

1. *Curcuma alismatifolia* Gagnep. in Bull. Soc. Bot. Fr. xlix. (1903). 259.

Rhizome hardly developed, root stock about 1.5 cm wide, roots bearing tubers. Leaves ca 4. Bladeless sheaths ca 3, 4-14 cm long, glabrous. *Blades* linear, sometimes oblanceolate-linear, 18-28(-40), apex acute, base cuneate, both surfaces glabrous. Leaf-sheaths 12-18 cm long, petiole 2-4 cm long. 18-37, glabrous. Ligule membranous, small, rounded, ca 1 mm long, glabrous.

Inflorescence central, peduncle 33-78 cm long, spike 10-17 x 2-4 cm. *Bracts* : coma bracts pink with greenish tip, elliptic, 5-6 x 2-3 cm, apex acute; flower bracts greenish tinted with purple, obovate, 3-3.5 x 3-3.5 cm, apex truncate and shortly mucronate, glabrous. *Bracteoles* ovate, acute, 6.5 x 4 mm. *Calyx* white, ca 8 mm long, 3-lobed, glabrous. *Corolla*-tube 2 mm long, glabrous, dorsal lobe 1.1 x 0.8 cm, hooded, lateral lobes 1.1 x 0.6 cm. *Staminodes* white, lanceolate, 1.7 x 0.7 cm, apex acute. *Labellum* purple with yellow median stripe, elliptic, 1.7 x 1.4 cm, apex bilobed, margin crinckled. *Stamen* : filament 4x 3 mm, anther 5 mm long, anther-

crest ca 1 mm long, spurs absent. *Ovary* 2.5-3 x 2 mm, glabrous; stylodes lacking.

2. *Curcuma amada* Roxb. in As. Res. xi. (1810). 341. (described from Y 20058803, and Max 74-649)

Rhizome branched, elongate, 2-2.5 cm thick, white with pleasant smell. Leaves 4-7. *Blades* elliptic-oblong, 51-68 x 12-22 cm, apex long acuminate, base cuneate, both surfaces glabrous. Leaf-sheaths c 34 cm long, petiole c 20 cm long, finely hairy. Ligule rounded, ca 5 cm long, hairy. *Inflorescence* central, peduncle 11-40 cm long, spike 11-24 x 2.5-4 cm. *Bracts* lanceolate, 4.5 x 2.5 cm, apex acute, both surfaces pubescent. *Bracteoles* folded, unequal sided, after open 3.2 x 1.1 cm, outside hairy. *Calyx* 0.8-1.3 cm long, 3-lobed, sparsely hairy. *Corolla*-tube hairy or glabrescent 2 cm long, dorsal-lobe 1.5 x 0.9 cm, lateral lobes narrower, apex rounded. *Staminodes* oblong, 1.6 x 0.7 cm, apex rounded. *Labellum* obovate-oblong, 2 x 1.3 cm, apex bilobed. *Stamen*: filament 5 x 3-5 mm, anther 4 mm long, no crest, spurs ca 2 mm long. *Ovary* ca 5 x 3 mm, densely hairy; stylodes 3-4 mm long.

3. *Curcuma angustifolia* Roxb. in As. Res. xi.(1810). 338. t. 3.

Rhizome not branched, root stock c 1-2 cm wide, 3-4 cm long. Leaves 2-4. Bladeless sheaths ca 3, sparsely hairy and ciliate. *Blades* oblong or linear, 22-45 x 2.5-6 cm, apex long acuminate, base cuneate, both surfaces glabrous. Leaf-sheaths 10-15 cm long, petiole 2-4 cm long, glabrous. Ligule very short, hairy. *Inflorescence* laterally attached to the leafy shoot; peduncle 4-18 cm long, spike 7-13 x 2.5-4 cm. *Bracts* oblong, ca 3.5 x 2.5 cm, apex rounded or broadly acute. *Bracteoles* oblong, ca 7 x 2.5 mm, acute, slightly hooded. *Calyx* 7 mm long, trilobed, margins hyaline, glabrous. *Corolla*-tube 2.3 cm long, dilated upward, outside glabrous, throat hairy, dorsal lobe 8 x 8 mm, apex shortly mucronate; hooded, lateral lobes oblong, 7 x 4 mm, apex rounded, slightly hooded. *Staminodes* oblong, 9 x 5 mm, apex rounded. *Labellum* suborbicular, 10 x 11 mm, apex bilobed. *Stamen*: filament 3 mm long, glabrous; anther without crest, ca 3 mm long, spurs 1.5-2 mm long, glabrous. *Ovary* 3 x 2 mm, long hairy; stylodes 3 mm long.

4. *Curcuma attenuata* Wall. Cat. no. 6602.

Rhizome not branched, root stock small. Leaves 2-4. *Blades* elliptic-oblong or linear, 21-61 x 4.5-8 cm, apex long acuminate or acicular, base cuneate, upper surface glabrous, lower hairy or glabrescent, at least at the apex. Petiole 1-5 cm long, glabrous; leaf-sheaths 15-25 cm long, hairy. Ligule inconspicuous, 1-2 mm long, hairy. *Inflorescence* central; peduncle 11-42 cm long, spike 10-18 x 3-5 cm. *Bracts* elliptic, 2.8 x 1.8 cm, apex broadly acute. *Bracteoles* oblong, 1.2 x 0.4 cm, apex hooded, ciliate. *Calyx* 6 cm long, unequally 3-lobed, glabrous or sparsely hairy, ciliate. *Corolla*-tube 2.1 cm long, glabrous, except the upper part sparsely hairy, dorsal lobe oblong, 1.1 x 0.8 cm, apex mucronate, hooded; lateral lobes oblong, 1.0 x 0.5 cm, apex rounded. *Staminodes* ovate-oblong, 1.3 x 0.6 cm, apex rounded. *Labellum* subelliptic, 1.4 x 1.2 cm, apex bilobed, inside hairy. *Stamen*: filament broad, ca 4.5 mm long; anther without crest, 3 mm long, spurs acute, 2 mm long. *Ovary* 2 x 1 mm, long hairy; stylodes ca 3 mm long.

5. *Curcuma aurantiaca* van Zijp in Rec. Trav. Bot. Neerl. xii. (1915). 345.

Rhizome short, or hardly developed. Leaves 2-5. *Blades* elliptic-oblong or oblong, 28-46 x 7-15 cm, apex long acuminate or acicular, base rounded, upper surface glabrous, lower surface pubescent. Petiole c 15 cm long, leaf-sheaths c 20 cm long. Ligule triangular, ca 5 mm long, hairy. *Inflorescence* central; peduncle 10-30 cm long, spike cylindrical, 10-21 x 3-4 cm. *Bracts* both surfaces pubescent: coma bracts 6.5 x 2.4 cm, apex rounded with mucronate; flower bracts oblong, 5 x 3 cm, apex rounded and reflexed. *Bracteoles* 6-8 mm long, hairy. *Calyx* ca 1 cm long, hairy. *Corolla*-tube 1-1.2 cm long, glabrous, dorsal lobe oblong, 1.7 x 1 cm, apex mucronate, hooded, outside hairy; lateral lobes oblong, 1.5 x 0.7 cm, apex rounded, slightly hooded, outside hairy. *Staminodes* elliptic, 1.8 x 1 cm, apex rounded, margins ciliate, inside hairy. *Labellum* cuneate-ovate or clawed-ovate, 2.4 x 1.7 cm, apex bilobed, margin ciliate, throat hairy. *Stamen*: filament broad, 8 x 3 mm, glabrous; anther hairy, without spurs, ca 4 mm long, anther-crest ca 1 mm long, ciliate. *Ovary* ca 3 x 1.5 mm, densely pubescent. Capsule 1.2 x 0.6 cm.

6. *Curcuma cochinchinensis* Gagnep. in Bull. Soc. Bot. Fr. liv. (1907). 404.

Rhizome small, about 0.5 cm wide, (from the dry spec.) covered by papery, light brownish scales. Bladeless sheaths 2-3, glabrous, ciliate, 6-12 cm long. Leaves ca 2. *Blades* oblong or elliptic-oblong, rarely lanceolate, 22-24 x 5.5-6.5 cm, apex acute, base cuneate, upper surface glabrous, lower hairy. Petiole 1-3 cm long, leaf sheath 7-9 cm long, hairy. Ligule rounded, hairy, ca 3 mm long. *Inflorescence* central, rarely laterally attached to the tuft; peduncle 3-10 cm, spike 4-8 x 2-4 cm. *Bracts* finely hairy: coma bracts none, flower bracts elliptic, ca 4 x 2.4 cm, the inner ones slightly smaller, apex broadly acute. *Bracteoles* ca 2 x 0.5 mm. *Calyx* ca 1.4 cm long, tri-lobed, lobes obtuse. *Corolla*-tube 1.8-2 cm, hairy, dorsal lobe 2x 0.8 cm, hooded; lateral lobes 1.4 x 0.5 cm, slightly hooded. *Staminodes* elliptic, apex rounded, 2 x 1.1 cm. *Labellum* elliptic, 1.9 x 1.2 cm, apex emarginate. *Stamen*: filament 5 x 6 mm; anther 5.5 mm, anther-crest rounded, ca 1 x 1 mm, spurs very small, ca 1 mm long or shorter. *Ovary* ca 2.5 cm long, hairy; stylodes ca 4 mm long.

7. *Curcuma ecomata* Craib in Kew Bull. (1912). 301.

Rhizome not elongate, bearing tubers. Bladeless sheaths 10-14 cm long, glabrous, ciliate. Leaves 2-4. *Blades* elliptic-oblong, 27-35 x 6-11 cm, apex acuminate, base cuneate. Petiole with sheath (15-)22-30(-38) cm. Ligule inconspicuous, membranous. *Inflorescence* from leafless rhizome, covered with 3-4 bladeless sheaths, peduncle (3-)5-7(-12) cm, spike ellipsoid or ovate, 5-8 x 3-4 cm. *Bracts*:coma bracts none; flower bracts ovate, broadly acute, ca 3 x 2.2 cm, glabrous, margin hyaline. *Bracteoles*? *Calyx* ca 1.5- 2.0 cm long, 3-lobed, glabrous. *Corolla*-tube ca 2.7-3 cm long, hairy, dorsal lobe 1.5-1.9 x 0.6 cm, apex hooded; lateral lobes 1.5 x 0.6 cm. *Staminodes* elliptic, 1.5-1.8 x 0.8 cm, acute, inside hairy. *Labellum* ovate-cuneate, bilobed, 1.4-1.8 x 1.0-1.2 cm. *Stamen*:filament 7 x 2 mm, anther ca 7 mm long, anther crest ca 1 mm long, spurs ca 3 mm long. *Ovary* 3-4 x 2 mm, hairy.

8. *Curcuma gracillima* Gagnep. in Bull Soc. Bot. Fr. l. (1903). 161. (descr. from Put 2874)

Rhizome small, hardly developed. Leaves 2-4 in a tuft. *Blades* elliptic-oblong, 10-16 x 1.5 cm, apex mucronate, base cuneate, both surfaces glabrous except apex hairy, greenish with purple stripe along the midrib. Petiole with leaf sheath 8-12 cm long, glabrous. Bladeless sheaths 3-4, 2-10 cm long, apex mucronate, glabrous. Leaf sheaths 6-8 cm long, glabrous. Ligule membranous, 2x 1 mm, apex rounded, glabrous. *Inflorescence* central, peduncle slender, 9-18 cm long; spike 2-3 x 1-2 cm. *Bracts* glabrous: coma bracts purple, oblong, 1-2 x 0.5-1 cm, apex mucronate; flower bracts 1.2-1.5 x 1.0 cm.

9. *Curcuma harmandii* Gagnep. in Bull. Soc. Bot. Fr. liv. (1907). 404.

Rhizome unbranched, root stock 1.5 x 1 cm, white inside. Roots bearing ellipsoid tubers. Leaves ca 3. Bladeless sheaths 15-17 cm long. *Blades* dark green, elliptic, ca 16 x 7 cm, apex acute to acuminate, base cuneate, both surfaces glabrous. petiole 5-8(-13) cm long. leaf-sheaths 14-20 cm long. Ligule membranous, minute, apex rounded. *Inflorescence* central, peduncle 12 cm long, spike ca 14 cm long. *Bracts* : coma bracts none, flower bracts dark green, lanceolate, with upper half suddenly narrowed to acute apex, ca 6 cm long, the widest part ca 3.5 cm, both surfaces glabrous. *Bracteoles* elliptic to ovate, 1 x 0.8 cm, apex rounded. *Calyx* white, 8 mm long, 3-lobed, deeply divided along one side, glabrous. *Corolla* white, tube 2.5 cm long, glabrous; dorsal lobe oblong, 1.2 x 0.8, apex rounded and hooded; lateral lobes oblong, 1 x 0.7 cm, apex rounded, slightly hooded. *Staminodes* white, linear, 1.5 x 0.15 cm. *Labellum* white with pink median stripes. *Stamen* : filament ca 2.5 x 2.5 mm; anther 4 mm long, anther crest truncate, 3 mm long. *Ovary* 3 x 2 mm, glabrous; stylodes lacking.

10. *Curcuma longa* L. Sp. Pl. ed. i. (1753) 2.

Rhizome elongate branched, dark yellow to orange. Leaves several. *Blades* elliptic-oblong, 65-90 x 13-17 cm, apex acuminate, base long cuneate, both surfaces glabrous. Leaf-sheaths c 30 cm long. Petiole sparsely hairy, c 12 cm long. *Inflorescence* central. Peduncle 10-15 cm long, spike 13-16(-20) x 4-6 cm. *Bracts*: coma bracts greenish-white, slightly purplish at the apex, oblong, apex broadly acute, 6.0 x 2.5 cm, both sides

finely hairy, flower bracts pale greenish, oblong or slightly obovate, 4.5 x 3.0 cm, apex rounded, almost truncate, both sides finely hairy, except the lower part of the inside bracts. *Bracteoles* keeled, obovate-oblong, both sides glabrous, apex rounded, ciliate. *Calyx* white, 1 cm long, 3-lobed, truncate, deeply divided on one side. *Corolla* pale yellow to white, tube 3.2 cm long, lateral lobes 1.3 x 0.8 cm, apex rounded, dorsal lobe 1.4 x 1.0 cm, acuminate, hooded. *Staminodes* pale yellow, oblong. 1.3 x 0.9 cm. *Labellum* pale yellow, darker yellow at the middle band, obovate-oblong, 3-lobed, middle lobe bifid, 2.2 x 1.6 cm. *Stamen*: filament 5 x 3 mm, anther thick, 3.5 mm long, spurs 3 mm long. *Ovary* white, 4.0 x 2.5 mm, hairy; stylodes c 3.5 mm long.

11. *Curcuma parviflora* Wall. Pl. As. Rar. I. (1830). 47. t. 57.
(descr. flower from Max 74-865)

Rhizome small. *Leaves* 5-7. *Blades* elliptic to elliptic-oblong, 8-22 x 3-7 cm, apex acuminate, base rounded or broadly acute, cuneate, upper surface glabrous, lower surface shortly hairy. *Petiole* 2-10 cm long. *Leaf sheaths* 4-10 cm long, glabrous. *Ligule* membranous, very short, glabrous, margin ciliate. *Inflorescence* central, peduncle c. 8 cm long, hairy; spike 6.5 x 3.0 cm. *Bracts*: coma bracts white, apex often tinted greenish, lanceolate, apex acute, 1.5-4.0 x 0.8-1.8 cm, glabrous; flower bracts greenish, obovate to suborbicular, c. 2.8 x 3.2 cm, apex broadly rounded, almost truncate or slightly mucronate, glabrous, both edges folded inside, apex reflexed. *Bracteoles* 5-7 x 4-5 mm, glabrous. *Calyx* c. 4 mm long, glabrous. *Corolla*-tube c. 1.2 cm long, glabrous, dorsal lobe oblong, 5 x 3 mm, hooded, lateral lobes about the same, apex rounded. *Staminodes* white, oblanceolate, 8 x 2.5 mm. *Labellum* purple, oblong or obovate-oblong, 1.0 x 0.7 cm, apex bilobed, margin irregularly crenate. *Stamen*: filament c. 2 mm long, glabrous; anther c. 1 mm long, anther-crest c. 2 mm long, rounded, spurs absent. *Ovary* c. 1.5 mm long, glabrous, stylodes lacking.

12. *Curcuma petiolata* Roxb. Fl. ind. ed. 1.I. (1820). 37.
(described from Larsen 31801 and 704)

Rhizome not well developed, roots bearing ellipsoid tubers *Leaves* ca 7 in a tuft. *Blades* elliptic or elliptic-oblong, 42-46 x 16-20(-26) cm, apex acuminate, base rounded or subcordate, both surfaces glabrous. *Petiole* 7-14 cm long, glabrous. *Leaf sheaths* 21-30 cm

long, glabrous. Ligule membranous, truncate, 2 mm long, glabrous, margin ciliate. *Inflorescence* central, peduncle 25-40 cm long, glabrous, spike 15-18 x 3.5-5 cm. *Bracts*: coma bracts pink, flower bracts greenish. Size of bracts? *Bracteoles* 1.8 x 1.4 cm, obovate, apex rounded, slightly hooded. *Calyx* funnel-shaped, ca 8 mm long, 3-lobed, glabrous. *Corolla*-tube 2.2 cm long, dilated to the top; dorsal lobe ca 1.3 x 0.9 cm, apex mucronate, lateral lobes ca 1.2 x 0.5 cm. *Staminodes* oblong, 1.6 x 0.9 cm, apex rounded. *Labellum* obovate to suborbicular, 1.6 x 1.6 cm, apex bilobed. *Stamen*: filament ca 7 x 5 mm, anther ca 4 mm long, crest none, spurs ca 2 mm long. *Ovary* 2-3 x 2-3 mm, hairy; stylodes ca 3 mm long. Capsule obovoid, 1 x 0.5 cm, sparsely hairy. Seeds ellipsoid, 3.5 x 1 mm, aril white, lacerate.

13. *Curcuma plicata* Wall. ms. apud Bak. in Hook. f. Fl. Brit. Ind. vi. (1890). 213.

Rhizome short., bearing ellipsoid tubers. Leaves ca 7 in a tuft. *Blades* elliptic-oblong or oblong and narrowed to both ends, 26-31 x 6-8 cm, apex acuminate, base cuneate, both surfaces glabrous. Bladeless sheaths 5-13 cm long, glabrous. Petiole leaf sheath 20-27 cm long. Ligule 2 mm long, ciliate. *Inflorescence* central, peduncle 10-25 cm long, spike 9-13 x 3-4 cm, spike 9-13 x 3-4 cm. *Bracts*: coma bracts purple, flower bracts greenish. *Bracteoles* oblong, 7 x 4 mm, hairy outside. *Calyx* ca 1 cm long, unequally 3-lobed, hairy. *Corolla*-tube 2 cm long, hairy, dorsal lobe oblong, 1.7 x 0.7 cm, mucronate, outside hairy; lateral lobes 1.4 x 0.5 cm, outside hairy. *Staminodes* clawed-ovate, 1.5 x 0.7 cm, apex obtuse or broadly acute. *Labellum* oblong or obovate-oblong, 1.5 x 1.1 cm, apex emarginate. *Stamen*: filament 3 x 2 mm, anther 3 mm long, anther-crest very short or none, spurs ca 2 mm long. *Ovary* 3-4 x 1 mm, hairy.

14. *Curcuma roscoeana* Wall. Pl. As. Rar. i. (1830). 8. t.9.

Rhizome small. Leaves 3-5 in a tuft. *Blades* elliptic or elliptic-oblong, 25-40 x 9-16 cm, apex acuminate, base rounded and slightly cuneate, both surfaces glabrous. Bladeless sheaths 13-40 cm long, glabrous or sparsely hairy, ciliate. Petiole 11-26 cm long, glabrous. Ligule 2-5 mm long, apex rounded, glabrous, ciliate. *Inflorescence* central, peduncle 7-9 cm long, spike 12 x 4-4.5 cm. *Bracts* orange, slightly greenish at the base, oblanceolate-oblong or

oblong, 4 cm long, apex rounded, reflexed, glabrous, no coma bracts. *Bracteoles* elliptic, membranous, keeled, 8 x 6 mm, glabrous. *Calyx* white, 2.2 cm long, 3-lobed. *Corolla-tube* white, 3-3.7 cm long, dilated to the top, dorsal lobe 1 x 0.4 cm, apex obtuse, margin hyaline, lateral lobes 1 x 0.4 cm, apex obtuse, margin hyaline. *Staminodes* white, elliptic, 1.4 x 0.7 cm, apex acute or shallowly bilobed, entire. *Labellum* white with yellow midband, 1.8 x 1.5 cm, apex retuse, margin entire. *Stamen*: filament broad, 3 x 3 mm, anther white, crest rounded, often reflexed backward, spurs none. *Ovary* white, 2-2.5 x 1-1.5 mm, glabrous.

15. *Curcuma rubescens* Roxb. in As. Res. xi. (1810). 336.

Rhizome well developed, white inside. *Leaves* about 8, greenish except the upper midrib dark red or purple. *Blades* elliptic-oblong, 40-50 x 10-13 cm, apex acuminate, base cuneate, both surfaces glabrous; leaf-sheaths dark red throughout, 20-30 cm long; petiole winged, 6-12 cm long. *Ligule* membranous, glabrous, c. 3 mm long. *Inflorescence* separated from the leaf tuft, often appearing before the leaves. *Peduncle* 14-25 cm long; spike cylindrical. *Bracts*: coma bracts pink, 6 x 3 cm, flower bracts greenish, 4 x 3.2 cm. *Calyx* 9 mm long, 3-lobed with truncate apex. *Corolla-tube* c. 3 cm long, dorsal lobe hooded, 1.2 x 1 cm, apex spiny; lateral lobes 1.1 x 0.8 cm. *Staminodes* yellow, oblong, 1.2 x 0.8 cm. *Labellum* yellow with darker yellow midband, obovate, 3-lobed, middle lobe retuse. *Stamen*: filament 6 x 4 mm, anther 4 mm long, spurs c. 2 mm long. *Ovary* c. 4 x 2.5 mm, hairy.

16. *Curcuma sessilis* Gage in Rec. Bot. Surv. India. iii. 106.

Rootstock 3-3.5 cm long and 2.5 cm wide, end of fibrous roots with elliptic tubers, both white inside. *Leaves* 2-3 in a tuft. *Blades* oblong, narrowed to both ends, 22-41 x 4-6 cm, apex acuminate to acicular, base cuneate, both surfaces pubescent. *Petiole* 1-3(5) cm long, leaf-sheaths 10-16 cm long. *Ligule* rounded, 2 mm long, densely hairy. *Inflorescence* developed before the leaves, *peduncle* (6-)8-12(-18) cm, hairy, spike (6-)8-11(-16) x 2-4 cm. *Bracts*: coma bracts purple, glabrous or glabrescent, slightly ciliate. flower bracts greenish, glabrous or sparsely hairy. *Bracteoles* lanceolate, folded, after open ca 1.4 x 6 cm, margin hyaline. *Calyx* ca 9 mm long, 3-lobed, hairy. *Corolla-tube* ca 2 cm

long, dorsal lobe 1 x 0.6 cm, apex shortly mucronate, hooded, lateral lobes slightly shorter.

Staminodes oblong, 0.9 x 0.4 cm, apex rounded. *Labelum* obovate, 1.4 x 1.0 cm, apex bilobed. *Stamen* : filament broad, ca 5 mm long, anther without crest, 3 mm long, spurs 2 mm long. *Ovary* ca 2.5 x 2 mm, hairy.

17. *Curcuma sparganifolia* Gagnep. in Bull. Soc. Bot. Fr. xlix. (1903). 260. (Fl. described from Max 76-513 , AAU)

Rhizome small. Leaves usually 2 in a tuft. Bladeless sheaths 2-3, glabrous, the outermost the shortest, ca 2.5-3.5 cm long, the innermost the longest, ca 8-16 cm long. Petiole glabrous, 3-10 cm long, leaf sheath glabrous, (7-)12-20(-24) cm long. *Blade* linear, purple cloud along the midrib, 13-32 x 1.5-2.5 cm. Ligule membranous, rounded, 2-3 mm long, glabrous. *Inflorescence* (Max76-513) central, peduncle (10-)40-50(-56) cm long, spike 3-5 x 2-3 cm. (the following described from Max 76-513) *Bracts* glabrous, no coma: lower bracts suborbicular, 2.1 x 2.1 cm, apex rounded, upper bracts oblong, 2.1 x 1.0 cm, apex obtuse.

Bracteoles keeled, oblong, 5 x 3-4 mm, glabrous. *Calyx* ca 4 mm long, unequally trilobed, glabrous. *Corolla*-tube ca 7 mm long, glabrous; dorsal lobe oblong, 7 x 5 mm, apex hooded and short mucronate, lateral lobes oblong, 6 x 4 mm, apex slightly hooded and rounded. *Staminodes* obovate-oblong, 1.0 x 0.4 cm, apex rounded. *Labellum* clawed-obovate, apex emarginate, the blade 4-5 x 6-8 mm, the claw 4-5 mm long. *Stamen* : filament ca 2 x 1 mm, anther ca 2 mm long, spurs none, anther-crest 1-1.5 mm long, apex broadly acute. *Ovary* 1.5-2 mm long, glabrous; stylodes lacking. Capsule obovoid, 8 x 5 mm, glabrous.

18. *Curcuma stenochila* Gagnep. in Bull. Soc. Bot. Fr. lii. (1903). 543.

Rhizome small, bearing globose tubers. Leaves about 7. *Blades* elliptic or elliptic-oblong, upper surface glabrous, lower hairy. Bladeless sheaths 5-15 cm long, hairy. Petiole 12-18(-22) cm long, leaf-sheaths 15-20 cm long, hairy. Ligule suborbicular, apex rounded, densely hairy. *Inflorescence* central, peduncle ca 3 cm long, spike 3-4 x 1.2-1.7 cm. *Bracts*: coma bracts none, flower bracts ovate, 3.5 x 2 cm, apex acuminate, both surfaces hairy. *Bracteoles* ? *Calyx* ca 2 cm long, hairy, 3-lobed, each lobe acute

and ciliate at apex. *Corolla*-tube 3.8 cm long, hairy; dorsal lobe 2.4 x 0.7 cm, apex acicular, hooded; lateral lobes 2 x 0.6 cm, acute, hooded. *Staminodes* ovate-cuneate or elliptic, 2.2 x 1.1 cm, apex acute, outside hairy. *Labellum* oblong or clawed-obovate, 3.5 x 1.5 cm, apex bilobed, each lobe acute.

Stamen: filament broad, 7 x 4 mm, hairy, anther 9 mm long, crest rounded, 3 mm long, spurs 2 mm long, hairy. *Ovary* 3 x 2 mm, densely hairy; stylodes slender, acute, 0.5 mm long.

19. *Curcuma thorelii* Gagnep. in Bull. Soc. Bot. Fr. liv. (1907). 406. (flower, descr. from Pimchai 003)

Rhizome small, rarely branched. Roots with ellipsoid tubers. *Leaves* about 5. *Blades* elliptic-oblong, 12-20 x 3-3.5 cm, apex mucronate, base acute, cuneate, upper surface glabrous, lower surface shortly hairy. *Petiole* 2-9 cm long, sparsely hairy. *Leaf sheaths* 5.5-12 cm long, glabrous. *Ligule* membranous, rounded, c. 5 x 3 mm, glabrous. *Inflorescence* central, peduncle c. 17 cm long, sparsely hairy; spike c. 6.5 x 3.0 cm. *Bracts*: coma bracts white, elliptic to elliptic-oblong, apex acute, 1.7-3.8 x 0.8-1.9 cm, glabrous, spreaded; flower bracts greenish, obovate, c. 3.0 x 2.4 cm, glabrous, apex rounded. *Bracteoles* oblong, c. 1.2 x 0.8 cm, apex rounded, glabrous. *Calyx* 6-8 mm long, glabrous. *Corolla*-tube 1.2 cm long, glabrous, dorsal lobe c. 8 x 6 mm, laterall lobes c. 7 x 3 mm. *Staminodes* purple, obovate-cuneate, c. 1.5 x 1.0 cm, apex bilobed, margin irregularly crenate. *Labellum* white, obovate-cuneate, c. 1.5 x 1 cm. *Stamen*: filament c. 2 mm long and 2 mm wide, glabrous; anther c. 3 mm long, anther-crest 1 mm long, apex rounded, connective hairy, spurs absent. *Ovary* 2 x 1 mm, glabrous, stylodes lacking.

20. *Curcuma trichosantha* Gagnep. in Bull. Soc. Bot. Fr. liv. (1907). 407. (descr. from Prayad 340,343, Fl. from Geesink)

Rootstock 1.5 cm thick. *Rhizome* short or hardly develop. *Leaves* usually 1. *Blades* oblong, 24-28 x 2.5-4 cm, apex acuminate to acicular, base cuneate, both surfaces glabrous. *Petiole* with sheath ca 12 cm long. *Bladeless sheaths* about 3, glabrous, ciliate, 2-5(-18) cm long. *Leaf sheaths* ciliate, ca 11 cm long. *Inflorescence* separated from the leafy shoot. *Peduncle* 4-7 cm long, glabrous; spike 3.5-7 x 2-3.5 cm. *Bracts*: coma bracts purple, glabrous, oblong, 2.5 x 1 cm, apex broadly acute; flower bracts greenish,

glabrous, 3.2 x 1.5-2 cm. (flowers described from Geesink 5605, spirit specimen no. 6539 (L)): *Calyx* 7-8 mm long, unequally trilobed. *Corolla*-tube ca 1.9 cm long, glabrous; dorsal lobe oblong, 1.1 x 0.7 cm, apex hooded and mucronate, lateral lobes oblong, 1.1 x 0.6 cm, apex rounded. *Staminodes* oblong, 1.2 x 0.5 cm, apex rounded. *Labellum* oblong, 1.7 x 1.1 cm, trilobed, the middle lobe emarginate. *Stamen* : filament 6 x 4 mm, anther 3 mm long, spurs ca 1.5 mm long, no anther-crest. *Ovary* 2 mm long, glabrous or very sparsely hairy; stylodes 3-4 mm long.

21. *Curcuma viridiflora* Roxb. Fl. Ind. 1 (1820). 34.
Specimens: Max 73-78: BK Kosterman 1145: P, L(2sheets).

Rhizome well developed, orange inside. *Leaves* about 4. *Blades* ovate-oblong, 29-36 x 12-28 cm, apex acuminate, base rounded-cuneate, distinct veins on the upper surface, both surfaces glabrous. Bladeless sheaths 13-17 cm long. Leaf sheaths 19-33 cm long. Petiole 11-15 cm long. ligule membrous, rounded, ca 7 mm long, ciliate. *Inflorescence* central, peduncle 15-24 cm long, spike 13-21 x 4-5 cm. *Bracts*: coma bracts whitish, finely hairy, apex broadly acute or rounded, c 3-3.5 x 2 cm, flower bracts light green-yellowish, shorter, c 2-2.5 x 1.8-2 cm.

22. *Curcuma xanthorrhiza* Roxb. Fl. Ind. ed. 1. (1820). 25.

Rhizome dark yellow or orange inside. *Leaves* green with reddish midvein, developed different time from inflorescence. *Blades* elliptic-oblong, (26-)30-40(-65) x 8-12(-20) cm, apex acuminate, base cuneate, both surface glabrous; leaf sheaths 24-32 cm long, glabrous; petiole very short, slightly winged, glabrous. Ligule ca 1 mm long, glabrous. *Inflorescence* surrounded by 3-4 bladeless sheaths; peduncle 16-29 cm long, glabrous; spike 12-19 x 4-8 cm. (from Max 74-417). *Bracts* : coma bracts red and spreading, flower bracts green with reddish tips. *Bracteoles* folded or keeled, after open, elliptic, 2.4-2.7 x 1.4-1.8 cm, apex broadly acute. *Calyx* ca 1 cm long, trilobed, truncate, hairy. *Corolla*-tube ca 3 cm long, hairy, lobes pink-reddish, dorsal lobe 1.6 x 0.9 cm, apex hooded, mucronate and hairy, lateral lobes oblong, 1.3 x 0.9 cm, apex rounded. *Staminodes* light yellow, oblong, 1.8 x 0.8 cm, apex rounded. *Labellum* yellow, obovate-oblong, 2 x 1.7 cm, apex emarginate. *Stamen* : filament 5 mm long, 4 mm wide, anther ca 4

mm long, laterally hairy, spurs ca 3 mm long. Ovary 5 mm long, densely hairy; stylodes ca 5 mm long.

23. *Curcuma zedoaria* Rosc. Monandr. Pl. (1828).t. 109.
(Described from Geesink et al 6624)

Rhizome branched, pale yellow inside. Bladeless sheaths about 4, the shortest 5-8 cm long, the longest 30-35 cm long, glabrous, apex mucronate, hairy. Leaves 1-4. *Blades* elliptic-oblong, 35-41 x 9-12 cm, apex acuminate, base cuneate, dark green with dark purplish along midnerve. Upper surface glabrous, lower surface glabrous or sparsely hairy, especially near the margins and the apex. Petiole 3-4 cm long, glabrous. Ligule short, ciliate. Leaf sheaths 30-34 cm long, finely hairy. *Inflorescence* separated from the leaf tuft, often appearing before the leaves. Peduncle 18-27 cm long, hairy; spike cylindric and broadened to the apex, 11-19 x 5-6 cm. *Bracts*: flower bracts greenish, hairy both sides, 4-5 x 2.5 cm, apex rounded, coma bracts more elongate, purplish-pink, 6-7 x 2 cm, hairy both sides. *Bracteoles* (?) *Calyx* 8-10 mm long, unequally trilobed, apex rounded or almost truncate, hairy. *Corolla*-tube 2.5-3 cm long, lobes red, dorsal lobe oblong, 1.8 x 1.4 cm, apex hooded, mucronate and hairy; lateral lobes oblong, 1.6 x 1.2 cm, apex rounded. *Staminodes* oblong, 1.8 x 0.8-0.9 cm, apex rounded, yellow. *Labellum* obovate, 2.1 x 1.7 cm, apex emarginate, obscurely trilobed, yellow with dark yellow midrib. *Stamen* white: filament 6 mm long, anther 4 mm long, laterally hairy, spurs 2 mm long. *Ovary* 2 mm long, hairy; stylodes 5 mm long.

24. *Curcuma* cf. *albiflora* Thw. (unknown1)

Specimens: Max. 72-409: BK, 73-78: AAU, 73-480: AAU, BK, 74-629: AAU, BK, 74-699: AAU, BK, L, 75-629: AAU, BK, L

Rootstock ca 3 x 1.5 cm, orange inside, unbranched. Leaves 2-3 in a tuft. Bladeless sheaths about 3, 9-15 cm long, glabrous. *Blades* elliptic-oblong, (18-)25-409-77) x (5-)7-12(-17) cm, apex acuminate to caudate, base cuneate, , both surfaces glabrous. Leaf sheaths 8-25 cm long, glabrous. Petiole 4-9 cm long, glabrous. Ligule thin, very short, glabrous. *Inflorescence* central, peduncle 8-14 cm long, glabrous, spike 7-10(14) x 3-5 cm. *Bracts*: coma bracts none, flower bracts 3-4.5 x 2-3 cm, apex rounded, rarely with short mucronate, glabrous, white. *Bracteoles* ? *Calyx* 1.3 cm

long, 3-lobed, deeply divided along one side, lobes rounded or nearly truncate. *Corolla* white, tube 1.8 cm long, funnel-shaped, outside hairy; dorsal lobe triangular, 1.2 x 0.9 cm, apex acuminate and hooded; lateral lobes oblong, 1 x 0.5 cm, apex acute and hooded. *Staminodes* white, clawed: blade ovate, 8 x 6 mm, apex rounded, inside hairy; claw 4 x 4 mm, ciliate. *Labellum* white with yellow midband, suborbicular, 1.2 x 1.2 cm, apex bilobed, each lobe acute, inside hairy, sparsely ciliate. *Stamen*: filament broad, 7 x 4 mm, hairy at the back; anther linear, 3.5 mm long, crest ca 0.5 mm long, spurs ca 1.5 mm long, connective hairy. *Ovary* 2 x 2 mm, glabrous; stylodes cylindrical, acute, ca 4 mm long.

25. *Curcuma* cf. *oligantha* Trimen (unknown 2)

Specimens: Kerr 5896: BK, K; 21454: BK, K

Max 72-297: BK

Somran s.n. (Chula)

Rhizome slender. Leaves few, usually 1, surrounded by several blade less sheaths. *Blades* elliptic-oblong, rarely lanceolate, 9-13(18) x 2-4.5 cm, apex acuminate, base acute or cuneate, upper surface glabrous, lower surface hairy. Bladeless sheaths ca 4, sparsely hairy. Leaf sheaths (?) Petiole(?) Ligule (?) *Inflorescence* separated from the leafy shoot, peduncle (length?), glabrous or sparsely hairy near the base of spike, spike 3-6 x 2 cm. *Bracts*: coma bracts none, flower bracts lanceolate, 5.2 x 2.2 cm, apex acute, inside hairy, margin ciliate. *Bracteoles* (?) Flowers white. *Calyx* 2.5 cm long, 3-lobed, glabrous, apex ciliate. *Corolla*-tube 3 cm long, dilated to the top, outside hairy; dorsal lobe oblong, apex acuminate, hooded; lateral lobes oblong, 2 x 0.6 cm, apex acute, hooded. *Staminodes* elliptic, 2.5 x 1.4 cm, apex broadly acute, base shortly clawed, inside hairy. *Labellum* elliptic or nearly obovate with emarginate-acute apex, 2.2 x 1.6 cm, inside glandular hairy. *Stamen*: filament broad, 4 mm long; anther linear, 8 mm long, crest none, spurs petaloid and succulent, 5 mm long and 1 mm wide. *Ovary* 3 x 2 mm, densely hairy; stylodes filiform, 0.9 mm long, apex acute.

26. *Curcuma* aff. *oligantha* Trimen (unknown 3)

Specimens: Collins 1086: C, K

Max 75-413: AAU, BK, L; 75-625: AAU, L; 76-161: AAU, BK, L

Rhizome small, c 5-6 mm wide, white, root stock c 2 cm wide. Leafy shoot ca 50 cm tall. Leaves few, usually appeared after the inflorescence. *Blades* elliptic-oblong, 19-34 x 6-8 cm, apex acuminate, base acute or cuneate, upper surface glabrous, lower surface pubescent. Bladeless sheaths purplish, 6-25 cm long, glabrous, apex mucronate and hooded. Petiole 3-8 cm long, glabrous, leaf-sheaths purplish, 13-22 cm long, glabrous. Ligule inconspicuous, truncate, ca 2 mm long, glabrous. *Inflorescence* usually without leaves, surrounded by several bladeless sheaths, peduncle 5-12 cm long, spike (?) *Bracts*: coma bracts none, flower bracts lanceolate, 4.5-6 x 2.2 cm, apex acuminate and often reflexed backward, both sides glabrous. *Bracteoles* narrowed, linear, folded, after open 1.8 x 0.15 cm, apex hooded. Flowers white. *Calyx* 2.5 cm long, 3-lobed, deeply divided along one side, glabrous. *Corolla*-tube 3.8 cm long, hairy; dorsal lobe oblong, 2.7 x 0.7 cm, apex cuspidate, hooded; lateral lobes oblong, 2 x 0.7 cm, apex shortly mucronate, hooded. *Staminodes* elliptic, 2.8 x 1.3 cm, apex rounded, inside hairy. *Labellum* white with a yellow midband, elliptic, 2.7 x 1.8 cm, apex emarginate, inside hairy. *Stamen*: filament broad and short, ca 2 x 3 mm; anther linear, ca 6 mm long, crest very short or none, spurs ca 5 mm long, petaloid. *Ovary* 4 x 1.5 mm, glabrous; stylodes linear, acute, ca 6 mm long. Fruit obovoid, calyx persistent, 1.5 x 0.8 cm, seeds with white aril, ca 4 x 1.5 mm, ellipsoid.

27. *Curcuma* sp. (unknown 4)

Specimens: Larsen 30750: AAU, K

Niyomdham 1246: AAU, BKF, K

Rhizome (?) Leaves (from the specimen, seen only 1 leaf). *Blades* elliptic or elliptic-oblong, 35-50 x 19-24 cm, apex long acuminate, base rounded, slightly cuneate or subcordate, both surfaces glabrous. Bladeless sheaths ca 14 cm long. Leaf sheaths 19-24 cm long, hairy. Petiole 11-18 cm long, hairy. Ligule densely hairy, apex acute, 5-6 cm long. *Inflorescence* central, peduncle 10-15 cm long, hairy; spike 14-18 x 4-6 cm. *Bracts*: coma bracts purple, flower bracts greenish tinted with red. Flowers orange. *Calyx* 9 mm long,

unequally 3-lobed, apex ciliate. *Corolla*-tube 2.8 cm long, funnel-shaped; dorsal lobe 1.7 x 1 cm, apex mucronate, hooded, ciliate; lateral lobes oblong, 1.5 x 0.6 cm, apex rounded or broadly acute. *Staminodes* oblong, 1.5 x 0.75 cm, apex rounded. *Labellum* ovate-cuneate, 1.4 x 1.4 cm, 3-lobed, middle lobe emarginate-acute. *Stamen* : filament broad, 6 x 4 mm; anther 6 mm long, crest minute or none, spurs thick, triangular, acute, 1.5 mm long and 1 mm broad. *Ovary* 2 x 1 mm, densely hairy.

28. *Curcuma* cf. *stenochila* Gagnep. (unknown 5)
Specimen: Obchan Thaithong 1241 (PS 1419), plant from Chantaburi, selling at Chatuchak market

Rhizome small, inside pale yellow, bearing ovoid tubers. Leaves ca 5. Bladeless sheaths none (?) *Blades* elliptic, 19-26 x 10-12 cm, apex acuminate, base cordate, both surfaces glabrous. Leaf sheaths sparsely hairy, 7.5-10.5 cm; petiole glabrescent, 8-14 cm long. Ligule triangular, acute, 6 mm long, densely hairy. *Inflorescence* central, peduncle 5-6 cm long, hairy; spike 7 x 4-5 cm. *Bracts* bright red, outside sparsely hairy: coma bracts none; flower bracts ovate or triangular, 4-5 x 2-2.5 cm, apex acute. *Bracteoles* white, ca 2 cm long, 3-lobed, apex rounded or retuse, ciliate. *Corolla*-tube yellow, ca 3 cm long, lobes yellow tipped with red; dorsal lobe oblong, 1.4-1.8 x 0.5-0.6 cm, apex mucronate; lateral lobes oblong, about the same sizes as the dorsal ones, apex broadly acute. *Staminodes* yellow, lanceolate, 1.6 x 1.0 cm, apex acute with dark red spot. *Labellum* yellow tipped with red, clawed-ovate, blade 1.0 x 1.3 cm, apex deeply bilobed, claw 0.5 cm long. *Stamen* : filament 4 mm long, anther 7 mm long, anther-crest rounded, 2 mm long, spurs 3 mm long. *Ovary* 4 x 2 mm, hairy; stylodes 6 mm long.

29. *Curcuma* cf. *sparganifolia* Gagnep. (unknown 6)
Specimens: Kerr 19483: BK, C, K, L, 19483 A: K Kasem 566: BK
Markan 919: K, L 2491: K
Put 1793: BK, C, K, L
Collins 0V: K
(Described from Kerr 19483 A: K)

Rhizome short. Leaves ca 4 in a tuft. Bladeless sheaths 1 or 2, ca 9 cm long, glabrous. *Blades* elliptic to elliptic-oblong, 15-22 x 3-6 cm, apex acuminate, base cuneate, both surfaces glabrous. Leaf

sheaths 10- 15(-21) cm long, glabrous. Petiole (2-)3-5(-10) cm long, glabrous. Ligule membrabrous, truncate, ca 1 mm long, glabrous. *Inflorescence* central, peduncle 45-60(-90) cm long, spike 4-6 x 2-3 cm. *Bracts*:coma bracts elongate, erect, purplish; flower bracts shorter, keeled, reflexed backward, purplish-greenish. Flower purplish. *Calyx* 5-6 mm long, unequally trilobed. *Corolla*-tube ca 1.2 cm long, dorsal lobe oblong, 1.3 x 0.6 cm, apex hooded and rounded, lateral lobes lanceolate, 1.3 x 0.35 cm, apex acute. *Staminodes* oblong, apex acute, ca 1.2 x 0.5 cm. *Labellum* obovate-oblong, apex bilobed, ca 1.3 x 0.7 cm. *Stamen* : filament broad, ca 1 mm long, 2 mm wide; anther ca 4 mm long, anther-crest very short, ca 0.5 mm long, spurs none. *Ovary* ca 2 mm long, glabrous.

30. *Curcuma* sp. aff. *sumatrana* Miq. (unknown 7)

Specimen: Chula s. n. Tak Province (same as list no. 29, sp. nov. 2)

Rhizome elongate, slender. Leaves ca 4. Bladeless sheaths 1-2, the longest one ca 18 cm long, finely hairy. *Blades* elliptic-oblong, 50-57 x 18-22 cm, apex long acuminate to acicular, base cuneate, upper surface glabrous, lower surface glabrous except on main veins. Leaf sheaths 30-45 cm long, finely hairy. Petiole 19-24 cm long. Ligule membranous, 1 mm long, rounded, ciliate. *Inflorescence* central, peduncle 17-19 cm long, spike 10-14 x 5-6 cm. *Bracts* : coma bracts none; flowers red, obovate, 4-5 x 3-3.5 cm. *Bracteoles* white with red apex, broadly elliptic, 3-3.5 x 1.5-2.2 cm. *Calyx* white, 9 mm long, 3-lobed, sparsely hairy. *Corolla*-tube yellow, to constrictin 2 cm long, throat 0.5 cm long, lobes yellow tinted with red; dorsal lobe oblong, 1.7 x 1.1 cm, hooded with mucronate apex; lateral lobes oblong, 1.5 x 1.0 cm, slightly hooded with rounded apex. *Staminodes* yellow, subelliptic or obovate, 2.0 x 0.9 cm. *Labellum* yellow with yellow-orange midband, subelliptic or suborbicular, 1.6 x 1.7 cm, 3-lobed, and emarginate. *Stamen* : filament 5 x 4 mm; anther 4 mm long, anther-crest 1 mm or shorter, spurs ca 3 mm long. *Ovary* 2 x 1.5 mm, hairy; stylodes ca 4 mm long.