length/width ratio 0.8–1, chartaceous; base cordate to obtuse; margin subentire to weakly crenate, teeth 1–3 by 3–8 mm, with a gland on tooth tip; apex acute to slightly acuminate; upper surface glabrous, lower surface velvety, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries c. 5 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–8 mm long, indumentum simple, of velvety hairs up to 0.2 mm long; fertile portion 8–13 by 2–3 cm, internodes 1–2 mm long. *Staminate flowers*: bracts ovate, c. 0.5 by 0.25 mm, hairy outside; pedicel 0.5–1 mm long, glabrous; calyx 0.5–1 mm diam, sepals ovate to elliptic, c. 0.75 by 0.5 mm, glabrous, midrib not verrucate, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, laxly many-flowered, rachis visible, in different axils than staminate ones; peduncle 4–15 mm long, indumentum velvety with simple recurved hairs; fertile portion 8–34 by 0.3–0.7 cm, internodes 3–10 mm long. *Pistillate flowers* c. 1 mm diam; 1 per bract; bract stipules not seen; bracts sessile, 1–1.5 by 1.5–2 mm, chartaceous, non-accrescent, weakly veined outside, without dots, sparsely hairy outside with hairs of c. 0.2 mm long, glabrous inside, lobes 3, c. 0.5 by 0.5 mm, apices acute; pedicel absent; calyx c. 1 mm diam, sepals 3, ovate, c. 1 by 1 mm, sparsely hairy outside with hairs c. 0.2 mm long, without verrucae, glabrous inside; ovary globose, c. 1.5 by 1.5 mm, trilocular; stigmas 3, 2–4 mm long, each divided 4–6 times, smooth. *Bisexual inflorescences* like the staminate ones but with 1 or 2 pistillate flowers near the base. *Fruits* globose to oblate, c. 3 by 4 mm, verrucate, covered with velvety hairs, without longitudinal ridges, columella c. 2



Map 14 Distribution of *Acalypha longispica* Warb.

by 1 mm. *Allomorphic fruits* unknown. *Seeds* globose, c. 1.5 by 1.5 mm.

Distribution — Malesia: Moluccas, New Guinea.

Habitat & Ecology — Forest margins, secondary vegetation, regrowths on village gardens, often alluvial; soil clayey, limestone. Flowering: March to December. Altitude 15–1350 m.

Vernacular names — New Guinea (Papua): Mandewoenik (Biak).

Notes — 1. Key characters include 3-partite and non-accrescent pistillate bracts, trilocular fruits, and reflexed, broad, almost orbicular stipules. This species is similar to *A. caturus* and *A. cardiophylla* var. *cardiophylla*; see the notes under these species. See also note 1 under *A. novoguineensis*.

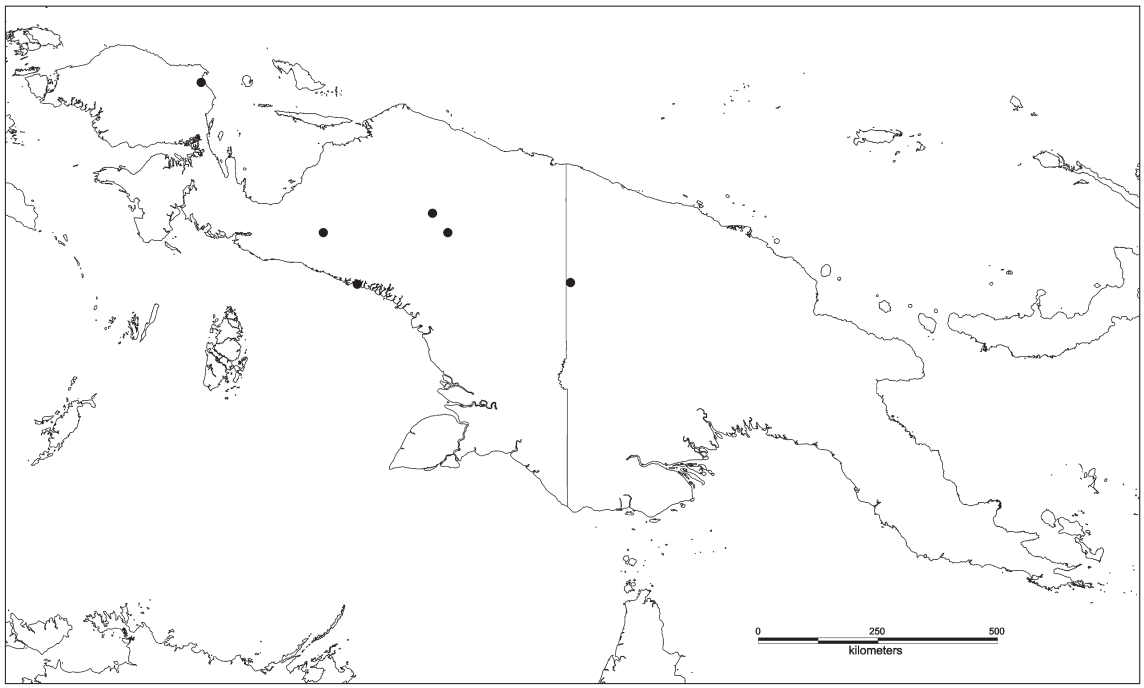
2. Rarely some pistillate flowers occur at the base of the staminate inflorescence (*PNH* (*Sulit*) *10070*, *PNH* (*Sulit*) *14310*), which is more common in *A. cardiophylla* var. *cardiophylla*.

3. The specific epithet refers to the long inflorescences.

19. *Acalypha nervulosa* Airy Shaw — Map 15

Acalypha nervulosa Airy Shaw (1966) 407; (1980a) 19; Govaerts et al. (2000) 78. — Type: *P. van Royen 8128* (holo K; iso L), Papua New Guinea, Vogelkop Peninsula, Nettoti range, Wekari river camp.

Straggling shrubs, 1–3 m tall, monoecious; flowering branches 14–36 cm long, 3–3.5 mm diam, velvety. *Indumentum* sparsely hairy, denser on young parts, with simple straight hairs. *Stip-*



Map 15 Distribution of *Acalypha nervulosa* Airy Shaw.

ules caducous, elliptic, needle-like, 2–3 by 0.2–0.5 mm, with hairs of 0.5–1 mm long and capitate trichomes of c. 0.1 mm long. *Leaves*: petiole 4–7 mm long, with simple straight hairs of 0.5–0.75 mm long; blade ovate to elliptic, 7–11 by 2–4 cm, length/width ratio 2–3.5, chartaceous; base obtuse to acute; margin serrate, teeth c. 1 by 3 mm, with a gland on tooth tip; apex acute to acuminate; upper surface nearly glabrous, hairs on lamina straight, 0.5–0.75 mm long; lower surface densely pubescent especially along nerves, hairs 0.5–0.75 mm long; penninerved, veins at base 1, upper secondaries 7–9 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 3–10 mm long, hairs simple, straight; fertile portion 45–97 by 1.5–2 mm, internodes up to 2 mm long. *Staminate flowers*: bracts broadly ovate, c. 1 by 0.5 mm, outside with sparse hairs of 0.2–0.5 mm long; pedicel c. 0.5 mm long, with straight hairs of c. 0.2 mm long; calyx 0.5–1 mm diam, sepals ovate, c. 0.75 by 0.25 mm, with sparse straight hairs of c. 0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.2 mm long, thecae c. 0.2 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, spicate, straight, many-flowered, in different axils than staminate ones; peduncle 7–35 mm long, simple straight hairs; fertile portion 8–10 by 0.2–0.3 cm, internodes 3–8 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules elliptic 0.75–1 by c. 0.2 mm; bracts sessile, ovate, 4–7 by 6–8 mm, foliaceous, accrescent, strongly veined outside, with dots, densely hairy outside, sparsely hairy inside, with simple hairs of 0.25–0.5 mm long, with short capitate trichomes of c. 0.1 mm long, teeth 9–11, apical tooth c. 3 by 1.5 mm, lateral teeth c. 2 by 1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, 1–1.5 by 0.5–1 mm, hairy on margins with hairs of c. 0.2 mm long, without verrucae; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 3–6 mm long, each divided 10–16 times, hairy. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 1.5 by 2 mm, verrucate, with hairs of c. 0.5 mm long, without trichomes, columella c. 1 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 2 by 1.5 mm.

Distribution — Endemic in Papua New Guinea.

Habitat & Ecology — River banks, riparian marshes, young secondary (montane) forest; soil sandy clay with much gravel. Flowering: All year round. Altitude 850–1925 m. Fruits eaten by birds (*Widjaja EAW 4378*).

Vernacular names — Bekuom (Hatam); Hamaka (Sougb); Boekwom (Hattam); Potie (Kapaukoe); Potie (Dani).

Uses — Leaves used for sore throat and as cigarette wrappers (*Kostermans & Soegeng 580*).

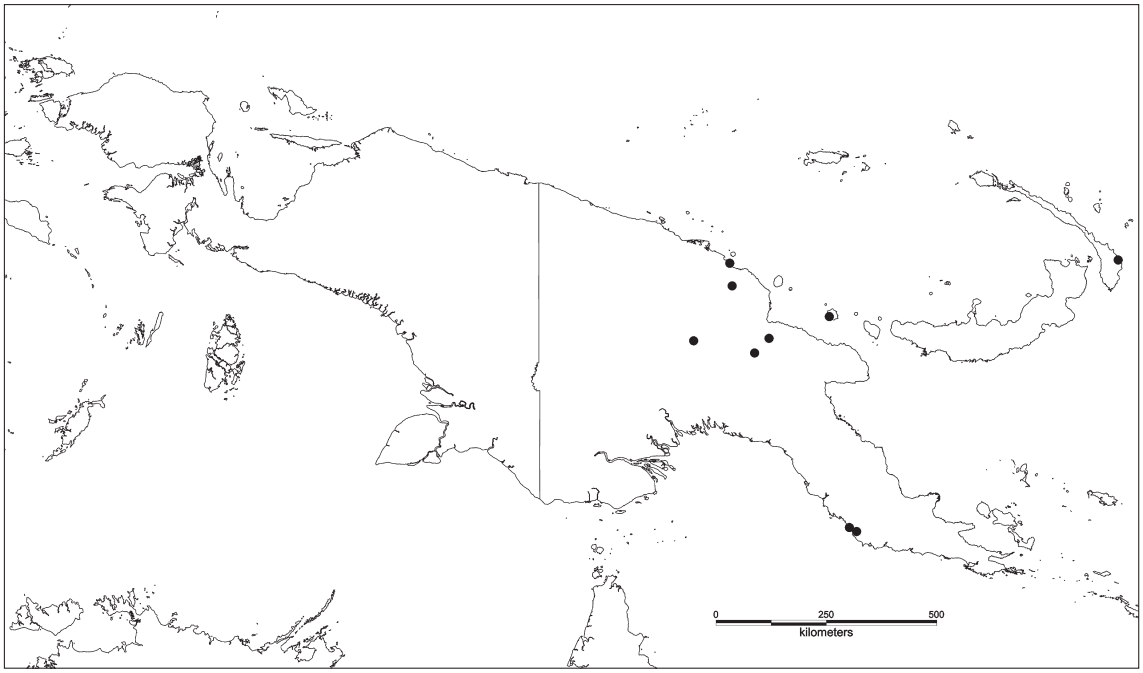
Notes — 1. Key characters include short and laxly flowered pistillate inflorescences, small leaves, and a single staminate inflorescence per axil. This species is similar to *A. hellwigii* in its short petioles and needle-like stipules, but differs in having penninerved leaves and a single staminate inflorescence per axil.

2. The specific epithet probably refers to the pinnate nervation of the leaves.

20. *Acalypha novoguineensis* Warb. — Fig. 2k; Map 16

Acalypha novoguineensis Warb. (1891) 359; (1894) 198, in obs.; Boerl. (1900) 286; Pax & K.Hoffm. (1924) 151; Fosberg (1940) 114, in obs.; Airy Shaw (1980a) 20; Govaerts et al. (2000) 78. — Type: *Warburg 20502* (holo B†; iso A), Papua New Guinea, Kaiser Wilhelmsland, Astrolabe-Bay, Sigar.

Large shrubs or small trees, 5–8 m tall, monoecious; flowering branches 12–25 cm long, 4–7 mm diam, velvety. *Indumentum* densely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, ovate to elliptic, c. 2 by 1 mm, hairy, without capitate trichomes. *Leaves*: petiole 4–12 cm long, with dense velvety hairs up to 1 mm long; blade ovate to elliptic, 7–17 by 6.5–16 cm, length/width ratio 1–1.4, chartaceous; base cordate; margin serrate to crenate, teeth 1–5 by 3–10 mm, with a gland on tooth tip; apex acute to acuminate; upper surface sparse to densely hairy, lower surface densely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 5, upper secondaries c. 8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 2–5 mm long, indumentum of velvety hairs up to 0.2 mm long; fertile portion 10–17 by 3–5 cm, internodes 1–3 mm long. *Staminate flowers*: bracts elliptic, 1–1.5 by 0.25–0.5 mm, outside with dense hairs of 0.3–0.5 mm long; pedicel 0.5–1 mm long, with straight hairs up to 0.2 mm long; calyx 0.75–1 mm diam, sepals ovate to elliptic, c. 1 by 0.5 mm, with straight hairs up to 0.25 mm long, midrib not verrucate, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, many-flowered, in different axils than staminate ones;



Map 16 Distribution of *Acalypha novoguineensis* Warb.

peduncle 5–7 mm long, indumentum velvety with simple recurved hairs of 0.5–0.75 mm long; fertile portion 9–18 by 3–5 cm, internodes 3–6 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules elliptic, c. 0.5 by 0.2 mm; bracts sessile, 2–3.5 by 1.5–4 mm, foliaceous, accrescent, strongly veined outside, with dots, sparsely hairy outside with hairs of c. 0.5 mm long and with a few sessile glands, glabrous inside, teeth 5, apical tooth 0.5–1 by 1–2 mm, lateral teeth c. 0.5 by 0.5 mm, apices obtuse; pedicel absent; calyx 1–1.5 mm diam, sepals 3, elliptic, c. 1 by 0.5 mm, hairy outside with no verrucae, glabrous inside; ovary globose, c. 2 by 2 mm, trilocular; stigmas 3, 5–6 mm long, each divided 10–12 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, 1.5–2 by 2–2.5 mm, verrucate, with both straight hairs and hairs with enlarged bases, septum covered with bulbous-based trichomes 0.25–0.5 by 0.2–0.25 mm, columella c. 1 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.5 by 1 mm.

Distribution — Malesia: Papua New Guinea, New Ireland.

Habitat & Ecology — Secondary forest, edges of forest, edges of rivers. Flowering: January to October. Altitude 9–600 m.

Vernacular names — Papua New Guinea: Morumbi taindi (Kuman).

Uses — Sometimes cultivated (*Sterly 1677*).

Notes — 1. Key characters include small pistillate bracts with subentire margins, cordate leaves with densely hairy lower sides and deeply crenate or serrate margins, and shortly pedunculate staminate inflorescences. This species is similar to *A. longispica* and *A. grandis* in its cordate leaf bases, but differs from *A. longispica* in having small foliaceous pistillate bracts, and from *A. grandis* in its small and shallowly toothed pistillate bracts.

2. The specific epithet refers to the type locality, New Guinea.

21. *Acalypha phyllonomifolia* Airy Shaw — Fig. 6i1-i2; Map 4

Acalypha phyllonomifolia Airy Shaw (1966) 406; (1974) t. 3719; (1978) 74, in obs.; (1980a) 20; Govaerts et al. (2000) 82. — Type: *Carr 13953* (holo K; iso A, BM, L, SING), Papua New Guinea, Yodda river.

Acalypha concinna Airy Shaw (1978) 74; (1980a) 16; Govaerts et al. (2000) 57. — Type: *LAE (Stevens & Veldkamp) 54966* (holo K; iso L), Papua, Milne Bay District, Raba Raba Subdistrict, Suckling Complex Mayu II.

Straggling shrubs, 2–3 m tall, monoecious; flowering branches 6–20 cm long, 1–3 mm diam, without axillary spines. *Indumentum* nearly absent, of simple straight hairs. *Stipules* persistent, narrowly elliptic, needle-like, 2–4 by 0.2–0.5 mm, glabrous, without capitate trichomes. *Leaves*: petiole 0.2–1.5 cm long, glabrous; blade ovate to elliptic, 4–7 by 1–3 cm, length/width ratio 2–5, chartaceous; base obtuse to acute; margin serrate, teeth 0.5–1 by 2–3 mm, with a gland on tooth tip; apex caudate, forming drip-tips of 2–4 cm long; upper and lower surface nearly glabrous, flat or slightly sunken between the veinlets; veins at base 5, upper secondaries 7–12 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 1–2 cm long, sparsely hairy; fertile portion 90–180 by 1–3 mm, internodes 1–5 mm long. *Staminate flowers*: bracts ovate, 0.5–1 by 0.5–1 mm, sparsely hairy outside, hairs c. 0.2 mm long; pedicel c. 0.5 mm long, with straight hairs of c. 0.1 mm long; calyx 0.5–1.5 mm diam, sepals ovate to elliptic, 0.5–0.75 by 0.3–0.5 mm, glabrous, midrib sparsely verrucate in upper half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 (or 2) per axil (sometimes the same axil as a staminate inflorescence), consisting of a single bract and associated flowers; peduncle absent. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract; bract stipules elliptic, 0.2–0.5 by 0.2–0.5 mm; bracts sessile, 5–6 by 5–6 mm, strongly veined outside, without dots, glabrous, teeth 5, the apical tooth 1.5–2 by 1–3 mm, lateral teeth 1–1.5 by 0.5–2 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.25–0.5 mm, glabrous, without verrucae; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 2–5 mm long, each divided 6–8 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 2.5 by 3 mm, with sessile glands, verrucate, columella c. 2.5 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.5 by 1 mm.

Distribution — Endemic in Papua New Guinea.

Habitat & Ecology — Riversides, secondary forest. Flowering: December and January. Altitude 1350–1950 m.

Notes — 1. Key characters include leaves with drip tips, and usually solitary and subsessile pistillate flowers.

2. The specific epithet refers to having leaves that are similar to those in the genus *Phyllonoma* Willd. ex Schult. (*Saxifragaceae*).

22. *Acalypha pulogensis* Sagun & G.A.Levin — Map 5

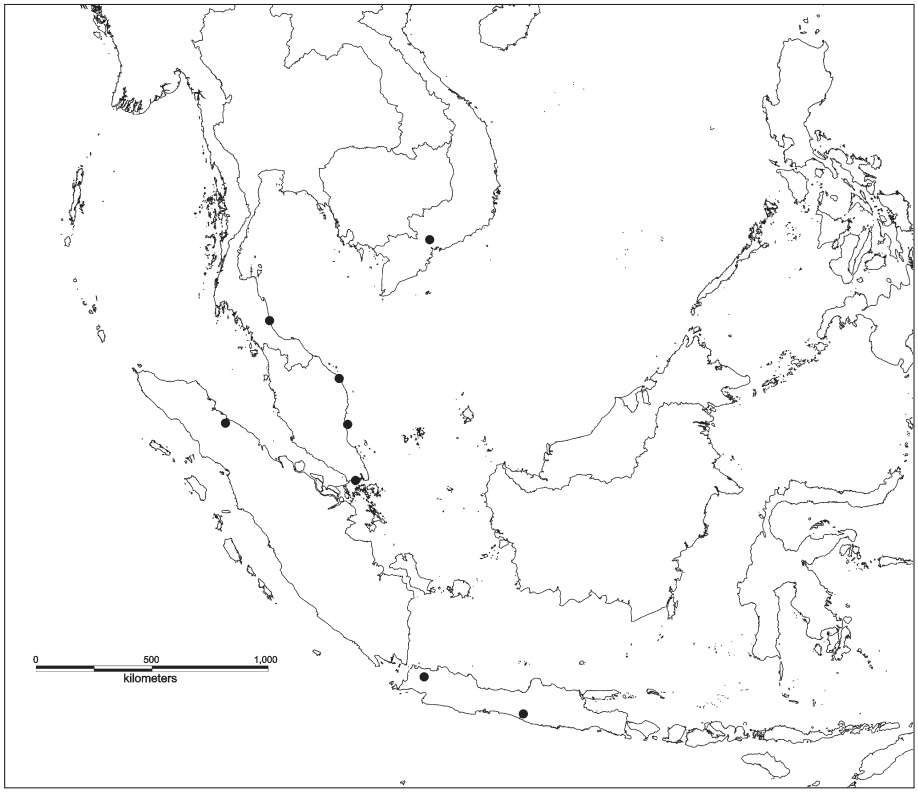
Acalypha pulogensis Sagun & G.A.Levin (2007) 357. — Type: *PNH* (*Celestino) 4372* (holo L, barcode L0242361; iso L, barcode L0241973), Philippines, Mt Pulog, Kabayan, Benguet, Luzon.

Large shrubs or small trees, 3–4 m tall, monoecious; flowering branches 15–28 cm long, 4–7 mm diam, velvety. *Indumentum* sparsely hairy, denser on young parts, with simple recurved hairs. *Stipules* persistent, ovate to elliptic, c. 12 by 2.5 mm, midrib hairy outside, without capitate trichomes. *Leaves*: petiole 2–9 cm long, with sparse straight hairs of c. 0.5 mm long; blade ovate to elliptic, 9–16.5 by 5.5–11 cm, length/width ratio 1.5–1.6, chartaceous, not variegated, green when fresh; base emarginate, eglandular; margin serrate (staminate branches) or crenate to undulate (pistillate branches), teeth 1–3 by 2–5 mm, without a gland on tooth tip; apex acute to acuminate; upper surface glabrous, lower surface sparsely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries c. 8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–10 mm long, velvety hairs up to 0.2 mm long; fertile portion 4–15 by 3–4 cm, internodes 1–2 mm long. *Staminate flowers*: bracts ovate, 0.75–1 by c.1 mm, outside with dense hairs of 0.3–0.5 mm long; pedicel 0.5–1 mm long, with straight hairs up to 0.2 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, c. 0.75 by 0.5 mm, with straight hairs up to 0.25 mm long, midrib not verrucate, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, many-flowered, in other axils than staminate ones; peduncle 12–40 mm long, indumentum velvety with simple recurved hairs of 0.5–0.75 mm long; fertile portion 11–17 by 1.2–2 cm, internodes 3–10 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 or 2 per bract, maturing singly; bract stipules elliptic, 0.75–1 by 0.3–0.5 mm; bracts sessile, 6–12 by 8–11 mm, foliaceous, accrescent, strongly veined outside, with dots, sparsely hairy outside with hairs of 0.5–0.75 mm long, glabrous inside, teeth c. 11, apical tooth 4–6 by 1.5–2 mm, apex slightly rounded, lateral teeth 2–3 by 1–1.5 mm, apices acute; pedicel 0(–0.75) mm long; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1.25 by 1 mm, hairy outside with no verrucae, glabrous inside; ovary globose to oblate, c. 1 by 1 mm, trilocular; stigmas 3, 5–6 mm long, each divided 4–6 times, smooth. *Bisexual inflorescences* none. *Fruits* globose to oblate, c. 1.75 by 1.75 mm, verrucate, distal half covered with trichomes, columella c. 0.75 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.75 by 1 mm.

Distribution — Endemic to the Philippines (Luzon).

Habitat & Ecology — Flowering: March. Altitude c. 2000 m.

Notes — 1. Merrill and Quisumbing distributed specimens with an unpublished name. However, we decided not to use this name due to its misleading connotation of obtusely undulate leaf margins, whereas the leaves are often serrate.



Map 17 Distribution of *Acalypha siamensis* Oliv. ex Gage var. *siamensis*.

2. This species is similar to *A. angatensis* Blanco with its thick staminate inflorescences, and to *A. amentacea* var. *amentacea* in terms of its deeply toothed pistillate bracts and large practically glabrous stipules. However, *A. pulogensis* does not possess the velvety leaf lower sides and the boat-shaped stipules of *A. angatensis*. *Acalypha pulogensis* also has much larger pistillate bracts with dots and longer teeth, as opposed to the smaller, shallowly toothed, and undotted pistillate bracts of its close allies.

3. The specific epithet refers to the type locality, Mt Pulog, Luzon, Northern Philippines, the source of the only collection of this species.

23. *Acalypha siamensis* Oliv. ex Gage var. ***siamensis*** — Fig. 2l, 5d, 6j1-j2; Map 17

Acalypha siamensis Oliv. ex Gage (1922) 238; Ridl. (1924) 274; Merr. (1938) 39; Merr. & Chun (1940) 92; Airy Shaw (1972) 207; Govaerts et al. (2000) 88. — *Acalypha sphenophylla* Pax & K.Hoffm. (1924) 110, nom. superf. — Lectotype (selected here): *Ridley 14522* (holo SING; iso BM, K), Malaysia, Perak, Ulu Temango. — Syntypes: *Ridley 2306* (SING), Malaysia, Pahang, Kwala Beru; *Ridley 1291* (SING), Malaysia, Pahang, Katapang; *Burkill 994* (SING), Malaysia, Pahang, Palau Timau.

Acalypha evrardii Gagnep. (1924) 871; Merr. (1938) 40. — Lectotype (selected here): *Pierre 1573* (holo K; iso G, US), Vietnam (Cochinchine), Thu-dau-mot et Saigon. — Syntypes: *Pierre 1123* (n.v.), Vietnam (Cochinchine), Thu-dau-mot et Saigon; *Evrard 512*, *680* (n.v.), Vietnam, Annam; *Poilane 2842* (n.v.), Vietnam, Annam; *Harmand 726* (n.v.), Vietnam, Condor.

Shrubs, 0.5–2.5 m tall, monoecious; flowering branches 15–25 cm long, 1.5–2 mm diam, glabrous. *Indumentum* nearly absent, of simple straight hairs. *Stipules* persistent, elliptic, 2–2.5 by c. 1 mm, glabrous, without capitate trichomes. *Leaves*: petiole 1.5–3 mm long, with simple recurved hairs of 0.5–1 mm long; blade elliptic to obovate, 3–8 by 1.5–3.5 cm, length/width ratio 2–2.5, chartaceous; base acute; margin serrate, teeth 1–2 by 3–5 mm, with a gland on tooth tip; apex acute to slightly acuminate; upper surface glabrous; lower surface glabrous; veins at base 3, upper secondaries 3–5 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate; peduncle c. 10 mm long, with simple straight hairs of c. 0.1 mm long; fertile portion c. 21 by 5 mm, pistillate below and staminate above; pistillate portion 9–25 by 5–15 mm, internodes 3–5 mm long; staminate portion 11–30 by 2–3 mm, internodes c. 1 mm long. *Staminate flowers*: bracts broadly ovate, c. 1 by 1 mm, outside with sparse hairs of c. 0.2 mm long and with some short capitate trichomes; pedicel c. 0.5 mm long, with straight hairs of c.0.2 mm long; calyx c. 1.5 mm diam, sepals ovate, c. 0.5 by 0.3 mm, with straight hairs of c. 0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.20 by 0.1 mm. *Pistillate flowers* c. 2 mm diam; 1 per bract; bract stipules ovate, c. 1 by 0.75 mm; bracts sessile, 3–5 by 4–6 mm, weakly veined outside, glabrous, without dots, teeth 9, apical tooth 1–1.5 by 1.5–3 mm, lateral teeth 0.5–1 by 1–2 mm, apices acute; pedicel absent; calyx c. 2 mm diam, sepals 3, ovate, c. 1.5 by 1 mm, hairy on margins with sparse verrucae on upper half of midrib; ovary globose to oblate, c. 1 by 1.5 mm, bi- or trilocular; stigmas 2 or 3, 4–4.5 mm long, each divided 10–12 times, with hairs of 0.2–0.5 mm long. *Fruits* globose to oblate, c. 4 by 5 mm, with hairs of c. 0.2 mm long, covered with spines, 1–2 by 0.2–0.5 mm, apex terminating with a small caput, latter usually detaching when mature, columella 2–3 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, 1.5–2.5 by 1–2 mm.

Distribution — Thailand, Vietnam, Malay Peninsula (cult. in Singapore), Sumatra, Java (cult.), Sulawesi.

Habitat & Ecology — Usually cultivated. Flowering: January to November. Altitude 15–30 m.

Vernacular names — Malaysia: Te tjina. Sumatra: Kajoe pala (Aer Djoman); Kajoe tes (Aer Djoman).

Uses — Planted in Java as a substitute for tea (*Meijer 7265*) and used as a hedge plant.

Notes — 1. Key characters include elliptic to obovate leaves, bisexual inflorescences, and spiny fruits. It is most similar to *A. capillipes* (see notes under that species).

2. Another variety, *A. siamensis* Oliv. ex Gage var. *denticulata* Airy Shaw (1977) occurs in Thailand.

3. The specific epithet refers to the type locality of Thailand, formerly known as Siam.

24. *Acalypha spectabilis* Airy Shaw — Fig. 2m, 6k1-k2; Map 4

Acalypha spectabilis Airy Shaw (1978) 71; (1980a) 20. — Type: *NGF (Streimann & Kairo) 44458* (holo BRI; iso L), Papua New Guinea, Northeast New Guinea, Morobe Dist., Wau subdist., near Yaman head of Baime River.

Shrubs, 2–4 m tall, monoecious; flowering branches c. 21 cm long, 5–10 mm diam, velvety. *Indumentum* of dense, velvety, straight hairs. *Stipules* persistent, obovate, 7–9 by 4.5–7.5 mm, with velvety hairs up to 2 mm long. *Leaves*: petiole 5–15 by 3–7 mm long, with dense simple straight hairs 1–2 mm long; blade elliptic to obovate, 10.5–17 by 5.5–10 cm, length/width ratio 1.7–1.9, bullate, chartaceous; base obtuse to emarginate; margin serrate, teeth 1–3 by 1–3 mm, with a gland on tooth tip; apex acute; upper surface sparsely hairy, hairs straight, c. 0.5 mm long, bullate between the veinlets; lower surface densely pubescent; veins at base 3, upper secondaries 8–10 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 1.5–2 cm long, hairs simple, straight, 0.2–0.5 mm long; fertile portion 9–13 by 3–5 cm; internodes 1–2 mm long. *Staminate flowers*: bracts elliptic, c. 1.5 by 1 mm, outside with dense hairs of 0.5–1 mm long; pedicel c. 1 mm long, with straight hairs of c. 0.5 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, c. 0.5 by 0.3 mm, with straight hairs of c. 0.2 mm long, midrib sparsely verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, consisting of a solitary bract and associated flower; peduncle absent. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules not seen; bracts sessile, ovate to obovate, c. 5 by 4–5 mm, weakly veined outside, densely hairy outside at base and along midrib with hairs of 1.5–2 mm long, glabrous inside, margins lined with simple trichomes of 0.2–0.25 mm long, teeth absent (the margins entire), apex acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, elliptic, c. 1 by 0.25–0.5 mm, densely hairy on margins, without verrucae; ovary globose, c. 0.5 by 0.5 mm, trilocular; stigmas 3, 2–3 mm long, each divided > 20 times, smooth. *Bisexual inflorescences* absent. *Fruits* not seen. *Allomorphic fruits* unknown. *Seeds* not seen.

Distribution — Endemic in Papua New Guinea.

Habitat & Ecology — *Nothofagus* dominated ridge in small clearing. Flowering: May and December. Altitude 450 m.

Notes — 1. Key characters include elliptic to obovate and bullate leaves, short stout petioles, solitary pistillate flowers, and pistillate bracts with entire margins.

2. The specific epithet presumably refers to the visually striking or remarkable appearance of the plant, probably due to its bullate leaves and dense, velvety indumentum, but Airy Shaw (1978) gave no explanation of his choice of epithet.

25. *Acalypha stenophylla* K.Schum. — Fig. 6l1-l2; Map 4

Acalypha stenophylla K.Schum. (1888) 206; K.Schum. & Hollrung (1889) 75; K.Schum. & Lauterb. (1900) 403; Boerl. (1900) 286; Pax & K.Hoffm. (1924) 168; Airy Shaw (1980a) 21. — Type: *Hollrung 239* (holo B†; iso K), Papua New Guinea, Kaiser Wilhelmsland, Finschhafen, Kalueng.

Shrubs, 0.6–0.9 m tall, apparently dioecious; flowering branches 11–21 cm long, 2–3 mm diam, velvety. *Indumentum* of dense simple straight hairs. *Stipules* persistent, elliptic, needle-like, 4–8 by 0.5–1 mm, densely hairy, without capitate trichomes. *Leaves*: petiole 3–10 cm long, with dense velvety hairs up to 1 mm long; blade narrowly elliptic, 7–10 by 1–2.5 cm, length/width ratio 4–7, chartaceous; base obtuse; margin subentire to serrate, teeth 0.5–1 by 3–5 mm, with a gland on tooth tip; apex acute to acuminate; upper surface hairy, lower surface densely hairy, surfaces flat or slightly sunken between the veinlets; veins at base 3, upper secondaries 6–8 per side. *Staminate inflorescences* not seen. *Pistillate inflorescences* axillary, 1 per axil, spicate, straight, many-flowered, in different nodes than staminate ones; peduncle 5–20 mm long, indumentum velvety with simple straight hairs of c. 0.5 mm long; fertile portion 20–60 by 3–6 mm, internodes 4–10 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules elliptic, c. 0.5 by 0.25 mm; bracts sessile, 3–4 by 4–5 mm, foliaceous, accrescent, strongly veined outside, with dots, densely hairy outside, hairy inside, hairs c. 0.5 mm long, teeth c. 13, apical tooth c. 1.5 by 2 mm, apex acute, lateral teeth c. 1 by 1 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.5 mm, hairy outside with no verrucae, margins with capitate trichomes, glabrous inside; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 3–4 mm long, each divided 8–10 times, base hairy. *Bisexual inflorescences* absent. *Fruits* not seen. *Allomorphic fruits* unknown. *Seeds* not seen.

Distribution — Endemic in Papua New Guinea.

Habitat & Ecology — On arid hills and in grassland. Flowering: January. Altitude 90–150 m.

Notes — 1. Key characters include narrowly elliptic leaves and dense velvety indumentum covering the whole plant body.

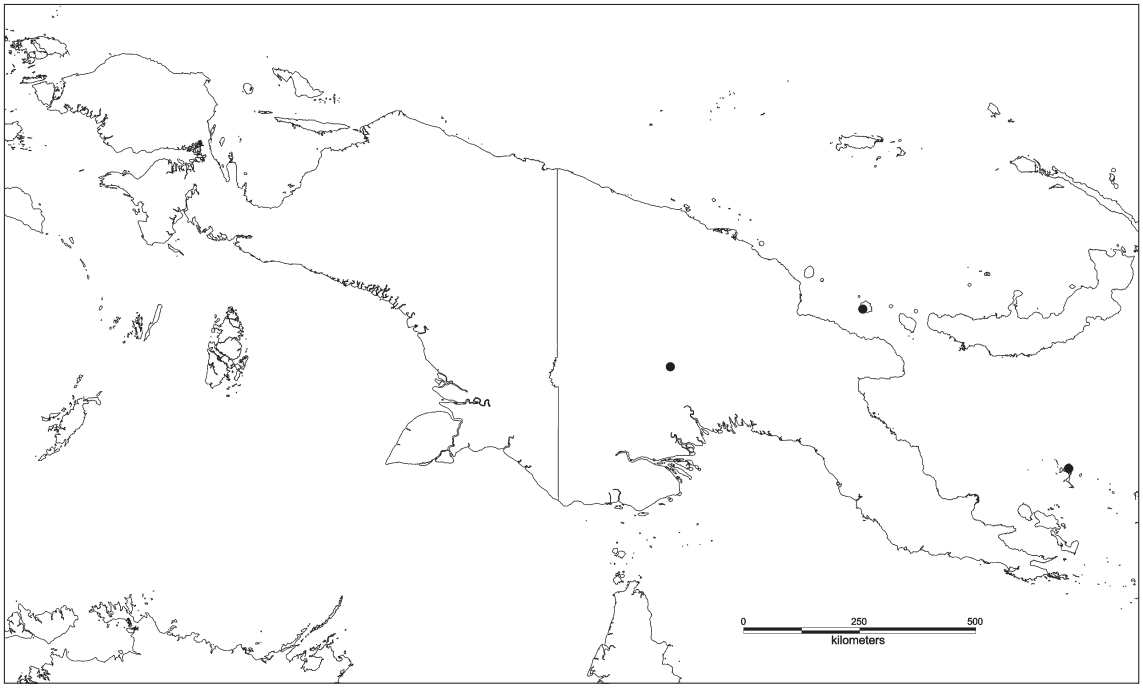
2. The specific epithet refers to the distinctive narrow leaves.

26. *Acalypha subintegra* Airy Shaw — Fig. 2n; Map 18

Acalypha subintegra Airy Shaw (1978) 73; (1980a) 21. — Type: *Brass 27620* (holo K; iso A, L), Papua, Milne Bay Dist., Misima subdistr. (Louisiade Archipelago), Misina Is., Narian.

Shrubs, 2–4 m tall, monoecious; flowering branches 8–22 cm long, 3–5 mm diam, velvety. *Indumentum* densely hairy, denser on young parts, with simple recurved or straight hairs. *Stipules* persistent, narrowly elliptic and needle-like, 2.5–3 by c. 0.5 mm, hairy, with capitate trichomes. *Leaves*: petiole 4–14 cm long, with velvety hairs c. 0.25 mm long; blade ovate to cordate, 9–15.5 by 5.5–10 cm, length/width ratio 1.3–1.7, chartaceous; base cordate; margin subentire to weakly crenate, teeth 0.25–0.5 by 4–6 mm, gland on tooth apex; apex acute to acuminate; upper surface nearly glabrous, lower surface with dense hairs of 0.5–1 mm long, surfaces flat or slightly sunken between the veinlets; veins at base 5, upper secondaries 6–8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 3–7 mm long, hairs velvety, up to 0.5 mm long; fertile portion 32–80 by 2–3 cm, terminal end bulbous, internodes 3–4 mm long. *Staminate flowers*: bracts ovate, c. 0.5 by 0.5 mm, outside with hairs of c. 0.2 mm long, inside glabrous; pedicel c. 0.5 mm long, with straight dense hairs up to 0.2 mm long; calyx 0.5–0.75 mm diam, sepals ovate to elliptic, c. 0.5 by 0.25 mm, with straight hairs up to 0.1–0.2 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.2 mm long, thecae c. 0.2 by 0.1 mm. *Pistillate inflorescences* terminal or axillary, 1 per axil, straight, spicate, densely many-flowered, internodes usually not visible, in other axils than staminate ones; peduncle c. 3 cm long, hairs velvety, c. 0.2 mm long; fertile portion c. 23.5 by 1.3 cm, internodes 2–5 mm long. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules elliptic, c. 0.5 by 0.5 mm; bracts sessile, 4–10 by 5.5–6.5 mm, foliaceous, accrescent, strongly veined outside, without dots, with sparse subsessile trichomes on both sides, densely hairy outside, sparsely hairy inside, hairs 0.5–1 mm long, teeth 11–15, 1–2 by 1–1.5 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1.5 by 0.75 mm, hairy outside, with short capitate trichomes, without verrucae, glabrous inside; ovary globose, c. 1 by 1 mm, trilocular; stigmas 3, 5 mm long, each divided 8–10 times, with hairs 0.1–0.2 mm long. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 2 by 2.5 mm, verrucate, with dense straight hairs of 0.2–1 mm long, columella c. 1.5 by 0.5 mm long. *Allomorphic fruits* unknown. *Seeds* prolate, c. 1.5 by 1 mm.

Distribution — Papua New Guinea (Louisiade & Trobriand Is.).



Map 18 Distribution of *Acalypha subintegra* Airy Shaw.

Habitat & Ecology — Along rocky coastline or old lava flows in light forest and regrowth. Flowering: March, October, November. Altitude 4.5–27 m.

Notes — 1. Key characters include subentire leaves, bulbous distal ends on the staminate inflorescences, velvety leaf undersides, and short needle-like stipules.

2. See note 1 under *Acalypha grandis*.

3. The specific epithet refers to the subentire leaves.

27. *Acalypha wilkesiana* Müll.Arg. — Fig. 2o, 6m1-m2

Acalypha wilkesiana Müll.Arg. (1866) 817; Seem. (1867) 225; Warb. (1891) 358; (1894) 198, in obs.; Koord. (1898) 579; Boerl. (1900) 286; J.J.Sm. (1910a) 20; Merr. (1912) 293; (1916) 285; (1923) 446; Pax & K.Hoffm. (1924) 153; De Wild. (1926) 495; Backer & Bakh.f. (1963) 489; Airy Shaw (1972) 206, 208; Whitmore (1973) 51; Airy Shaw (1975) 24; (1980a) 21; (1980b) 586; (1983) 3; Chakrab. & N.P.Balakr. (1992) 10. — *Acalypha amentacea* Roxb. subsp. *wilkesiana* (Müll.Arg.) Fosberg & Sachet (1980) 10; Govaerts et al. (2000) 48. — Type: *Wilkes Expedition 22* (holo G-DC; iso GH), Fiji.

Acalypha compacta Guilf. ex C.T.White (1933) 343; Airy Shaw (1980b) 585; Govaerts et al. (2000) 48. — Lectotype (Airy Shaw 1980b): *C.T. White s.n.* (holo BRI), Australia, New South Wales, Queensland.

Acalypha grandis auct. non Benth.: Airy Shaw (1982) 3.

Acalypha longispica auct. non Warb.: K.Schum. & Lauterb. (1900) 401 p.p. [*Lauterbach 358*].

Large shrubs, 0.5–4 m tall, monoecious; flowering branches 9–30 cm long, 2–6 mm diam. *Indumentum* nearly absent, of few simple recurved hairs. *Stipules* persistent, elliptic, 5–10 by 0.5–1 mm, hairy on outside of midrib, without capitate trichomes. *Leaves*: petiole 2–10 cm long, with sparse straight hairs of 1–2 mm long; blade ovate to elliptic, 9–19 by 5–14 cm, length/width ratio 1.4–1.9, chartaceous, often variegated or brown-coloured, often twisted and aberrant; base obtuse to acute; margin serrate to crenate to undulate, teeth 1–3 by 2–10 mm, with a gland on tooth tip; apex acute to acuminate; upper and lower surface glabrous, flat or slightly sunken between the veinlets; veins at base 3, upper secondaries c. 8 per side. *Staminate inflorescences* axillary, 1 per axil, spicate; peduncle 5–15 mm long, hairs velvety, up to 0.2 mm long; fertile portion 4–15 by 3–4 cm, internodes 1–5 mm long. *Staminate flowers*: bracts elliptic, c. 1 by 0.5 mm, outside with dense hairs of 0.3–0.5 mm long; pedicel 0.5–1 mm long, with straight hairs up to 0.2 mm long; calyx 0.5–1 mm diam, sepals ovate to elliptic, 0.75–1 by c. 0.5 mm, with straight hairs up to 0.25 mm long, midrib verrucate in distal half, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate inflorescences* axillary, 1 per axil, straight, spicate, many-flowered, in other axils than staminate ones; peduncle 1.5–4 cm long, hairs velvety, recurved, c. 0.1 mm long; fertile portion 10–15 by 1–1.5 cm, internodes 3–10 mm long. *Pistillate flowers* 1.5–2 mm diam; 1 per bract; bract stipules narrowly elliptic, 1–1.5 by c. 0.25 mm; bracts sessile, 5–6 by 7–8 mm, foliaceous, accrescent, weakly veined outside, without dots, nearly glabrous outside, glabrous inside, teeth c. 7, apical tooth c. 2.5 by 3.5 mm, lateral teeth 1–3 by 1–3 mm, apices acute; pedicel absent; calyx 1.5–2 mm diam, sepals 3, ovate to elliptic, c. 1.5 by 1 mm, margins with short capitate trichomes, outside nearly glabrous and without verrucae, glabrous inside; ovary globose to oblate, c. 1.5 by 2 mm, trilocular; stigmas 3 or 4, 5–6 mm long, each divided 8–10 times, smooth. *Bisexual inflorescences* absent. *Fruits* globose to oblate, c. 4 by 5 mm, verrucate, densely hairy, columella c. 2.5 mm long. *Allomorphic fruits* unknown. *Seeds* globose, c. 2 by 2 mm.

Distribution — Widespread cultivated ornamental; not known in the wild, origin unknown.

Habitat & Ecology — Cultivated, sometimes escaped and found along edge of forests and along roads. Flowering: February to December. Altitude 400–450 m.

Uses — Often popular ornamental.

Notes — 1. Key characters include variegated and often twisted leaves with distinctly serrate to lobate margins and deeply toothed pistillate bracts.

2. Various cultivars have been named under *A. wilkesiana*, but no infraspecific taxa within *A. wilkesiana* are recognized in this revision.

3. *Acalypha wilkesiana* is considered here as a distinct species and not as subspecies of *A. amentacea* (Fosberg & Sachet 1980) due to its diagnosable morphological characteristics and distinct position in the molecular phylogenetic analyses.

4. The specific epithet honours Charles Wilkes, head of the United States Exploring Expedition (1838–1842), during which the type was collected.

28. *Acalypha zollingeri* Müll.Arg. — Fig. 2p; Map 4

Acalypha zollingeri Müll.Arg. (1865) 40; (1866) 867; Boerl. (1900) 286; Pax & K.Hoffm. (1924) 135; Govaerts et al. (2000) 94. — *Ricinocarpus zollingeri* (Müll.Arg.) Kuntze (1891) 617. — Typus: *Zollinger 3419* (holo G-DC; iso A, BM, G-DC, L, LE), Indonesia, Lesser Sunda Is., Sumbawa.

Shrubs, c. 2 m tall, monoecious; flowering branches 8–17 cm long, 2–3 mm diam. *Indumentum* nearly absent, with yellow refringent stalkless glands, capitate trichomes, stem and peduncle with few simple straight and stellate hairs. *Stipules* caducous, elliptic, 1–1.5 by 0.25–0.5 mm, hairy, without capitate trichomes. *Leaves*: petiole 3–23 mm long, with straight hairs of c. 0.25 mm long; blade ovate to elliptic, 3.5–5.5 by 1.2–2.5 cm, length/width ratio 2.2–2.5, chartaceous; base acute, with a pair of dot-like glands; margin weakly serrate, teeth 0.5–1 by 0.5–8 mm, with a gland on tooth tip; apex acute to acuminate; upper surface glabrous; lower surface glabrous with yellow refringent stalkless glands; veins at base 3, upper secondaries 5 per side. *Exclusively staminate* and *pistillate inflorescences* absent. *Bisexual inflorescences* axillary, 1 per axil, spicate; peduncle 1.5–6 cm long; with simple straight and stellate hairs; fertile portion 14–31 by 1.5–2 mm, pistillate below and staminate above; pistillate portion 4–6 by 1.5–2.5 mm, internodes 5–7 mm long; staminate portion 10–25 by 1.5–2 mm, internodes 0.5–1 mm long. *Staminate flowers*: bracts elliptic, c. 0.75 by 0.5 mm, outside with dense hairs of 0.2–0.5 mm long; pedicel 0.5–0.75 mm long, with straight hairs of 0.1–0.5 mm long and capitate trichomes of c. 0.5 mm long; calyx 0.5–0.75 mm diam, sepals ovate, c. 0.5 by 0.25 mm, with straight hairs of c. 0.2 mm long, midrib without verrucae, apex acute; filaments c. 0.25 mm long, thecae c. 0.25 by 0.1 mm. *Pistillate flowers* 1–1.5 mm diam; 1 per bract; bract stipules not seen; bracts sessile, 7–15 by 8–12 mm, strongly veined outside, without dots, with yellow refrigent stalkless glands, otherwise glabrous, teeth c. 15, the apical tooth 3–4 by 4–5 mm, lateral teeth 0.5–1 by 4–5 mm, apices acute; pedicel absent; calyx 1–1.5 mm diam, sepals 3, ovate to elliptic, c. 1 by 0.25 mm, densely hairy on margins, without verrucae; ovary globose, c. 1.5 by 1.5 mm, trilocular; stigmas 3, 3–4 mm long, each divided 4–6 times, smooth. *Fruits* not seen. *Allomorphic fruits* unknown. *Seeds* not seen.

Distribution — Lesser Sunda Is. (Sumbawa).

Notes — 1. Key characters include stellate hairs on the stem; yellow refringent stalkless glands on the lower leaf surfaces, pistillate bracts, and ovaries; and pistillate bracts with subentire margins. See note 1 under *A. australis*.

2. *Acalypha dalzellii* Hook.f. (1887) from India and *A. pubiflora* Baill. subsp. *australica* Radcl.-Sm. (Radcliffe-Smith 1990) from Australia have very similar morphologies and may be conspecific with *A. zollingeri*.

3. The specific epithet honours botanist Heinrich Zollinger, who made three trips to Indonesia between 1841 and 1859.

DOUBTFUL SPECIES

Acalypha celebica Koord. (1898) 578; Boerl. (1900) 286; K.Schum. (1901) 348; Koord.-Schum. (1914) 71; Pax & K.Hoffm. (1924) 176; Hurus. (1954) 297; in obs. pro syn.; Airy Shaw (1982) 3. — Lectotype (designated here): *Koorders 16782* (holo BO), Indonesia, Sulawesi, Manado.
Note — Probably not *Euphorbiaceae*.

Acalypha hoffmanniana Hurus. (1954) 297; Airy Shaw (1982) 3; Govaerts et al. (2000) 67. — *Acalyphopsis celebica* Pax & K.Hoffm. (1924) 178, non *Acalypha celebica* Koord. (1898) 578. — Type: Warburg 16643†, 16645†, 16647† (holo B†), Indonesia, South Sulawesi (Sud-Celebes).
Note — Scanty description and no extant type material.

EXCLUDED SPECIES

Acalypha arvensis Poepp. & Endl. in Poepp. (1841) 21.
Note — Rarely cultivated, indigenous to Central and South America.

Acalypha integrifolia Willd. (1805) 530.
Note — Rarely cultivated, indigenous to Mauritius.

Acalypha pilosa Cav. (1800) 136; Fern.-Vill. (1880) 194.
Note — Rarely cultivated, indigenous to Mexico.

Acalypha siamensis Gagnep. (1924) 874, non Oliv. ex Gage (1922) 238. — Type: *Pierre 6291* (holo P; iso A), Vietnam (Cochinchina). = **Acalypha kerrii** Craib.
Note — Indigenous to Thailand and Vietnam.

Acalypha hispida Willd. (1805) 523, nom. inval., non Burm.f. (1768) 203; Willd. (1809) 993; Blume (1825) 628; Hassk. (1848) 248; Wall. (1828) n.7780C; Hook. & Arn. (1830–1841) 213; Span. (1841) 350; Baill. (1862) 224. — Type: *Hb. Willd. Folio 17812* (holo B-W, barcode B-W 17812-020) = **Acalypha poiretii** Spreng.

Acknowledgements We are thankful to Anita Walsmit Sachs-Jansen (L) for her beautiful illustrations, Rick Phillippe (ILLS) for curatorial support, and Kenneth Robertson (ILLS) and Kenneth Wurdack (US) for their comments on the manuscript. For loan of material and assistance during herbarium visits, VGS would like to thank Petra Hoffmann (K), Gill Challen (K), George Argent (E), Rita Calder (E), Kanchi Gandhi (A, GH), Dmitri Geltman (LE), Jim Solomon (MO), Tutie Djarwaningsih (BO), Serena Lee (SING), Jana Leong-Skornickova (SING), and the curators and staff of A, B, BM, BO, BR, CAHUP, E, F, G, GH, K, L, LBC, LE, MO, NY, SING, U, US, and WRSL. For assistance in fieldwork, VGS also likes to thank Dr. Irawati, Rosniati Risna and Julisasi Tri Hadiah of LIPI Kebun Raya, Bogor for their help in doing fieldwork in Java and Sulawesi. VGS would also like to acknowledge funding support from the University of Illinois Graduate College Conference Travel Grant, University of Illinois School of Integrative Biology Enhancement Fund, Singapore Botanic Garden Botanical Research Fellowship, University of Illinois at Urbana-Champaign Dissertation Travel Grant, American Society of Plant Taxonomists Graduate Student Research Grant, International Association for Plant Taxonomy Research Grant in Plant Systematics, Illinois State Academy of Sciences Student Research Award, Illinois Natural History Survey Herbert Holdsworth Ross Memorial Award for Research in Systematics, and the University of Illinois Department of Plant Biology John R. Laughnan Fund Travel Grant. This work is also supported by NSF grant DEB-0128872 to Geoffrey A. Levin and Victor W. Steinmann.

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IDENTIFICATION LIST

The numbers after the collector numbers refer to the following species:

1 = *A. amentacea* var. *amentacea*
2 = *A. angatensis*
3 = *A. argentii*
4 = *A. australis*
5 = *A. balgooyi*
6 = *A. brachystachya*
7 = *A. capillipes*
8 = *A. cardiophylla* var. *cardiophylla*
9 = *A. caturus*
10 = *A. floresensis*
11 = *A. grandibracteata*
12 = *A. grandis*
13 = *A. hellwigii*
14 = *A. hispida*
15 = *A. indica*
16 = *A. lanceolata* var. *lanceolata*
17 = *A. longispica*
18 = *A. nervulosa*
19 = *A. novoguineensis*
20 = *A. paniculata*
21 = *A. phyllonomifolia*
22 = *A. pulogensis*
23 = *A. siamensis* var. *siamensis*
24 = *A. spectabilis*
25 = *A. stenophylla*
26 = *A. subintegra*
27 = *A. wilkesiana*
28 = *A. zollingeri*

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