

XIII. BOTANICAL GUIDE TO THE SANDY SEA SHORES OF MALESIA

C.G.G.J. van Steenis & J.F. Veldkamp  
Rijksherbarium, POB 9514, 2300 RA Leiden, The Netherlands

Among the papers left by the late Dr. Van Steenis the following manuscript was found, nearly finished. It seemed of sufficient interest to botanists on holiday who can't leave the local flora alone. Just because one's mind is elsewhere during holidays beaches are undercollected areas and interesting finds may be expected.

It must be understood that this is a key to the common species in natural formations on sandy or rocky substrates, e.g. of the sandy beach, the beach forest, the pes-caprae- and Barringtonia-formations, but not of the seagrass- and mangrove-formations. There are many species that have only a limited distribution, or occur only sporadically, or, especially in tourist-infested areas, are actually inland weeds. These have not been included as a key to them all was beyond the idea of this note. At the end a list of some rarely, or facultatively natural occurring species is given by family. Any species seen that has not been enumerated here is not necessarily an addition or a rare one, yet, one never knows, of course, and it would be prudent to collect some of it for a second look back home, where it may serve at least as a souvenir of a good time.

The species marked (\*) are illustrated (in colour) in a nice booklet of W.A. WHISTLER, Coastal flowers of the tropical Pacific. (1980), Pacific Tropical Botanical Garden, POB 340, Lawai, Kauai (Hawaii) 96765, U.S.A.

For a key to mangrove plants see Meindersma et al., Tectona 15 (1922) 561—611, or in Trop. Nat. 12 (1923) 25—46, 70—77.

1. Plant not parasitic. Chlorophyll well-developed. Stems not filiform. . . . . 2
- Plant parasitic, herbaceous, almost completely without chlorophyll. Stems filiform, orange or yellow. (Lauraceae) (\*). . . . . Cassytha filiformis L.
  
2. Woody plants (sometimes prostrate shrublets!) . . . . . 3
- Herbaceous plants. . . . . 39
  
3. Leaves well-developed. . . . . 4
- Leaves minute, scale-like. — Conifer-like tree. Twigs filiform, needle-like. Leaves verticillate. (Casuarinaceae) (\*). . . Casuarina equisetifolia L.
  
4. Leaves opposite. . . . . 5
- Leaves alternate. . . . . 12
  
5. Latex absent. Leaves with normally developed veins. . . . . 6
- Latex yellow. Leaves with very many veins, close and transversal parallel. — Tree. Flowers white. Fruits marble-like. (Guttiferae) (\*). . . . . Calophyllum inophyllum L.

- 6. Flowers either not in capitules, without ray-florets, or flowers white. . . . . 7
- Flowers in involucrate capitules. — Weak plant, often hardly woody. (Compositae) (\*). . . . . Wedelia biflora (L.) DC.
  
- 7. Ovaries and fruits free. . . . . 8
- Ovaries connate. Fruit fleshy, juicy, subtended by some bracts. — Flowers white. (Rubiaceae). . . . . Morinda citrifolia L.
  
- 8. Inflorescences terminal. . . . . 9
- Inflorescences axillary. — Small, gnarled treelet. Leaves ± fleshy, densely appressed grey-hairy, 1—3 cm long. Flowers 1 or 2 together, 6—8 mm long, white. Capsule operculate. Seeds many, small. (Lythraceae) (\*). . . . . Pemphis acidula Forst. f.
  
- 9. Flowers more than 10 mm long. . . . . 10
- Flowers at most 3 mm long. — Small shrub. Flowers in terminal corymbs, small, white, Drupe black, 4—6 mm. (Verbenaceae: *Premna integrifolia* L.). . . . . Premna corymbosa (Burm. f.) Rottler & Willd.
  
- 10. Shrubby plant, up to 4 m tall. Stipules absent. Leaves uni- and/or 3-foliolate. Flowers up to 1.5 cm long, bluish, purple, violet. Fruit not spiny, 5—6 mm diam. . . . . 11
- Tree, 5—10 m tall. Stipules present. Leaves simple. Flowers 2.5—4.5 cm long. Fruit globose, 2—2.5 cm diam. (Rubiaceae) (\*). . . . . Guettarda speciosa L.
  
- 11. Small erect shrub. Leaves 3-foliolate. Inflorescences more than 7 cm long. (Verbenaceae; also regarded as var. *bicolor* (Willd.) Mold.) (\*). . . . . Vitex trifolia L. s.s.
- Plant with erect branches from underground runners. Leaves usually uni-, sometimes 3-foliolate, densely puberulous beneath. Inflorescences up to 7 cm long. (Verbenaceae; also regarded as var. *simplicifolia* Cham.). . . . . Vitex trifolia L. ssp. littoralis Steen.
  
- 12. (4). Leaves not peltate. . . . . 13
- Leaves peltate. — Fruits large, surrounded by a fleshy, bell-shaped involucre. (Hernandiaceae: *Hernandia peltata* Meissn.) (\*). . . . . Hernandia nymphaeifolia (Presl) Kubitzki
  
- 13. Leaves compound. . . . . 14
- Leaves simple. . . . . 22
  
- 14. Shrubs or trees. Leaves 3-foliolate or once pinnate. . . . . 15
- Lianas. Leaves twice pinnate. . . . . 20
  
- 15. Leaves 3-foliolate. . . . . 16
- Leaves once pinnate. . . . . 17

16. Tree. Flowers scarlet, large. Pod 10—45 cm long, constricted between the seeds, bursting irregularly. Seeds ellipsoid. (Leguminosae: *Erythrina variegata* L.) (\*) . . . . . *Erythrina orientalis* (L.) Murr.  
 -. Shrub. Flowers pale, small. Pod 1—5 cm long, constricted and falling apart between the indehiscent joints. (Leguminosae) (\*).  
 . . . . . *Desmodium umbellatum* (L.) DC.
17. Plant palm-like. Stem simple. Leaflets linear, many, stiff. Fruit not a pod. . . . . 18  
 -. Plant not palm-like. Stem branched. Leaflets not linear and stiff. Fruit a pod. . . . . 19
18. Stem armoured with semi-persistent petiole bases. Leaflets 20—35 cm long. (Cycadaceae). . . . . *Cycas rumphii* Miq.  
 -. Stem smooth with annular leaf scars. Leaflets 50—100 cm long. (Palmae) (\*).  
 . . . . . *Cocos nucifera* L.
19. Leaflets 7—23, 1.5—8.5 by 1—6 cm, glaucous, hairy. Flowers yellow. Pods moniliform, 6—20 cm long. Seeds 1—10. (Leguminosae) (\*).  
 . . . . . *Sophora tomentosa* L.  
 -. Leaflets (3—)5—7, 5—22 by 2.5—15 cm. shiny dark green, glabrous. Flowers white or pale violet (often galous, ball-shaped!). Pod flat, oblong, 5—7 cm long, indehiscent, 1-seeded. (Leguminosae). . . *Pongamia pinnata* (L.) Pierre
20. (14). Pods prickly by rigid, 0.5—2 cm long spines. . . . . 21  
 -. Pods unarmed. — Stipules minute, often fugacious. Leaflets in 2—5 pairs. (Leguminosae). . . . . *Caesalpinia crista* L.
21. Stipules pinnate with 3—5 leaflets. Leaflets 16—24 per pinna. Ovules 2. Seeds grey. (Leguminosae) (\*). . . . . *Caesalpinia bonduc* (L.) Roxb.  
 -. Stipules subulate or obliquely subcordate, often split in to 2 or 3 superposed parts, Leaflets 6—14 per pinna. Ovules 4. Seeds yellow. (Leguminosae: *Caesalpinia globulorum* Bakh. f. & Royen). . *Caesalpinia major* (Medic.) Roxb.
22. (13.) Stilt-roots absent. Leaves not spiny, not in tristichous spirals. . 23  
 -. Stilt-roots present. Leaves spiny, in tristichous spirals. (Pandanaceae) (\*).  
 . . . . . *Pandanus tectorius* Parkinson
23. Leaf base cordate. — Stipules large. Leaf hairy or scaly. Petals free, large, yellow. Stamens united into a column. . . . . 24  
 -. Leaf base not cordate, or petals connate, orange-red. . . . . 26
24. Calyx cupular. Style apparently 1, stigma clavate. Fruits not or tardily dehiscent. . . . . 25  
 -. Calyx 5-lobed. Styles 5, much connate, stigmas capitate. Fruit a capsule. — Leaves underneath fine grey-hairy, the major 1—3 nerves at base with a slit-like gland. (Malvaceae) (\*). . . . . *Hibiscus tiliaceus* L.

25. Tree. Leaves at first brown-scaly, glabrescent, coriaceous, underneath without a gland at the base of the midrib, axils of the major nerves often with domatia. (Malvaceae) (\*). . . . . Thespesia populnea (L.) Corréa  
 -. Shrub. Leaves not scaly, usually densely stellate hairy beneath, herbaceous, underneath with a gland at the base of the midrib, axils of the major nerves without domatia. (Malvaceae). . . . . Thespesia lampas (Cav.) Dalz. & Gibs.
26. Plants with white latex. . . . . 27  
 -. Plants without latex. . . . . 29
27. Small trees. Flowers large with a distinct tube and spreading lobes, white with a coloured eye, in terminal inflorescences. . . . . 28  
 -. Large trees. Flowers small, cupular, uniform greenish or white, in axillary fascicles. (Sapotaceae). . . . . Planchonella obovata (Lour.) Pierre
28. Flowers with a yellow eye, tube widened from the middle. (Apocynaceae).  
 . . . . . Cerbera odollam Gaertn.  
 -. Flowers with a red eye, tube widened at the top. (Apocynaceae) (\*).  
 . . . . . Cerbera manghas L.
29. Leaves glabrous, or not silky hairy. Flower not in forked cincinni. . . . 30  
 -. Leaves silky grey-hairy all over. Flowers in forked cincinni. Gnarled tree. (Boraginaceae: *Tournefortia argentea* L.f.) (\*).  
 . . . . . Messerschmidia argentea (L.f.) Johnston
30. Leaves 15—60 by 6—24 cm, obovate. . . . . 31  
 -. Leaves 0.5—16.5 by 0.5—7.5 cm, rarely larger. . . . . 33
31. Trees. Flowers in racemes or spikes. greenish or white. Fruit brown or red.  
 . . . . . 32  
 -. Shrub (up to 3 m) with semi-herbaceous branches. Flowers in axillary, many-flowered cymes, pale violet. Drupe white. (Goodeniaceae: *Scaevola taccada* Roxb.) (\*). . . . . Scaevola sericea Vahl
32. Petiole absent. Leaves without domatia or glands. Flowers bisexual, more than 10 cm diam. Stamens many. Fruit quadrangular, more than 10 cm long. (Lecythidaceae: *Barringtonia speciosa* Forst. f.). (\*).  
 . . . . . Barringtonia asiatica (L.) Kurz  
 -. Petiole 5—15 mm long. Leaves underneath with many domatia and at base with 2 glands. Flowers unisexual, up to 5 mm wide. Stamens 10. Fruit ovoid to ellipsoid, ± flattened, up to 7 cm long. (Combretaceae) (\*). Terminalia catappa L.
33. Leaves oval, entire. Fruits in a white, campanulate involucre. (Hernandiaceae). . . . . Hernandia ovigera L.  
 -. Leaves and fruits otherwise. . . . . 34
34. Leaves serrate. . . . . 35  
 -. Leaves entire. . . . . 36

35. Erect, subglabrous shrub. Leaves ovate, 4—11 cm long. Flowers small, green. Fruit a subovoid, unarmed drupe. (Rhamnaceae) (\*).  
 . . . . . Colubrina asiatica (L.) Brongn.
- Stem prostrate, profusely rooting, stellate hairy. Leaves suborbicular, up to 3.5 cm long. Flowers 1.5—2 cm diam., bright yellow. Fruit woody, spiny. (Tiliaceae) (\*). . . . . Triumfetta procumbens (Bl.) Merr. & Rolfe
36. Erect shrubs or treelets, up to 10 m tall. Leaves ovate to lanceolate. Flowers in dense racemes or panicles. . . . . 37
- Trees, often buttressed, 10—20 m. Leaves obovate. Flowers in axillary fascicles. (Sapotaceae). . . . . Planchonella obovata (Lour.) Pierre
37. Leaves not dotted. Flowers in panicles. Fruit not a berry. . . . . 38
- Leaves with brown dots in translucent light. Flowers in dense racemes. Petals present, reddish to violet. Berries dotted, dark. (Myrsinaceae: Ardisia elliptica Thunb.). . . . . Ardisia humilis Vahl
38. Petals absent. Capsules 2- or 3-winged. (Sapindaceae). Dodonaea viscosa Jacq.
- Petals present. Fruit an ellipsoid drupe, covered by the calyx. (Boraginaceae) (\*). . . . . Cordia subcordata Lamk.
39. (2). Leaves simple or compound, but not lacinate. . . . . 40
- Leaves many times lacinate. — Flowers terminal on a long peduncle in a capitule, with long threads. (Taccaceae) (\*).  
 . . . . . Tacca leontopetaloides (L.) O. Ktze.
40. Leaves opposite. . . . . 41
- Leaves alternate or basal. . . . . 45
41. Leaves compound or unifoliolate. . . . . 42
- Leaves simple. . . . . 43
42. Plants prostrate. Leaves pinnate. Flowers yellow. Fruit spiny. (Zygophyllaceae). . . . . Tribulus terrestris L.
- Plant with erect branches from underground runners. Leaves usually uni-, sometimes 3-foliolate. Fruit not spiny. (Verbenaceae; also regarded as var. simplicifolia Cham.). . . . . Vitex trifolia L. ssp. littoralis Steen.
43. Leaves ± flat. . . . . 44
- Leaves 6—15 mm thick, very succulent. — Latex absent. Flowers solitary, pink inside. Fruit an operculate capsule. (Aizoaceae).  
 . . . . . Sesuvium portulacastrum (L.) L.
44. Latex present. Leaves entire, rather fleshy. Flowers greenish yellow in long-stalked cyathia. Fruit a 3-valved capsule. (Euphorbiaceae).  
 . . . . . Euphorbia atoto Forst. f.
- Latex absent. Leaves crenulate. Flowers yellow, in capitules with ray florets. Fruit a 1-awned achene. (Compositae) (\*). . . Wedelia biflora (L.) DC.

45. Bulb absent. Leaves shorter, cauline. Flowers much smaller, not white. . . . . 46  
 -. Bulb present. Leaves 50—130 cm long, basal. Flowers at least 16 cm diam., white, fragrant. (Amaryllidaceae). . . . . Crinum asiaticum L.
46. Leaves 3-foliolate. Flowers papilionoid. Fruit a pod. — Plants prostrate or creeping. . . . . 47  
 -. Leaves simple. Flowers and fruits different. . . . . 48
47. Leaflets elliptic to orbicular, apex rounded, not acuminate. Flowers pink. Pod turgid, 6—15 by 2—3 cm, each valve with a longitudinal ridge near the upper suture. (Leguminosae: *Canavallia rosea* (Sw.) DC.) (\*).  
 . . . . . Canavallia maritima (Aubl.) Piper  
 -. Leaflets mostly ovate, apex ± rounded, but nearly always acuminate. Flowers yellow. Pod cylindric, constricted between the seeds, 3.5—6 cm by 8—9 mm, valves without such ridges. (Leguminosae) (\*). *Vigna marina* (Burm. f.) Merr.
48. Leaves linear, with a sheath, grass-like. Flowers in spikelets. . . . . 49  
 -. Leaves ovate to orbicular, notched at the apex. Flowers red-purple, c. 5 cm diam. (Convolvulaceae).  
 . . . . . Ipomoea pes-caprae (L.) R. Br. ssp. brasiliensis (L.) Ooststr.
49. Culms terete. Leaves with a ligule at the throat of the sheath. Fruit a caryopsis. (Gramineae). . . . . 50  
 -. Culms usually triquetrous. Ligule absent. Fruit a castaneous to black nut. (Cyperaceae). . . . . 56
50. Plant not very coarse, inflorescences not hedgehog-shaped, spikelets bisexual. . . . . 51  
 -. Very coarse, dioecious creeper with pungent leaves and hedgehog-shaped inflorescences. . . . . Spinifex littoreus (Burm. f.) Merr.
51. Inflorescence curved in fruit, burying in the substrate, ± enclosed in the topmost leaf, resembling a bird's head. (\*).  
 . . . . . Thuarea involuta (Forst. f.) R. & S.  
 -. Inflorescence otherwise. . . . . 52
52. Inflorescence a terminal spike, spikelets alternating immersed in cavities in the disarticulating rachis, one to a joint. (*Monerma repens* (Forst. f.) Beauv.). (\*). . . . . Lepturus repens (Forst. f.) R. Br.  
 -. Inflorescence otherwise. . . . . 53
53. Leaves filiform, involute, up to 4 mm wide when expanded. Racemes slender. Spikelets not paired, up to 4.5 mm long. . . . . 54  
 -. Leaves pseudo-petiolate with a cordate base, at least 6 mm wide. Racemes paired (!), rather thick. Spikelets paired, at least 6 mm long.  
 . . . . . Ischaemum muticum L.

54. Ligule a dense row of short hairs. Racemes spiciform, contracted. . . . .55  
 -. Ligule a scarious collar. Racemes usually 2, opposite, patent.  
 . . . . . Paspalum vaginatum Sw.
55. Leaves 1.5—2.6 mm wide (when expanded), usually erecto-patent to patent.  
 Peduncle exerted from the uppermost sheath at anthesis, the raceme distinctly  
 exerted above the foliage, up to 4.2 cm long.  
 . . . . . Zoysia matrella (L.) Merr. var. matrella  
 -. Leaves 0.7—1 mm wide (when expanded), usually erect. Peduncle, even in  
 fruit, not or hardly exerted from the uppermost sheath, the raceme therefore  
 not or little exerted above the foliage, up to 1.5 cm long.  
 . . . . . Zoysia matrella (L.) Merr. var. pacifica Goudswaard
56. Rhizome long-creeping, sending up tufts of leaves, stems solitary. Glumes  
 distichous. . . . .57  
 -. Rhizome short, not creeping. Stems tufted, more than 10 cm long. Glumes in a  
 spiral. — Spikelets many-flowered. (*Fimbristylis spathacea* Roth). (\*)  
 . . . . . Fimbristylis cymosa R. Br.
57. Stems up to 12 cm long. Spikelets in capitules, 1-flowered, falling off as a  
 whole. (*Remirea maritima* Aubl.). . . . . Cyperus pedunculatus (R. Br.) Kern  
 -. Stems up to 50 cm long. Spikelets in spikes, 8—20-flowered, falling from a  
 long-persistent rachilla. . . . . Cyperus stoloniferus Retz.

LIST OF THE MORE RARE PLANTS LEFT OUT ABOVE

- cl = climbing  
 cr = with creeping stems or rhizomes  
 f = facultative  
 r = rare  
 w = woody

Family	Species	Notes
Asclepiadaceae	<i>Calotropis gigantea</i> (Willd.) W.T. Aiton	f, w
Apocynaceae	<i>Catharanthus roseus</i> (L.) G. Don	f
	<i>Neisosperma oppositifolia</i> (Lamk.) Fosb. & Sacht	f, w (*)
	(= <i>Ochrosia oppositifolia</i> (Lamk.) K. Schum. = <i>O. parviflora</i> G. Don.)	w, r
Capparidaceae	<i>Capparis spinosa</i> L.	
	var. <i>mariana</i> (Jacq.) K. Schum.	
	(= <i>Capparis cordifolia</i> Lamk.)	cr, r (*)
Chenopodiaceae	<i>Arthrocnemum indicum</i> (Willd.) Moq.	f, r
	<i>Salsola kali</i> L.	r
Compositae	<i>Launaea sarmentosa</i> (Willd.) O. Ktze	cr, r
Convolvulaceae	<i>Ipomoea gracilis</i> R. Br.	cr, f
	<i>Ipomoea ochroleuca</i> Span.	cr, r

	<i>Ipomoea stolonifera</i> (Cyr.) Gmel. (= <i>Ipomoea littoralis</i> auct. non Bl.).	cr, r (*)
	<i>Ipomoea trichosperma</i> Bl.	cr, f
	<i>Ipomoea tuba</i> (Schlechtend.) G. Don	cr, f
Cyperaceae	<i>Bulbostylis barbata</i> (Rottb.) Clarke	f
	<i>Bulbostylis puberula</i> (Poir.) Clarke	f
	<i>Cyperus bulbosus</i> Vahl	r
	<i>Cyperus dubius</i> Rottb.	r
	<i>Cyperus hyalinus</i> Vahl	r
	<i>Cyperus radians</i> Kunth	r
	<i>Fimbristylis sericea</i> R. Br.	cr, r
Euphorbiaceae	<i>Sebastiania chamaelea</i> (L.) Muell.-Arg.	f
	<i>Stillingia lineata</i> (Lamk.) Muell.-Arg. ssp. <i>pacifica</i> (Muell.-Arg.) Steen.	r, w
Gramineae	<i>Digitaria heterantha</i> (Hook. f.) Merr.	cr, f
	<i>Digitaria mariannensis</i> Merr.	f
	<i>Eulalia ridleyi</i> (Hack.) Camus	cr, r
	<i>Sporobolus virginicus</i> (L.) Kunth	cr, f
Guttiferae	<i>Mammea odorata</i> (Raf.) Kosterm.	f, w
Leguminosae	<i>Lysiphyllum binatum</i> (Blanco) De Wit	r, w
	<i>Mucuna gigantea</i> (Willd.) DC.	cl, f, w (*)
	<i>Serianthes dilmyi</i> Fosb.	r, w
	<i>Tephrosia purpurea</i> (L.) Pers.	f, w (*)
Liliaceae	<i>Gloriosa superba</i> L.	cl, f
Malpighiaceae	<i>Tristellateia australasiae</i> A. Rich.	cl, r
Meliaceae	<i>Aglaiia elaeagnoidea</i> (Juss.) Benth.	f, w
Nyctaginaceae	<i>Pisonia grandis</i> R. Br.	r, w (*)
	<i>Pisonia umbelliflora</i> (Forst. f.) Seem.	f, w
Pandanaceae	<i>Pandanus leram</i> Voigt ssp. <i>andamanensium</i> (Kurz) Stone	r, w
	<i>Pandanus bidur</i> Miq.	r, w
Pedaliaceae	<i>Josephinia imperatricis</i> R. Br.	cr, f
Portulacaceae	<i>Portulaca oleracea</i> L.	f (*)
Rubiaceae	<i>Bikkia tetrandra</i> (L.) A. Gray	r, w
	<i>Timonius compressicaulis</i> (Miq.) Boerl.	r, w
Rutaceae	<i>Atalantia monophylla</i> (L.) DC. (= <i>A. malabarica</i> (Raf.) Tanaka, = <i>A. spinosa</i> (Willd.) Tanaka)	r, w
	<i>Pleiospermium littorale</i> (Miq.) Tanaka	r, w
Simaroubaceae	<i>Soulamea amara</i> Lamk.	f, w
	<i>Suriana maritima</i> L.	r, w (*)
Tiliaceae	<i>Triumfetta grandidens</i> Hance	cr, r
Verbenaceae	<i>Clerodendrum inerme</i> (L.) Gaertn.	f, w (*)
	<i>Premna obtusifolia</i> R. Br.	f, w (*)