Checklist of the genus *Antidesma* (Euphorbiaceae) in Thailand

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ABSTRACT. The genus *Antidesma* (Euphorbiaceae-Phyllanthoideae) is revised for the 'Flora of Thailand'. There are 18 species and five varieties of *Antidesma* in the area. Separate keys for staminate and pistillate material are provided.

ANTIDESMA

Burm. ex L., Sp. Pl.: 1027. 1753; Gen. Pl. ed. 5: 451. 1754.— *Bestram* Adans., Fam. 2: 354. 1763.— *Stilago* L., Mant. Pl.: 16. 1767.— *Rhytis* Lour., Fl. Cochinch.: 660. 1790.

About 100 species in the Old World Tropics, with the highest number in South-East Asia. 18 species in Thailand. Classification: Subfamily Phyllanthoideae, subtribe Antidesminae (Webster, 1994).

KEY TO THE SPECIES

Notes: Specimens should either be in fruit or bear mature staminate flowers. Pistillate flowering or sterile material may be difficult and sometimes impossible to determine. Descriptive terms are illustrated. Many structures can only be seen in sufficient detail under a dissecting microscope; dried flowers may have to be softened. All measurements are given in the dry state; fruit length includes calyx and stigmata.

Species in parentheses key out in this place only as an exception.

KEY FOR STAMINATE MATERIAL

1. Leaf apex rounded or retuse, more rarely obtuse
   2. Leaves base cordate to rounded, very rarely acute. Stamens 4–6. Sepals free, pubescent outside. Stipules 1–2 mm wide. Petiole 0.7–1 mm wide. Inflorescences consisting of 10–20 racemes. Flowers sessile. Disc consisting of free lobes. Pistillode present **4. A. ghaesembilla**
   2. Leaf base acute or obtuse, mostly cuneate. Stamens 2 (or 3). Sepals fused for $^2/_3$ of their length, glabrous outside. Stipules 0.5–1 mm wide. Petiole 1–2 mm wide. Inflorescences simple to branched twice. Flowers 1–1.5 mm long pedicellate. Disc cushion-shaped. Pistillode absent **1. A. acidum**
1. Leaf apex acute, acuminate or caudate
   3. Midvein in sicco sharply raised adaxially, distinctly perceptible to the touch
      4. Leaves 6–7.5 cm long, 2.5–3.5 times longer than wide, chartaceous to subcoriaceous. Indumentum of stipules, inflorescence axis and bracts whitish. Stipules 2–5 mm long **6b. A. japonicum** var. **robustius**
      4. Leaves 13–27 cm long, 4–5.5 times longer than wide, coriaceous. Indumentum of stipules, inflorescence axis and bracts ferrugineous. Stipules 4–10 mm long **7. A. laurifolium**
   3. Midvein in sicco impressed to gently raised adaxially, not distinctly perceptible to the touch

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5. Inflorescences at least partly cauline
   6. Petiole (at least of some leaves) longer than 10 mm, 1–1.5 mm wide, basally and distally usually slightly swollen and sometimes geniculate **14. A. puncticulatum**
   6. Petiole shorter than 10 mm (if longer, then wider than 1.5 mm), basally and distally not swollen or geniculate
      7. Tertiary veins close together, more than 10 between every two secondary veins. Petiole 1.5–4 mm wide. Inflorescences (4–)15–24 cm long. Leaves (7–)13–24(–50) by (2.5–)4–8(–15) cm **9. A. leucopodum**
      7. Tertiary veins widely spaced, less than 9 between every two secondary veins. Petiole up to 2 mm wide. Inflorescences 3–8 cm long. Leaves (5–)8–14(–19) by (2–)3–5(–7.5) cm
         8. Stipules, petiole and lower leaf side hairy all over. Indumentum ferrugineous. Inflorescences branched, consisting of 4–11 racemes. Disc extrastaminal-annular (but may sometimes appear cushion-shaped), glabrous (sometimes hairs originating from the base of the disc). Pistillode hairy **18. A. velutinum**
         8. Stipules, petiole and lower leaf side glabrous. Indumentum whitish or absent. Inflorescences simple or branched once. Disc cushion-shaped, hairy. Pistillode glabrous **5. A. helferi**

5. Inflorescences axillary (sometimes terminally condensed)
   9. Stipules foliaceous, more than 4 mm wide
      10. Disc pilose. Flowers 2–3 by 1.5–2 mm. Stamens 2–2.5 mm long, 1.5–2 mm long exserted from the calyx. Stipules, petiole and leaves glabrous **5. A. helferi**
      10. Disc glabrous, rarely pilose. Flowers 1–2.5 by 1–1.5 mm. Stamens 0.8–2 mm long, 0.5–1.5 mm long exserted from the disc. Stipules, petiole and major veins on lower leaf surface pilose
         11. Leaves drying olive-green. Plant with whitish indumentum or glabrous, indumentum never ferrugineous. Inflorescence much-branched, consisting of 10 or more racemes. Flowers 1–2.5 mm long. Stamens 1–2 mm long. Sepals often glandulously fimbriate **10d. A. montanum var. wallichii**
         11. Leaves drying reddish brown. Plant with ferrugineous indumentum, at least at the tip of the branchlets. Inflorescences simple or branched, consisting of up to 7 racemes. Flowers 1 mm long. Stamens 0.8–1 mm long. Sepals never glandulously fimbriate **11. A. neurocarpum**
   9. Stipules not foliaceous, up to 4 mm wide
      12. Bracts longer than 1.5 mm, conspicuous even in very young inflorescences. Sepals 5–7, free. Disc cushion-shaped, enclosing the bases of the filaments and pistillode, glabrous. Indumentum especially of young plant parts densely hirsute and never ferrugineous. Leaves abaxially hairy, drying olive-green **17. A. velutinosum**
      12. Bracts up to 1.5 mm long. Leaves and flowers various
         13. Stamens 2, rarely 3. Pistillode absent. Pedicels 1–1.5 mm long **1. A. acidum**
         13. Stamens 3–5. Pistillode present or absent. 0–1.5(–2) mm long
            14. Disc glabrous (sometimes hairs at base of calyx)
               15. Flowers 3–4 by 3 mm, sessile, smelling strongly of bat's droppings (unpleasant cheesy smell), attracting flies. Stamens 1.5–2 mm long exserted from the calyx. Anthers 0.5 by 0.7 mm. Pistillode present
                  16. Indumentum lacking or whitish. Abaxial leaf surface glabrous except sometimes along the midvein. Often cultivated **2a. A. bunius** var. **bunius**
                  16. Indumentum ferrugineous. Abaxial leaf surface pubescent all over. Rare **2b. A. bunius** var. **pubescens**
               15. Flowers 1–2.5 by 1–2 mm, sessile or pedicellate, without unpleasant cheesy smell. Stamens 0.5–2 mm long exserted from the calyx. Anthers various. Pistillode present or absent
                  17. Disc extrastaminal-annular
                     18. Stipules 3–7 by 0.5–1 mm. Petiole 1.2–1.5 mm wide. Indumentum ferrugineous. Leaves abaxially pubescent all over, distinctly velvety to the touch, up to 18 cm long, always drying reddish brown. Inflorescences 4–7 cm long, axillary or more rarely cauline **18. A. velutinum**
                     18. Stipules 1–3 by 0.2–0.5 mm. Petiole 0.7–1(–1.2) mm wide. Indumentum ochraceous. Leaves abaxially pubescent all over or only along the veins, up to 13 cm long, drying olive-green, greyish or reddish brown. Inflorescences 4–11 cm long, terminal or more rarely axillary **15. A. sootepense**

17. Disc consisting of free lobes (which are short and may appear to be fused extrastaminally in *A. pendulum*) or disc cushion-shaped, enclosing the bases of the filaments and, if present, pistillode (observe carefully, dried flowers may have to be softened)
    19. Disc consisting of free lobes
        20. Petiole 1.5–6 mm wide, glabrous. Leaves (13–)25–50 by (4–)7–14 cm, chartaceous to coriaceous, usually drying yellowish-brown. Inflorescences ca. 15 cm long, simple, solitary or fascicled in twos, axis glabrous. Pistillode glabrous. Stipules usually persistent, 0.5–3 mm wide. Midvein usually gently raised adaxially
            13. A. pendulum
        20. Petiole 0.5–1.2 mm wide, hairy. Leaves 3–11(–16) by 1–4(–5.5) cm, chartaceous to membranaceous, drying olive-green, reddish or greyish brown. Inflorescences 2–11 cm long, simple or branched, axis hairy. Pistillode pubescent. Stipules early caducous, 0.2–0.5 mm wide. Midvein impressed adaxially
            21. Inflorescences 2–4 cm long. Young twigs first dark brown with conspicuous lenticels, then light grey to whitish, glabrous to puberulent. Stamens 0.5 mm long exserted from the calyx. Petiole (4–)6–17 mm long. Leaves glabrous or slightly hairy only along the midvein, higher venation not conspicuously tessellated
                3. A. forbesii
            21. Inflorescences 4–11 cm long. Young twigs brown, (usually densely) ochraceous-tomentose. Stamens 1–2 mm long exserted from the calyx. Petiole 2–11 mm long. Leaves abaxially hairy at least along the veins, higher venation finely tessellated
                4. A. sootepense
    19. Disc cushion-shaped, enclosing the bases of the filaments and pistillode
        22. Indumentum especially of young plant parts and inflorescences ferrugineous to ochraceous
            23. Petiole 2–5 mm wide. Leaves (8–)15–30(–55) by up to 25 cm, tertiary veins percurrent, close together. Inflorescences 6–14 cm long, always simple, mostly thick, with flowers so densely arranged that they touch each other. Bracts 0.7–1.5 by 0.5–1 mm. Disc glabrous or pubescent. Pistillode present, 0.2–0.4 mm long, pubescent
                16. A. tomentosum
            23. Petiole 1 mm wide. Leaves (6–)9–14(–20) by up to 7 cm, tertiary veins weakly percurrent to reticulate. Inflorescences 2–6 cm long, simple or branched, very slender, with flowers more widely spaced, not touching each other. Bracts 0.5 by 0.3 mm. Disc glabrous. Pistillode absent or tiny, up to 0.1 mm long, glabrous to sparsely pilose
                11. A. neurocarpum
        22. Indumentum whitish or absent
            24. Plant rheophytic, leaves 4–10 times longer than wide or narrower than 2 cm
                25. Average leaf size 5–11 by 1–2 cm. Leaf apex acuminate
                    10c. A. montanum var. **salicinum**
                25. Average leaf size 3–6 by 0.4–1.2 cm. Leaf apex acute, sometimes rounded at the very tip
                    10a. A. montanum var. **microphyllum**
            24. Plant not rheophytic, leaves (1.2–)2.5–3.5(–6.6) times longer than wide
                26. Inflorescence, pedicels and flowers slender, usually very regular. Petiole 0.5–1 mm wide. Sepals free. Leaves chartaceous to subcoriaceous, often conspicuously shiny, narrowly elliptic-oblong to ovate or obovate, average leaf size 6–10 by 2–3.5 cm
                    6a. A. japonicum var. **japonicum**
                26. Inflorescence, pedicels and flowers not conspicuously slender. Petiole 0.7–2 mm wide. Sepals free to halfway fused. Leaves variable, not conspicuously shiny
                    10b. A. montanum var. **montanum**

14. Disc hairy all over or at least at the margin
    27. Disc consisting of free lobes. Pedicel 0
        28. Inflorescence ca. 15 cm long. Pistillode glabrous. Petiole 1.5–6 mm wide. Stipules 6–25 by 0.5–3 mm, usually persistent. Leaves (13–)25–50 by (4–)7–14 cm
            13. A. pendulum
        28. Inflorescence 4–12 cm long. Pistillode hairy. Petiole 0.7–1.5 mm wide. Stipules 2–6 (–10) by 0.5–1 mm, usually caducous. Leaves 2–15(–20) by 2–4.5(–9) cm

29. Sepals free, pubescent outside. Young twigs brown. Leaves 1–2.25 times longer than wide, base rounded to cordate, rarely acute. Inflorescences 4–8 cm long, much-branched, consisting of 10–20 racemes (4. *A. ghaesembilla*)
29. Sepals fused for 1/2 of their length or more, glabrous to sparsely pilose outside. Young twigs whitish. Leaves 2–4.7 times longer than wide, base acute to rounded. Inflorescences 6–12 cm long, simple or branched once **8. A. leucocladon**

27. Disc cushion-shaped, enclosing the bases of the filaments and pistillode. Pedicel various
30. Indumentum especially of young plant parts, inflorescences and disc ferrugineous to ochraceous. Petiole 2–5 mm wide. Leaves 8–55 cm long, drying reddish brown. Flowers sessile. Stamens 0.5 mm long exserted from the calyx **16. A. tomentosum**
30. Indumentum whitish or absent. Petiole 0.7–2 mm wide. Leaves 1.5–30 cm long, drying various colours. Flowers sessile or pedicellate. Stamens 0.5–2 mm long exserted from the calyx
31. Young twigs light grey, glabrous or nearly so. Leaves drying greyish green to reddish brown, chartaceous to coriaceous. Anthers 0.5–1 mm long and wide. Sepals never glandulously fimbriate. Flowers 2–3 mm long **5. A. helferi**
31. Young twigs brown,± densely hairy. Leaves usually drying olive-green, membranaceous to chartaceous, only larger leaves sometimes coriaceous. Anthers 0.2–0.5 mm long and wide. Sepals often glandulously fimbriate. Flowers 1–2.5 mm long
32. Lower leaf side patulously hirsute all over, especially along the veins **12. A. orthogyne**
32. Lower leaf side glabrous except along the major veins
33. Plant not rheophytic, leaves 1–3.5(–6.6) times longer than wide (10b. *A. montanum* var. *montanum*)
33. Plant rheophytic, leaves 4–10 times longer than wide or narrower than 2 cm
34. Average leaf size 5–11 by 1–2 cm. Leaf apex acuminate (10c. *A. montanum* var. *salicinum*)
34. Average leaf size 3–6 by 0.4–1.2 cm. Leaf apex acute, sometimes rounded at the very tip (10a. *A. montanum* var. *microphyllum*)

KEY FOR PISTILLATE AND FRUITING MATERIAL

See notes under Key for Staminate Material

1. Leaf apex rounded or retuse, more rarely obtuse
2. Leaf base cordate to rounded, very rarely acute. Sepals free, pubescent outside. Ovary pubescent. Stipules 1–2 mm wide. Petiole 0.7–1 mm wide. Fruiting pedicel 0–1 mm long. Inflorescences consisting of (1–)10–20 racemes **4. A. ghaesembilla**
2. Leaf base acute or obtuse, mostly cuneate. Sepals fused for 2/3rd of their length, glabrous outside. Ovary glabrous. Stipules 0.5–1 mm wide. Petiole 1–2 mm wide. Fruiting pedicel 1.5–3 mm long. Inflorescences simple to branched twice **1. A. acidum**
1. Leaf apex acute, acuminate or caudate
3. Midvein in sicco sharply raised adaxially, distinctly perceptible to the touch. Inflorescences simple
4. Leaves 6–7.5 cm long, 2.5–3.5 times longer than wide, chartaceous to subcoriaceous. Indumentum of stipules, inflorescence axis and bracts whitish. Ovary glabrous. Fruit 5–6(–8) by 4–5(–6) mm, glabrous. Infructescence 4–8 cm long. Stipules 2–5 mm long **6b. A. japonicum** var. **robustius**
4. Leaves 13–27 cm long, 4–5.5 times longer than wide, coriaceous. Indumentum of stipules, inflorescence axis and bracts ferrugineous. Ovary appressed-pubescent. Fruit 8–11 by 5–8 mm, pilose. Infructescence 7–15 cm long. Stipules 4-10 mm long **7. A. laurifolium**
3. Midvein in sicco impressed to gently raised adaxially, not distinctly perceptible to the touch. Inflorescences various
5. Inflorescences at least partly cauline
6. Petiole (at least of some leaves) longer than 10 mm, 1–1.5 mm wide, basally and distally usually slightly swollen and sometimes geniculate **14. A. puncticulatum**
6. Petiole shorter than 10 mm (if longer, then wider than 1.5 mm), basally and distally not swollen or geniculate

7. Tertiary veins close together, more than 10 between every two secondary veins. Petiole 1.5–4 mm wide. Leaves (7–)13–24(–50) by (2.5–)4–8(–15) cm. Calyx 0.3–0.5 mm long. Infructescence 10–25(–69) cm long. Fruiting pedicel 0.5–9 mm long **9. A. leucopodum**

7. Tertiary veins widely spaced, less than 9 between every two secondary veins. Petiole up to 2 mm wide. Inflorescences 3–8 cm long. Leaves (5–)8–14(–19) by (2–)3–5(–7.5) cm. Calyx 0.7–1.2 mm long. Infructescences 3–15 cm long. Fruiting pedicel 0.5–2.5 mm long

8. Stipules, petiole and lower leaf side hairy all over. Indumentum ferrugineous. Inflorescence 2–4 cm, infructescence 3–8 cm long. Sepals halfway fused. Disc glabrous (sometimes hairs at base of calyx). Fruit 4–5 by 3 mm, with a terminal to slightly subterminal style **18. A. velutinum**

8. Stipules, petiole and lower leaf side glabrous. Indumentum absent to whitish. Inflorescence 4–10 cm, infructescence 4–15 cm long. Sepals free or nearly so. Disc hairy. Fruit 6–8 by 4–6 mm, with a lateral to subterminal (rarely terminal) style **5. A. helferi**

5. Inflorescences axillary (sometimes terminally condensed)

9. Stipules foliaceous, more than 4 mm wide

10. Disc pilose. Calyx 0.7–1.2 by 1.2–1.5 mm. Stipules, petiole and leaves glabrous **5. A. helferi**

10. Disc glabrous, rarely pilose. Calyx 0.3–0.8 by 0.5–0.8 mm. Stipules, petiole and major veins on lower leaf surface pilose

11. Leaves drying olive-green. Plant with whitish indumentum or glabrous, indumentum never ferrugineous. Inflorescence simple to much-branched, consisting of 1–13 racemes, 4–10 cm long. Sepals often glandulously fimbriate. Fruiting pedicel 1–4 mm long. Fruit 3–6(–8) by 2.5–4(–6) mm **10d. A. montanum** var. **wallichii**

11. Leaves drying reddish brown. Plant with ferrugineous indumentum, at least at the tip of the branchlets. Inflorescence simple, rarely branched once or in fascicles of two, 1.5–6 cm long. Sepals never glandulously fimbriate. Fruiting pedicel 1–20 mm long. Fruit 6–10 by 4–7 mm **11. A. neurocarpum**

9. Stipules not foliaceous, up to 4 mm wide

12. Bracts longer than 1.5 mm, conspicuous even in very young inflorescences, less so in old infructescences. Fruit lens-shaped, obliquely ellipsoid or bean-shaped, 4–7 by 4–6 mm, with a distinctly asymmetrical base and lateral styles, laterally compressed. Sepals 5–8, free. Disc glabrous. Indumentum especially of young plant parts densely hirsute and never ferrugineous. Leaves abaxially hairy, drying olive-green **17. A. velutinosum**

12. Bracts up to 1.5 mm long. Leaves, flower and fruit various

13. Sepals fused for more than 1/2 of their length

14. Fruit roughly bean-shaped, with a lateral style and an asymmetrical base, 5–8 by 4–6 mm. Leaves chartaceous to submembranaceous **3. A. forbesii**

14. Fruit mostly ellipsoid, with a terminal to subterminal (sometimes lateral in *A. leucocladon*) style and a symmetrical base, size various. Leaves chartaceous to coriaceous

15. Fruit (3–) 4–6 (–8) by 3–4 (–6) mm, laterally compressed or terete. Midvein impressed to flat adaxially. Leaves with or without domatia, pilose at least along the major veins

16. Inflorescence 2–3 cm, infructescence 2–5(–8) cm long. Leaves with domatia between midvein and secondary veins abaxially. Calyx pitcher-shaped, lobed for up to 1/3rd of its length, margin never glandulously fimbriate **1. A. acidum**

16. Inflorescence 3–10 cm, infructescence 6–20 cm long. Leaf domatia present or absent. Calyx various

17. Calyx pitcher-shaped, lobed for 1/4th-1/2 of its length, margin never glandulously fimbriate. Leaves often with domatia, ochraceous-pilose at least along the veins abaxially, higher venation finely tessellated. Fruit without or with inconspicuous white pustules when dry **15. A. sootepense**

17. Calyx cup-shaped, lobed for ½ of its length, margin often glandulously fimbriate. Leaves without domatia, usually glabrous except along the major veins, higher venation not conspicuously tessellated. Fruits usually with conspicuous white pustules when dry

18. Plant rheophytic, leaves 4–10 times longer than wide

(10c. *A. montanum* var. *salicinum*)

18. Plant not rheophytic, leaves 2–3.5(–6.6) times longer than wide

(10b. *A. montanum* var. *montanum*)

15. Fruit 5–13 by 4–9 mm, laterally compressed. Midvein gently raised to flat adaxially. Leaves without domatia, completely glabrous or pubescent
    19. Sepals fused for up to 1/2 of their length; calyx in flower and fruit bowl-shaped to shallowly cup-shaped. Fruit 10–13 by 7–11 mm. Infructescence 25–75 cm long. Flowers sessile, fruiting pedicel 0–1(–3) mm long. Stipules usually persistent, 6–25 mm long. Leaves (13–)25–30(–50) cm long. Petiole 1.5–6 mm wide **13. A. pendulum**
    19. Sepals fused for 2/3rd-3/4th of their length; calyx in flower and fruit cup-shaped, pitcher-shaped or cylindrical. Fruit 5–11 by 4–7 mm. Infructescence 7–17 cm long. Flower shortly pedicellate, fruiting pedicel 1–9 mm long. Stipules early caducous, 2–6(–10) mm long. Leaves (5–)10–18(–32) cm long. Petiole 0.7–2 mm wide
        20. Young twigs whitish. Infructescence 7–10 cm long. Fruiting pedicel 1–2.5 cm long. Disc hairy. Fruit with subterminal to lateral style. Calyx 0.5–0.8 mm long, inside at the base without or with whitish hairs. Petiole 0.7–1.5 mm wide. Stipules 0.5–1 mm wide. Leaves membranaceous to chartaceous **8. A. leucocladon**
        20. Young twigs brown. Infructescence 10–17 cm long. Fruiting pedicel 2–9 cm long. Disc glabrous. Fruit with terminal to slightly subterminal style. Calyx 1–1.5 mm long, inside at the base with long ferrugineous hairs. Petiole 1.5–2 mm wide. Stipules 1.5–2 mm wide. Leaves coriaceous
            21. Indumentum lacking or whitish. Abaxial leaf surface glabrous except sometimes along the midvein. Ovary glabrous. Often cultivated **2a. A. bunius** var. **bunius**
            21. Indumentum ferrugineous. Abaxial leaf surface pubescent all over. Ovary sparsely pilose. Rare **2b. A. bunius** var. **pubescens**
13. Sepals free to fused for up to 1/2 of their length
    22. Indumentum especially of young plant parts and inflorescences ferrugineous to ochraceous
        23. Fruit 4–5 by 3 mm. Fruiting pedicel 0–1 mm long. Infructescence 3–8 cm long. Leaves up to 18 cm long. Stipules 3–7 by 0.5–1 mm
            24. Sepals free. Petiole 0.7–1 mm wide. Disc glabrous to pubescent. Ovary ovoid to globose. Leaves drying olive-green, 1–2.25 times longer than wide, abaxially pubescent to nearly glabrous **4. A. ghaesembilla**
            24. Sepals fused for 1/2 of their length. Petiole 1.2–1.5 mm wide. Disc glabrous. Ovary almost cylindrical. Leaves drying reddish brown, 2–4 times longer than wide, abaxially ferrugineous-pubescent all over, distinctly velvety to the touch **18. A. velutinum**
        23. Fruit 6–20 by 4–9 mm. Fruiting pedicel 1–23 mm long. Infructescence 4–65 cm long. Leaves up to 50 cm long. Stipules 3–35 by 1–18 mm
            25. Petiole 2–5 mm wide. Leaves (8–)15–30(–55) by up to 25 cm, tertiary veins percurrent, close together. Fruit obliquely ovate (mango-shaped) to falcate, always laterally compressed, hairy (old fruits sometimes almost glabrous). Disc glabrous to pubescent. Ovary ovoid to falcate, densely appressed-pubescent. Inflorescence (5–)10–30 cm, infructescence 10–65 cm long **16. A. tomentosum**
            25. Petiole 1 mm wide. Leaves (6–)9–14(–20) by up to 7 cm, tertiary veins weakly percurrent to reticulate. Fruit ellipsoid, globose, ovate or obovate, compressed or terete, glabrous, rarely thinly puberulent. Disc glabrous. Ovary globose, glabrous, rarely pilose. Inflorescence 1.5–6 cm long, infructescence 4–16 cm long **11. A. neurocarpum**
    22. Indumentum whitish or absent
        26. Fruit 10–13 by 7–9 mm, reticulate, laterally compressed. Sepals never glandulously fimbriate. Inflorescences simple, 8–35 cm, infructescences 25–75 cm long. Stipules 6–25 mm long. Leaves (13–)25–30(–50) cm long, midvein flat to gently raised, rarely slightly impressed adaxially. Stipules, petiole and inflorescence axis usually glabrous. Fruiting pedicel 0–1(–3) mm long **13. A. pendulum**
        26. Fruit 3–8 by 2.5–6 mm, areolate, compressed or terete. Sepals often glandulously fimbriate. Inflorescences simple or branched, 2–10 cm long, infructescences 2.5–20 cm long. Stipules 1.5–7(–13) mm long. Leaves (1.5–)3–15(–30) cm long, midvein impressed adaxially. Stipules, petiole and inflorescence axis usually hairy. Fruiting pedicel 1–6 mm long
            27. Fruit ventrally and dorsally compressed, 7–8 by 4–5 mm, pilose. Disc, ovary and abaxial leaf side (at least along the veins) densely hirsute **12. A. orthogyne**

27. Fruit laterally compressed or terete. Fruit size and indumentum various
  28. Plant rheophytic. leaves 4–10 times longer than wide or narrower than 2 cm. Fruit terete
    29. Average leaf size 5–11 by 1–2 cm. Leaf apex acuminate
      10c. A. montanum var. **salicinum**
    29. Average leaf size 3–6 by 0.4–1.2 cm. Leaf apex acute, sometimes rounded at the very tip
      10a. A. montanum var. **microphyllum**
  28. Plant not rheophytic, leaves 1–3.5(–6.6) times longer than wide. Fruit compressed or terete
    30. Fruit laterally compressed
      31. Disc glabrous. Fruiting pedicel (2–)3–6 mm long. Fruit glabrous
        6a. A. japonicum var. **japonicum**
      31. Disc hairy (if glabrous, fruiting pedicel 0–1 mm long and fruit hairy). Fruiting pedicel 0–2.5 mm long. Fruit pilose or glabrous
        32. Fruit 6–8 by 4–6 mm, with a lateral to subterminal, rarely terminal style. Leaf base acute. Leaves drying greyish green to reddish brown, glabrous. Inflorescence 4–10 cm, infructescence 4–24 cm long, simple or branched once or twice. Sepals rounded to acuminate. Stipules, petiole and leaves glabrous. Young twigs light grey
          5. A. helferi
        32. Fruit 3–5 by 2.5–3(–3.5) mm, with a terminal to slightly subterminal style. Leaf base rounded to cordate, rarely acute. Leaves drying olive-green, pubescent at least along the major veins abaxially. Inflorescence 2–3 cm, infructescence 3–7 cm long, usually much-branched, consisting of (1–) 10–20 racemes. Sepals acute. Stipules, petiole and leaves usually pubescent. Young twigs brown
          (4. *A. ghaesembilla*)
    30. Fruit terete or hardly laterally compressed
      33. Calyx pitcher-shaped, lobed for ¼th-1/2 of its length, margin never glandulously fimbriate. Leaves often with domatia, ochraceous-pilose at least along the veins abaxially, higher venation finely tessellated, 3–12.5 by 1–4.2 cm. Petiole 0.7–1(–1.2) mm wide. Fruit without or with inconspicuous white pustules when dry
        15. A. sootepense
      33. Calyx cup-shaped, lobed for ca. ½ of its length, margin often glandulously fimbriate. Leaves without domatia, usually glabrous except along the major veins, higher venation not conspicuously tessellated, 6–30 by 2–12 cm. Petiole 1–2 mm wide. Fruits usually with conspicuous white pustules when dry
        10b. A. montanum var. **montanum**

1. Antidesma acidum Retz., Obs. Bot. 5: 30. 1788, 'acida'; Müll.Arg. in DC., Prodr. 15(2): 249. 1866; Airy Shaw, Kew Bull. 26: 352. 1971; Grierson & Long, Fl. Bhutan 786, fig. 48 h-j. 1987.— *Stilago diandra* Roxb., Pl. Corom. 2: 35, pl. 166. 1802.— *Antidesma diandrum* Roth, Nov. pl. sp.: 369. 1821.— *A. lanceolarium* (Roxb.) Wall., Cat.: 7284. 1832; Wight, Ic. 3(1): 4, t. 766. prob. 1844.— *A. wallichianum* Presl, Epim.: 235. 1849.

T h a i l a n d.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Nan, Lamphun, Lampang, Phrae, Tak, Phitsanulok, Kamphaeng Phet; NORTH-EASTERN: Phetchabun, Loei, Nakhon Panom; EASTERN: Buri Ram, Surin, Si Sa Ket, Ubon Ratchathani; SOUTH-WESTERN: Uthai Thani, Kanchanaburi, Ratchaburi; CENTRAL: Saraburi; SOUTH-EASTERN: Chon Buri, Chanthaburi; PENINSULAR: Ranong, Phangnga, Krabi, Satun.

D i s t r i b u t i o n.— India (type) including Andaman & Nicobar Islands, Nepal, S. China, Bangladesh, Myanmar, Laos, Vietnam, Cambodia, Thailand, Java. Absent in Malesia except Java; absent in Sri Lanka. Distribution map in Baker et al. (1998: 252, fig. 6D).

E c o l o g y.— In dry deciduous, deciduous and evergreen forest, forest edges, open spaces, bamboo thickets; open or half-shady habitats; secondary, often disturbed, much degraded or frequently burnt vegetation. On sandy gravel, red volcanic soil, sand, silt or red lateritic soil, over limestone, granite and shale-granite; 0–1600 m.

U s e s.— Fruits eaten. Young leaves used in curry and as vegetable (India and Thailand).

V e r n a c u l a r.— Haw cha (Karen); kho cho la, mau (Northern); mao soi (มะม่าสร้อย) (North-eastern); mak mao (หมากม่า), nong sa (Karen South-western).

2. Antidesma bunius (L.) Spreng., Syst. Veg. 1: 826. 1824; Wight, Ic. 3(1): t. 819.— *Stilago bunius* L., Mant. Pl. 1: 122. 1767.

2a. var. **bunius.**— *Antidesma sylvestre* Lamk., Enc. 1: 207. 1783, 'sylvestris'— *A. bunius* (L.) Spreng. var. *wallichii* Müll.Arg. in DC., Prodr. 15(2): 263. 1866.— *A. floribundum* Tul., Ann. Sci. Nat., Bot., Sér. 3: 189. 1851.— *A. ciliatum* C.Presl, Epimel. bot.: 234. 1849.— *A. cordifolium* Presl, Epim.: 235. 1849.— *A. andamanicum* Hook.f., Fl. Br. Ind. 5: 364. 1887, **syn. nov.**— *Sapium crassifolium* Elmer, Leafl. Philipp. Bot. 2: 485. 1908.— *Antidesma collettii* Craib, Bull. Misc. Inform. Kew 1911 (10): 461. 1911.— *A. thorelianum* Gagnep., Bull. Soc. Bot. France 70: 124. 1923.

T h a i l a n d.— NORTHERN: Chiang Mai, Chiang Rai, Lamphun, Lampang, Tak; NORTH-EASTERN: Loei, Nakhon Phanom; SOUTH-WESTERN: Kanchanaburi; SOUTH-EASTERN: Chon Buri, Trat.

D i s t r i b u t i o n.— India (type) incl. Andaman & Nicobar Islands, Sri Lanka, S. China, Myanmar, Laos, Vietnam, Thailand, Singapore, Borneo, Java, Philippines, Sulawesi, Lesser Sunda Islands, Moluccas, New Guinea, Christmas Islands (Indian Ocean), Tahiti, Hawaiian Islands. As *A. bunius* is widely cultivated as a fruit tree, it is impossible to distinguish truly wild occurrences.

E c o l o g y.— In wet evergreen forests, open forests, deciduous dipterocarp forest, thickets, bamboo thickets, teak forest, river banks, forest edges, by roadsides, semi-cultivated and cultivated areas, gardens, shady or open habitats, usually in secondary but also in primary vegetation. On sand, loam or clay over (coral) limestone or granite bedrock. 0–2100 m.

U s e s.— Widely cultivated as a fruit tree. Wood subject to termite attacks and therefore unsuitable for work in contact with the soil (Vietnam, *Poilane 10901*). Leaf eaten as vegetable (Java).

V e r n a c u l a r.— Mamao dong (มะม่าดง) (Laos); mamao khwai (มะม่าควาย), mau, sa phou pho-maou san (Northern).

2b. var. **pubescens** Petra Hoffm., Kew Bull. 54: 350. 1999.

T h a i l a n d.— NORTHERN: Lamphun (type: Mae Li, *Winit* 295, holotype K!); NORTH-EASTERN: Phetchabun (Lom Kao).

D i s t r i b u t i o n.— Endemic to Thailand.

E c o l o g y.— In evergreen forest by stream; 700–1020 m.

N o t e.— These specimens have been referred to by Airy Shaw (1971: 359) as *Antidesma* cf. *nienkui* Merr. & Chun. Apart from the considerable disjunction, *A. bunius* var. *pubescens* differs from the type and only specimen of *A. nienkui* from Hainan in the shorter petioles and fused calyx lobes. Both taxa, however, have a similar dense ferrugineous indumentum in most parts, which distinguishes them from the nearly glabrous *A. bunius* var. *bunius*.

3. Antidesma forbesii Pax & K.Hoffm. in Engl., Pflanzenr. 81: 153. 1922.— *A. plagiorrhynchum* Airy Shaw, Kew Bull. 28: 272. 1973; Kew Bull. 36: 356, fig. C1–2, 363. 1981, **syn. nov.**— *A. pradoshii* Chakrab. & Gang., J. Econ. Taxon. Bot. 21: 479. 1997, **syn. nov.**

T h a i l a n d.— PENINSULAR: Phangnga.

D i s t r i b u t i o n.— Thailand (one collection), Peninsular Malaysia (Pahang, Cameron Highlands only), Sumatra (type).

E c o l o g y.— In montane rain and mossy forest; 1000–1900 m.

4. Antidesma ghaesembilla Gaertn., Fruct. 1: 189, t. 39. 1788; Wight, Ic. 3(1): t. 820. 1844–45; Gagnep. & Beille in Fl. Gén I.-C. 5(5/6): 505, fig. 64.11-19. 1926.— *A. pubescens* Roxb., Pl. Corom. 2: 35, pl. 167. 1802.— *A. paniculatum* Willd., Sp. pl. 4.2: 764. 1806, 'paniculata'.— *A. vestitum* Presl, Epim.: 232. 1849.

T h a i l a n d.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lamphun, Lampang, Tak, Phitsanulok, Nakhon Sawan; NORTH-EASTERN: Phetchabun, Loei, Khon Kaen; EASTERN: Nakhon Ratchasima, Buri Ram, Si Sa Ket; SOUTH-WESTERN: Kanchanaburi, Ratchaburi, Phetchaburi?, Prachuap Khiri Khan; CENTRAL: Ang Thong, Bangkok; SOUTH-EASTERN: Chon Buri, Chanthaburi; PENINSULAR: Chumphon, Surat Thani, Phangnga, Nakhon Si Thammarat, Trang, Songkhla, Yala, Narathiwat.

D i s t r i b u t i o n.— India incl. Nicobar Islands, Sri Lanka, S. China, Bangladesh, Myanmar, Laos, Vietnam, Cambodia, Thailand, Peninsular Malaysia, Sumatra, Borneo (Kalimantan, Sabah), Java, Philippines, Sulawesi, Lesser Sunda Islands, Moluccas, New Guinea, N. Australia. Type without locality.

E c o l o g y.— In savannah, grassland (often regularly burnt, said to be fire resistant, NGF 9809), open forest, dense scrubby forest, vine thickets, fresh-water swamps, edge of mangrove, coastal fringes, secondary vegetation around towns and villages (Malay: 'belukar'); on roadsides and river banks, on dry to swampy ground; usually in secondary vegetation. On clay, sand, lateritic soil, black peat, limestone, sometime on ultrabasic, over shale and granite bedrock; 0–1250 m.

U s e s.— Fruits eaten locally.

V e r n a c u l a r.— Mamao soi (มะเม่าสร้อย), mao (เม่า) (Northern); mamao (มะเม่า), mak mao (หมักเม่า) (North-eastern); mamao (มะเม่า), mak mao (มักเม่า) (South-western); mak mao (มักเม่า) (Central); mamao (มะเม่า) (South-eastern); mamao khao bao (มะเม่าข้าวเบา), mao khai pla (เม่าไข่ปลา), mao (เม่า) (Peninsular).

5. Antidesma helferi Hook.f., Fl. Br. Ind. 5: 357. 1887.— *A. pachystemon* Airy Shaw, Kew Bull. 23: 279. 1969.

T h a i l a n d.— PENINSULAR: Ranong, Phangnga, Krabi, Nakhon Si Thammarat, Trang.

D i s t r i b u t i o n.— Peninsular Myanmar (type), Thailand, Peninsular Malaysia, Sumatra (Aceh and East coast).

E c o l o g y.— In primary evergreen or mossy forest, often near water or on marshy ground. On alluvial and greyish clay-mud soil; 100–1300 m.

N o t e s.— The specimens from Peninsular Malaysia and from Sumatra have bigger, more eliiptic, thinner and dull leaves than those from Myanmar and Thailand, whereas the generative characters are uniform throughout the distribution area.

The fruiting specimens *Kerr 18703* from Krabi, and *Larsen et al. 45988* from Khao Luang, Nakhon Si Thammarat, differ by their glabrous discs from the remainder of the collections. In this and all vegetative characters the latter specimen much resembles the unmatched collection *van Beusekom & Phengkhlai 967* from the same locality and altitude.

6. Antidesma japonicum Siebold & Zucc., Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 212. 1846 (repr. as Fl. jap. fam. nat. 2: 88. 1846).

6a. var. **japonicum**.— ?*Antidesma gracillimum* Gage, Rec. Bot. Surv. India 9: 227. 1922; Chakrabarty & Gangopadhyay, J. Econ. Taxon. Bot. 21: 479. 1997.— *A. acuminatissimum* Quisumbing & Merr., Philipp. J. Sci. 37: 159. 1928, **syn. nov.**

T h a i l a n d.— NORTHERN: Chiang Mai, Phitsanulok; EASTERN: Nakhon Ratchasima; SOUTH-WESTERN: Ratchaburi, Phetchaburi, Prachuap Khiri Khan; SOUTH-EASTERN: Chon Buri, Chanthaburi; PENINSULAR: Nakhon Si Thammarat, Phatthalung, Songkhla, Pattani, Yala, Narathiwat.

D i s t r i b u t i o n.— Japan: Kyushu and Ryukyu Islands (type), Taiwan, S. China, Myanmar, Vietnam, Thailand, Peninsular Malaysia, Philippines (Luzon, Mindanao).

E c o l o g y.— In (evergreen) forest, often damp and thick, in virgin forest, dipterocarp forests, dry thickets, on limestone cliffs, along roadsides, in primary or secondary vegetation, on wet or dry ground. On sandy soil, clay, limestone, over granite bedrock; 0–1700 m.

U s e s.— Fire wood.

6b. var. **robustius** Airy Shaw, Kew Bull. 26: 355. 1971.

T h a i l a n d.— EASTERN: Nakhon Ratchasima (Pak Thong Chai/Sakaerat area (type: Pak Thong Chai ('TREND Camp'), E part of Khao Yai National Park, *Larsen, Santisuk & Warncke* 3137 (holotype K!; isotypes AAU, L!)).

D i s t r i b u t i o n.— Endemic to Thailand.

E c o l o g y.— In dry evergreen forest; 350–500 m.

7. Antidesma laurifolium Airy Shaw, Kew Bull. 26: 356. 1971.

T h a i l a n d.— SOUTH-EASTERN: Chanthaburi (type: Kao Sabap, *Kerr* 18012 (holotype K!, isotype L!)), Trat.

D i s t r i b u t i o n.— Cambodia (Kampot province), Thailand.

E c o l o g y.— In (dry) evergreen forest and secondary growth; 0–600 m.

N o t e.— Erroneously published as 'sp. nov.' again (Airy Shaw 1972: 458). The specimens cited there include two collections from Johore, Peninsular Malaysia (NW Gunung Blumut, 15 and 17 May 1968, *Whitmore* 8786 and 8853), which could not be located. The occurrence of *Antidasma laurifolium* in Johore, which would make the distribution strangely disjunct, is therefore doubtful.

8. Antidesma leucocladon Hook.f., Fl. Br. Ind. 5: 358. 1887.

T h a i l a n d.— SOUTH-EASTERN: Chanthaburi (only one collection); PENINSULAR: Chumphon, Ranong, Surat Thani, Nakhon Si Thammarat, Trang.

D i s t r i b u t i o n.— Thailand, Peninsular Malaysia (type), E. Sumatra.

E c o l o g y.— In primary evergreen forest, sometimes along streams or in fresh water swamps; 0–800 m.

V e r n a c u l a r.— Phak wan lang khao (ผักหวานหลังขาว) (Peninsular).

9. Antidesma leucopodum Miq., Sum.: 465. 1861.— *A. clementis* Merr., Philipp. J. Sci., C, 9: 465. 1914 (non Merr. 1917).— *A. cauliflorum* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 8: 316. 1915 (non Merr.).— *A. trunciflorum* Merr., En. Born.: 333. 1921, nom. nov.— *A. hirtellum* Ridl., Bull. Misc. Inform. Kew 1923(10): 366. 1923.— *A. caudatum* Pax & K.Hoffm., Mitt. Inst. Allg. Bot. Hamburg 7: 223. 1931.

T h a i l a n d.— SOUTH-WESTERN: Kanchanaburi (see note); PENINSULAR: Yala, Narathiwat.

D i s t r i b u t i o n.— Thailand, Peninsular Malaysia, Sumatra (type), Borneo, Philippines (Basilan, Mindanao).

E c o l o g y.— In lowland to lower montane (mixed) dipterocarp forest up to 50 m tall, mossy forest, riverine forest, usually in damp understorey, also on roadsides, primary or secondary vegetation. On loam and clay over sandstone and shale, alluvial soil and limestone rocks; 0–2200 m.

V e r n a c u l a r.— Mao polo (เม่าโปโล) (Peninsular).

U s e s.— Firewood.

N o t e.— The specimen *van Beusekom & Phengkhlai* 245 from Kanchanaburi, is the only collection made north of the Isthmus of Kra. The staminate inflorescences are terminal and rather short (3–5 cm long), but the flowers and leaves are typical of *Antidesma leucopodum*. The distribution map in Baker et al. (1998: 252, fig. 6B) does not take this specimen into account.

10. Antidesma montanum Blume, Bijdr.: 1124. 1826–27 (non Thwaites)

N o t e.— This is the most common and one of the most variable species of the genus. It is treated here in a broad sense. *Antidesma japonicum* Sieb. & Zucc. is accepted here as separate species although there are several transitional specimens.

10a. var. **microphyllum** (Hemsl.) Petra Hoffm., Kew Bull. 54: 357. 1999.— *Antidesma microphyllum* Hemsl. in Forbes & Hemsl., J. Linn. Soc., Bot. 26: 432. 1894.— *A. wattii* Hook.f., Fl. Br. Ind. 5: 366. 1887.— *A. seguinii* H. Lév., Repert. Spec. Nov. Regni Veg. 9: 460. 1911, 'seguini'.— *A. pseudomicrophyllum* Croizat, J. Arnold Arbor. 21: 496. 1940.

T h a i l a n d.— NORTH-EASTERN: Loei (Wang Saphung); EASTERN: Chaiyaphum (Ban Nam Phrom, Nam Phrom, Phu Khiao E. of Chaiyaphum).

D i s t r i b u t i o n.— India (Assam), S. China (type), Myanmar (Southern Shan States), Laos, Vietnam, Thailand.

E c o l o g y.— In (evergreen) forest along rivers. On sandstone; 300–1000 m.

N o t e.— var. *microphyllum* is a very small-leafed rheophyte. It differs only slightly from var. *salicinum*, mainly in leaf size and shape, and may have to be subsumed under this name when the genus has been revised for India, China, Myanmar, Laos and Vietnam.

10b. var. **montanum**.— *Antidesma oblongifolium* Blume, Bijdr.: 1125. 1826–27.— *A. barbatum* Presl, Epim.: 233. 1849.— *A. salicifolium* Presl, Epim.: 233. 1849.— *A. leptocladum* Tul., Ann. Sci. Nat., Bot., Sér. 3: 199. 1851.— *A. nitidum* Tul., Ann. Sci. Nat., Bot., Sér. 3: 193. 1851.— *A. pubescens* Roxb. var. *menasu* Tul., Ann. Sci. Nat., Bot., Sér. 3: 215. 1851.— *A. pubescens* Roxb. var. *moritzii* Tul., Ann. Sci. Nat., Bot., Sér. 3: 215. 1851.— *A. rostratum* Tul., Ann. Sci. Nat., Bot., Sér. 3: 218. 1851.— *A. henryi* Hemsl. in Forbes & Hemsl., J. Linn. Soc., Bot., 26: 431. 1894 (non Pax & K. Hoffm.).— *A. kerrii* Craib, Bull. Misc. Inform. Kew 1911 (10): 462. 1911, **syn. nov**.— *A. paxii* F. P. Metcalf, Lingnan Sci. J. 10: 485. 1931, as nom. nov.

T h a i l a n d.— NORTHERN: Mae Hong Son, Chiang Mai, Nan, Lamphun, Lampang, Phrae, Tak, Phitsanulok, Kamphaeng Phet, Nakhon Sawan; NORTH-EASTERN: Loei, Nakhon Phanom; EASTERN: Nakhon Ratchasima; SOUTH-WESTERN: Kanchanaburi; CENTRAL: Saraburi, Bangkok; SOUTH-EASTERN: Prachin Buri, Chachoengsao, Chon Buri, Chanthaburi, Trat; PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga, Phuket, Krabi, Nakhon Si Thammarat, Phatthalung, Trang, Satun, Songkhla, Pattani, Yala, Narathiwat.

Distribution.— India incl. Andaman & Nicobar Islands, Bhutan, Bangladesh, S. China, Japan (Ryukyu Islands), Taiwan, Laos, Vietnam, Cambodia, Thailand, Peninsular Malaysia, Sumatra, Borneo, Java (type), Sulawesi, Lesser Sunda Islands, Moluccas, New Guinea (Irian Jaya), Australia (Prince of Wales Island, N Queensland).

Ecology.— In primary and secondary evergreen to deciduous vegetation, mixed dipterocarp forest, riparian and littoral forest, coastal forest, beaches, monsoon forest, teak-forest, *Agathis* forest, bamboo groves, peat swamp forest, heath forest, thickets, grasslands, roadsides, around towns and villages (Malay: 'belukar'), also mossy montane forest, usually in understorey, from deep shade to total exposure, on dry to wet or seasonally flooded ground. Common in most places, with extremely high ecological amplitude. On sand, clay, loam, peat, volcanic and ultrabasic soil, over limestone, sandstone or granite; 0–2000 m.

Uses.— Often cultivated for its edible fruits. Wood used in house construction, for rice pestles and fire wood. Leaves applied to ulcers and lumber pains, roots applied for stomachache, the fruits or tea from the leaves 'as tonic after childbirth' (Philippines, labels of *PNH* 37987, 38059, 38372, *Zwickey 699*).

Vernacular.— Mau, se da kli (Karen Northern); ding da ti (South-western); korhier (South-eastern); mao (มะ), na dao, som mao pru (Peninsular).

10c. var. **salicinum** (Ridl.) Petra Hoffm., Kew Bull. 54: 359. 1999.— *Antidesma salicinum* Ridl., Fl. Mal. Pen. 3: 228. 1924.

Thailand.— SOUTH-EASTERN: Chachoengsao (Khao Tak Groep); PENINSULAR: Pattani (Ban Kia, Tomo), Narathiwat (Waeng).

Distribution.— Bangladesh, N. Vietnam, Thailand, Peninsular Malysia (type), Sumatra, Borneo.

Ecology.— Rheophyte. In riverine rain forest along rivers, often on swampy or seasonally flooded ground, among boulders or in the river bed, sometimes partly submerged in river. On sandstone; 0–700 m.

10d. var. **wallichii** (Tul.) Petra Hoffm., Kew Bull. 54: 357. 1999.— *Antidesma oblongifolium* Blume var. *wallichii* Tul., Ann. Sci. Nat., Bot., Sér. 3: 221. 1851.— *A. martabanicum* Presl, Epim.: 232. 1849.

Thailand.— PENINSULAR: Ranong (Ranong hot springs), Phuket (Katu, Ton Sai waterfall), Nakhon Si Thammarat (Khao Luang, Lansaka, Wat Khiriwong), Trang (Khao Chong).

Distribution.— Peninsular Myanmar (Tenasserim; type) and Peninsular Thailand.

Ecology.— In evergreen forest, scrub or along forest edges, usually damp places e.g. along waterfalls, open or shaded, primary or secondary vegetation; 50–600 m.

Note.— Specimens without stipules are almost indistinguishable from the type variety.

11. Antidesma neurocarpum Miq., Sum.: 466. 1861.

var. **neurocarpum**.— *Antidesma alatum* Hook.f., Fl. Br. Ind. 5: 358. 1887.— *A. hallieri* Merr., Philipp. J. Sci., C, 11: 57. 1916.— *A. rubiginosum* Merr., Philipp. J. Sci., C, 11: 61. 1916.— *A. inflatum* Merr., J. Straits Branch Roy. As. Soc. 76: 91. 1917.— *A. urophyllum* Pax & K.Hoffm., Mitt. Inst. Allg. Bot. Hamburg 7: 224. 1931.

T h a i l a n d.— PENINSULAR: Ranong, Surat Thani, Phangnga, Krabi, Nakhon Si Thammarat, Trang, Satun, Narathiwat.

D i s t r i b u t i o n.— Thailand, Peninsular Malaysia, Singapore, Sumatra (type), Borneo.

E c o l o g y.— In lowland to montane forest up to 45 m tall, dipterocarp forest, freshwater swamps, along logging roads and rivers, open bamboo forest, submontane mossy forest, in thickets and heath forest, often dense, humid, shaded habitats, primary or secondary vegetation. On sand, clay, loam, lateritic or volcanic soil, over sandstone, limestone, shales, basalt or granite; 0–1800 m.

U s e s.— Firewood.

N o t e.— A very variable species.

12. Antidesma orthogyne (Hook.f.) Airy Shaw, Kew Bull. 26: 359. 1971; Kew Bull. 26: 459. 1972.— *A. velutinosum* Blume var. *orthogyne* Hook.f., Fl. Br. Ind. 5: 357. 1887.

T h a i l a n d.— PENINSULAR: Satun (Khao Keo Range), Songkhla (Khao Keo), Naratiwat (Sungai Kolok, Nikom Waeng).

D i s t r i b u t i o n.— Thailand and Peninsular Malaysia (type).

E c o l o g y.— In primary, sometimes disturbed, dipterocarp forest; 10–700 m.

U s e s.— Wood used for planks. Juice from fruits used as an antiseptic (*Cockburn* FRI 7467).

N o t e.— This species has been confused with the similar *Antidesma velutinosum* Blume in the past. Hooker (in the protologue) as well as Airy Shaw (1972: 460) recognized it as a separate taxon because of the different fruits, but thought that staminate specimens are undistinguishable from *A. velutinosum*. Airy Shaw even suggested fruit dimorphism in *A. velutinosum*. The truth is that the type of *A. orthogyne* is a mixed gathering, consisting of twigs of *A. orthogyne* with very young fruits and one staminate flowering twig of *A. velutinosum*. No staminate specimen of *A. orthogyne* has hitherto been recognized and described as what it is, even though there are several staminate collections in different herbaria (usually filed under *A. velutinosum*). They can be distinguished from the latter species without great difficulty by their more widely spaced secondary veins, shorter bracts, fewer, more rounded sepals and, most importantly, by their hairy disc.

13. Antidesma pendulum Hook.f., Fl. Br. Ind. 5: 356. 1887.— *A. batuense* J.J.Sm., Icon. Bogor 4: 251, t. 380. 1914.— *A. sumatranum* Pax & K.Hoffm. in Engl., Pflanzenr. 81: 120. 1922.— *A. stenophyllum* Merr., Philipp. J. Sci. C, 11: 62. 1916 (non Gage), **syn. nov.**

T h a i l a n d.— PENINSULAR: Narathiwat (Waeng).

D i s t r i b u t i o n.— Thailand, Peninsular Malaysia (type), Sumatra, Borneo (Kalimantan, Sarawak).

E c o l o g y.— In primary or secondary forest, mixed dipterocarp forest, primary marshy forest, primary riverine forest, swamp forest, by waterfalls. On clay-loam soil over limestone, sandstone or granite; 15–600(–1300) m.

14. Antidesma puncticulatum Miq., Sum.: 468. 1861.— *A. thwaitesianum* Müll.Arg. in DC., Prodr. 15(2): 263. 1866.— *A. bunius* (L.) Spreng. var. *thwaitesianum* (Müll. Arg.) Trim. Syst. Cat. Ceylon Pl.: 81. 1885.

T h a i l a n d.— NORTHERN: Lampang, Phitsanulok; EASTERN: Nakhon Ratchasima; CENTRAL: Ang Thong; SOUTH-EASTERN: Chon Buri, Chanthaburi, Trat; PENINSULAR: Ranong, Phangnga, Phuket, Krabi, Nakhon Si Thammarat, Trang.

D i s t r i b u t i o n.— India (only Nicobar and Andaman Islands), Sri Lanka, Vietnam, Cambodia, Thailand, Peninsular Malaysia, Sumatra (type), Borneo (E. Kalimantan, Sabah), S.W. Philippines (Balabac, Bancalan, Palawan). Distibution map in Baker et al. (1998: 252, fig. 6C).

E c o l o g y.— In primary, more rarely secondary vegetation, evergreen primary, sometimes disturbed, forest, swamp forest, along river banks, at inner edge of the mangrove, secondary vegetation with *Dillenia* and *Melastoma*. On brown to black soil, sandy loam or peat, over sandstone; 0–500 m.

V e r n a c u l a r.— Mao luang (เม่าหลวง), mao sian (เม่าเสี้ยน) (Northern); mat se (มัดเซ) (Peninsular).

15. Antidesma sootepense Craib, Bull. Misc. Inform. Kew 1911 (10): 463. 1911, 'sootepensis'.

T h a i l a n d.— NORTHERN: Mae Hong Son, Chiang Mai (type: Doi Suthep, Kerr 676 (lectotype K!; isolectotypes K!, TCD!)), Chiang Rai, Nan, Lamphun, Lampang, Phrae, Phitsanulok, Tak; NORTH-EASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum; SOUTH-WESTERN: Kanchanaburi, Ratchaburi; CENTRAL: Saraburi; SOUTH-EASTERN: Chon Buri, Chanthaburi.

D i s t r i b u t i o n.— Myanmar (Northern Shan States), Laos, Thailand.

E c o l o g y.— In primary or secondary vegetation, evergreen or deciduous (or mixed evergreen/deciduous) mixed or dipterocarp forest, gallery forest, often along streams, also in gardens; open to shady, sometimes dry, fire-prone habitats. On clay or lateritic soil, over shale, limestone, granite or sandstone bedrock; 120–1150 m.

U s e s.— Fruits eaten.

V e r n a c u l a r.— Mak mao (มักเม่า) (Northern?); mamao duk (มะเม่าดูก), mao (เม่า), sa pho mae (Northern).

16. Antidesma tomentosum Blume, Cat.: 109. 1823, 'tomentosa'.

var. **tomentosum**.— *Antidesma cumingii* Müll.Arg. in DC., Prodr. 15(2): 249. 1866.— *A. persimile* Kurz, J. Bot. 13: 330. 1875.— *A. kingii* Hook.f., Fl. Br. Ind. 5: 356. 1887.— *A. longipes* Hook.f., Fl. Br. Ind. 5: 355. 1887 (non Pax).— *A. membranifolium* Elmer, Leafl. Philipp. Bot. 1: 313. 1908, 'membranaefolium'.— *A. subolivaceum* Elmer, Leafl. Philipp. Bot. 4: 1272. 1911.— *A. gibbsiae* Hutch. in Gibbs, J. Linn. Soc., Bot., 42: 134. 1914.— *A. rivulare* Merr., Philipp. J. Sci., C, 11: 60. 1916.

T h a i l a n d.— SOUTH-WESTERN: Prachuap Khiri Khan; PENINSULAR: Ranong, Surat Thani, Phangnga, Krabi, Nakhon Si Thammarat, Phattalung, Trang, Narathiwat.

D i s t r i b u t i o n.— Thailand, Peninsular Malaysia, Sumatra, Borneo, W Java (type), Philippines, Northern and Central Sulawesi.

E c o l o g y.— In primary and secondary evergreen vegetation; mixed lowland to hill dipterocarp forest; mossy forest, montane rainforest, dry shrubby heath forest on sandstone ('kerangas'), swamp forest, riverine forest, sometimes subject to flooding; plantations, road sides, forest edges, thickets, wet to dry habitats. On clay, sand and ultrabasic soil, over limestone, granite or sandstone; 0–1800 m.

U s e s.— The hard wood is used in ploughs; firewood. Roots are chewed and applied for internal pain (Philippines, PNH38075). Bark is burned and the ash is rubbed on the teeth to colour them (Philippines, PNH13524).

17. Antidesma velutinosum Blume, Bijdr.: 1125. 1826–27.— *A. attenuatum* Tul., Ann. Sci. Nat., Bot., Sér. 3: 235. 1851.— *A. molle* Müll.Arg., Linnaea 34: 67. 1865–66.— *A. velutinosum* Blume var. *lancifolium* Hook.f., Fl. Br. Ind. 5: 357. 1887, 'lancifolia', **syn. nov.**

T h a i l a n d.— NORTHERN: Chiang Mai, Nan, Tak; SOUTH-WESTERN: Kanchanaburi; PENINSULAR: Ranong, Surat Thani, Phangnga, Phuket, Nakhon Si Thammarat, Phatthalung, Trang, Satun, Songkhla, Pattani, Narathiwat.

D i s t r i b u t i o n.— Myanmar, Thailand, Peninsular Malaysia, Singapore, Sumatra, Anambas & Natuna Islands, Java (type).

E c o l o g y.— In primary and secondary evergreen (more rarely semi-evergreen) vegetation; wet mixed and dipterocarp forest, gallery forest; usually humid, shady habitat, often close to streams or waterfalls. On volcanic loam, limestone, granitic sand and shale; 20–1200 m.

U s e s.— Fruits eaten locally. Bark sold to the Chinese (Java, *Winckel* 311).

V e r n a c u l a r.— Mao (เม่า), mao po lo (เม่าโปโล), mao khao (เม่าเขา) (Peninsular).

18. Antidesma velutinum Tul., Ann. Sci. Nat., Bot., Sér. 3: 223. 1851.— *A. gymnogyne* Pax & K.Hoffm. in Engl., Pflanzenr. 81: 135. 1922.— *A. spaniothrix* Airy Shaw, Kew Bull. 33: 15. 1978, **syn. nov.**

T h a i l a n d.— NORTHERN: Tak, Phitsanulok; SOUTH-WESTERN: Kanchanaburi; SOUTH-EASTERN: Chanthaburi, Trat; PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga, Phuket, Krabi, Nakhon Si Thammarat, Phatthalung, Songkhla.

D i s t r i b u t i o n.— India? (type), Myanmar, Cambodia, Thailand, Peninsular Malaysia (Perlis, Kedah).

E c o l o g y.— In primary and secondary vegetation; dry, more rarely wet, evergreen, deciduous or mixed evergreen/deciduous forest, bamboo forest, often shady habitats near streams. On limestone, sandstone and granite; 0–600 m.

V e r n a c u l a r.— Po mai cho (Karen South-Western); mao kuan, mau, mung mau (Peninsular).

Unmatched Specimen

van Beusekom & Phengkhlai 967 (aff. *A. helferi*)

Peninsular Thailand, Nakhon Si Thammarat province, Khao Luang, 23 May 1968 (K!, L!).

Shrub. *Young twigs* ferrugineous-pubescent, soon becoming glabrous, light to medium brown. *Stipules* caducous, linear, 1–1.5 by 0.3–0.5 mm, ferrugineous-pilose. *Petiole* 2–4 by 1.5 mm, pilose. *Leaf blade* elliptic to ovate, 4.5–10.5 by 1.7–3.6 cm, 2.7–3.4 times longer than wide, subcoriaceous, basally acute to obtuse, apically acute or acuminate, glabrous, midvein impressed adaxially, tertiary veins reticulate, widely spaced, drying greyish green adaxially, olive-green abaxially, domatia absent. *Staminate inflorescences* 3.5–6.5 cm long, axillary, simple or branched once at the base, axis pilose. *Bracts* deltoid, 0.7 by 0.5 mm, pilose. *Staminate flowers* 2 by 2 mm, sessile; calyx 0.8–1 by 1.5–2 mm, sepals 4 or 5, free, 0.5–1 mm wide, deltoid, apically acute to rounded, pilose outside, glabrous inside; disc consisting of 4 or 5 free lobes, lobes ± obconical, well-separated from each other, 0.5 by 0.5 mm, glabrous; stamens 4 or 5, 1.5–2 mm long, 1 mm long exserted from the calyx, anthers 0.3 by 0.7 mm; pistillode globose, 0.5 by 0.5 mm, pilose.

E c o l o g y.— In mossy wet evergreen forest; 1500 m.

N o t e.— A staminate collection which combines vegetative characters of *Antidesma helferi* with a glabrous disc that consists of free lobes. It resembles very much the fruiting specimen *Larsen et al.* 45988 from the same locality and altitude (see *A. helferi*). This collection could not be satisfactorily matched but does not show sufficient differential characters to be described as new. It may be found to deserve taxonomic recognition when more material, especially pistillate, is gathered in the future.

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