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Some Important Characters and a Special Note on the Flora of Peat Swamp Forest in Thailand

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At present, the last primary peat swamp forest in Thailand remains in Narathiwat province. This covers an area of about 8,000 hectares (50,000 rais). Two hundred and ninety eight flowering plants have been observed there, including 70 species of commercial timber trees, many of which are restricted to the area.

Alstonia pneumatophora Backer, *Calophyllum teysmannii* Miq. var. *inophylloide* (King) Stevens, *Koompassia malaccensis* Benth., *Myristica iners* Bl., *Neesia altissima* Bl., *Parishia insignis* Hook.f., *Xylopia fusca* Maing. and *X. malayana* Hook.f. are the dominant, tall trees, reaching 35 – 40 metres above the peat level.

Eleiodoxa conferta Burr. and *Licuala longecalycata* Furt. are very common palms in the forest. Climbing species and ground flora are comparatively poor.

The peripheral belt of the forest consists of fire-resistant species, forming an almost pure stand of *Melaleuca cajaputi* Powell.

Buttresses, pneumatophores and stilt-roots are useful diagnostic characteristics and should be noted in field studies.

Peat swamp forest is a very special type of rain forest. It occours in fresh-water marshy land in which a thick layer of peat, 0.5 – 5 metre deep or more, has been formed.

The only remaining primary peat swamp forest in Thailand is located in the districts of Tak Bai, Sungai Padi and Sungai Kolok in Narathiwat province in the peninsular region. It lies at aproximately 6° 05′ – 6° 13′ North latitude, 101° 56′ – 102° 03′ East longitude, covering an area of about 50,000 rais (8,000 hectares).

A study of floristic composition of the peat swamp forest and the adjacent tidal forest has been under taken by the staff of the Forest Herbarium, Royal Forest Department since 1983. So far 88 families and 298 species of flowering plants and 13 families and 18 species of ferns have been recorded, of which 48 species are regarded as new records for Thailand.

Root adaptation of plants for survival in the marshy environment are characterized by having a short tap root, strong widespread lateral roots, and having stilt roots. In tree species, these characters are highly diagnostic and are very useful for recognising species in the field.

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Distinctive trees with high stilt roots, including *Blumeodendron kurzii* (Miq.) Beumée ex Airy Shaw, *Calophyllum teysmannii* Miq. var. *inophylloide* (King) Stevens, *Eugenia caudata* King, *E. oblata* Roxb., *E. tumida* Duth., *Melanochyla bracteata* King, and *Xylopia fusca* Maing.

Trees with buttresses are for example, *Parishia insignis* Hook.f., *Alstonia pneumatophora* Backer, *Dacryodes incurvata* (Engl.) Lamk. and *Xylopia malayana* Hook.f.

Pneumatophores are very characteristic features in certain species : peg-like ones are diagnostic of *Stemonurus secundiflorus* Bl.; Λ-like roots of *Elaeocarpus macrocerus* (Turez.) Merr.; bridge-like roots of *Neesia altissima* Bl.; and looped of *Horsfieldia crassifolia* (Hook.f. et Th.) Warb. and *Xylopia fusca* Maing. and knee-like of *Ganua motleyana* Pierre.

The climax vegetation association of peat swamp forest is consisting of mixed evergreen trees and shrubs, and mixed with climbers and herbaceous plants in a three storied formation. The uppermost storey consisted of about 70 species of valuable economic trees, such as : *Alstonia pneumatophora* Backer, *Amoora rubiginosa* Hiern, *Calophyllum teysmannii* Miq. var. *inophylloide* (King) Stevens, *Campnosperma coriaceum* (Jack) Hall.f., *Cratoxylum arborescens* Bl., *Dialium patens* Bak., *Dacryodes incurvata* (Engl.) Lamk., *Endiandra macrophylla* (Bl.) Boerl., *Eugenia muelleri* Miq., *E. grandis* Wight, *E. oblata* Roxb., *E. tumida* Duth., *Ganua motleyana* Pierre, *Horsfieldia crassifolia* (Hook.f. et Th.) Warb., *Ilex cymosa* Bl., *Koompassia malaccensis* Benth., *Litsea resinosa* Bl., *Myristica elliptica* Wall., *M. iners* Bl., *Neesia altissima* Bl., *Nothaphoebe umbelliflora* Bl., *Parastemon urophyllum* A.DC., *Podocarpus motleyi* (Parl.) Dumm., *Parishia insignis* Hook.f., *Sandoricum emarginatum* Hiern, *Sterculia macrophylla* Vent., *Xylopia fusca* Maing., *X. malayana* Hook.f., etc.

The tallest trees of which height reaches 35 – 40 m are *Alstonia pneumatophora* Backer, *Calophyllum teysmannii* Miq. var. *inophylloide* (King) Stevens, *Koompassia malaccensis* Benth., *Myristica iners* Bl., *Parishia insignis* Hook.f., *Xylopia fusca* Maing. and *X. malayana* Hook.f.

The under tree storey is composed by *Archidendron clypearia* (Benth.) Niels., *Baccaurea bracteata* Muell-Arg., *Blumeodendron kurzii* (Miq.) Beumée, *Cinnamomum rhynchophyllum* Miq., *Eugenia caudata* King, *E. chlorantha* Duth., *Myristica maingayi* Hook.f., etc. together with palm species, *Oncosperma tigillaria* Ridl. scattered in certain place and an abundance of *Cyrtostachys renda* Bl.

The shrub layer consists mainly of palm species. *Licuala longecalycata* Furt. and the stemless palm *Eleiodoxa conferta* Burr. are abundant. *Caryota mitis* Lour., *Nenga pumila* (Bl.) H. Wendl., *Pinanga riparia* Ridl. are scattered in the area together with *Pandanus immersus* Ridl. and *P. militaris* Warb.

Climbers are very sparse, except for certain places where clustering thorny

rattans occur. These are *Calamus caesius* Bl., *Daemonorops angustifolia* Mart. and *Korthalsia laciniosa* Mart. Others climbing species such as : *Dapania racemosa* Korth., *Freycinetia angustifolia* Bl., *F. javanica* Bl. and *F. sumatrana* Hems. occasionally appear.

Epiphytic plants are frequently found on trees such as : *Aeschynanthus parvifolia* R.Br., *Dischidia acutifolia* Maing., *D. minor* Merr., *Hoya micrantha* Hook.f., *H. parasitica* Wall., *Ficus microcarpa* Linn.f., *Fagraea acuminatissima* Merr., *F. auriculata* Jack, *F. tubulosa* Bl., *Cymbidium finlaysonianum* Lindl., *Dendrobium concinnum* Miq., *D. crumenatum* Sw., *D. pensile* Ridl., etc. together with the attractive, showy flowers of *Hedychium longicornutum* Bak.

Two kinds of parasitic plants are found in this type of forest. Terrestrial parasitic plants on roots are *Henslowia buxifolia* Bl., *Champereia manillana* (Bl.) Merr. and *Olax scandens* Roxb. The canopy-level parasites are *Amyema beccarii* Dans., *Dendropthoe pentandra* Miq., *Helixanthera cylindrica* (Jacq.) Dans., *Macrosolen cochinchinensis* (Lour.) V. Tiegh., *M. robinsonii* (Gamble) Dans., *Viscum articulatum* Burm.f. and *V. orientale* Willd.

Ground flora are comparatively poor. Normally, they are very sparse but are denser in open spaces in the forest. The species are *Aglaonema marantifolium* Bl., *Homalomena griffithii* Hook.f., *Hypolytrum nemorum* Spreng., *Lasia spinosa* Thw., *Tacca chantrieri* Andr. and *Labisia pumila* Roxb.

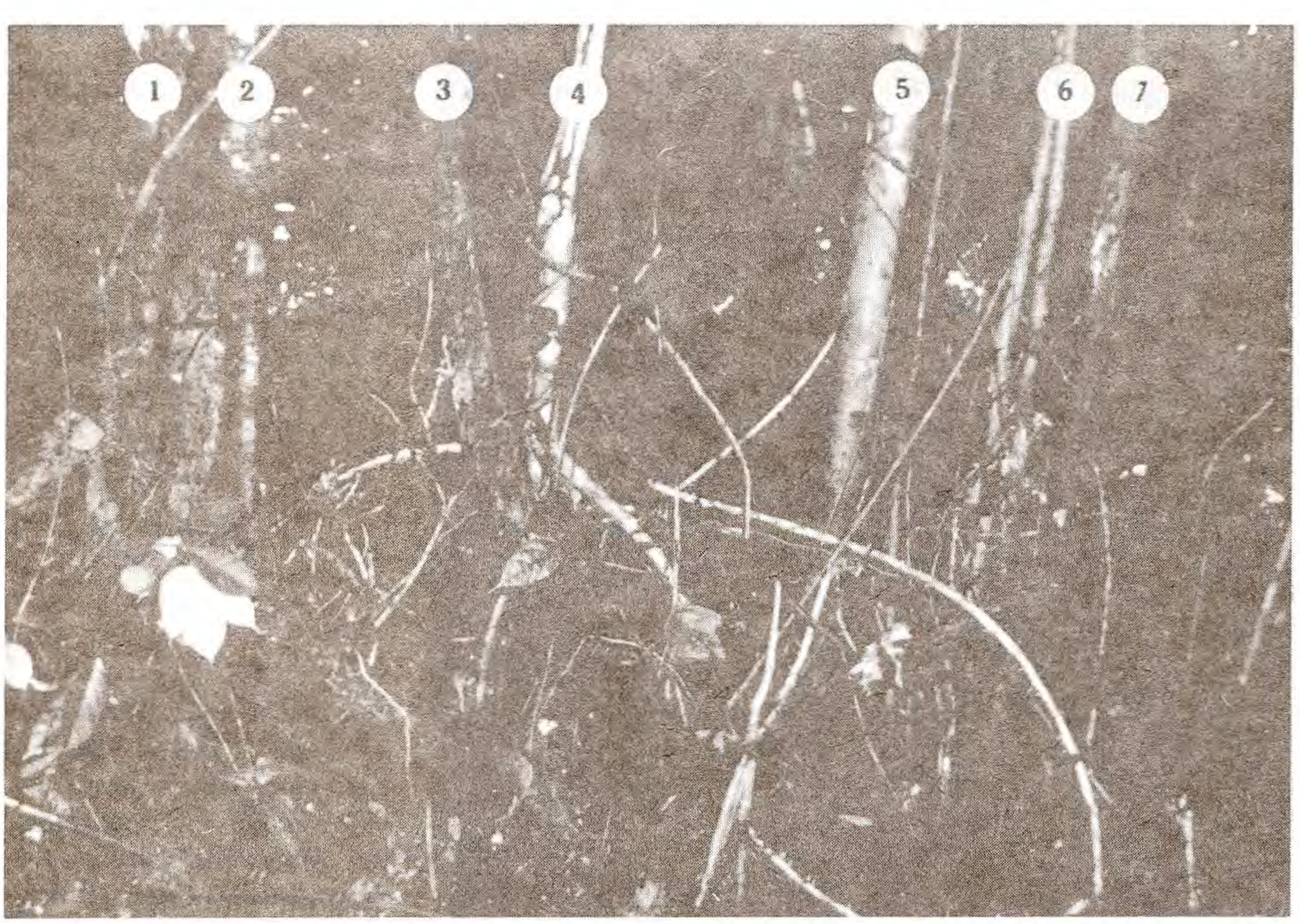
Macaranga pruinosa (Miq.) M.A. is regarded as one of the best pioneer species in peat swamp forest. Usually, it occurs in pure stands in disturbed areas, both within and outside the forest. After the area is repeatedly hazardous by fire, as in the peripheral sites of the swamp, the fire-resistant species *Melaleuca cajaputi* Pow. develops in almost pure stands, associating with very dense, thick ground cover such as : *Cyperus* spp., *Eleocharis dulcis* (Burm.f.) Hens., *Fimbristylis nutans* Vahl, *Fuirena umbellata* Rott., *Lepironia articulata* (Retz.) Domin, *Scleria poaeformis* Retz., *S. sumatrensis* Retz., *Scirpodendron ghaeri* Merr., *Echinochloa stagnina* P. Beauv., *Hymenachne pseudointerrupta* C. Muell., *Leersia hexandra* Sw. and *Panicum cambogiense* Balansa. *Nepenthes* spp. are frequent and the ferns *Stenochlaena pulustris* Bedd., *Lygodium* spp., and *Blechnum serratum* A. Rich. are also common.

Peat swamp forest is an unique vegetation community with a high proportion of endemic taxa, and is an extremely valuable scientific resource. The disturbance of its natural ecology in any way causes an abrupt, irreversible change in the vegetation type, from mixed evergreen rain forest to pure stands of fire-resistant trees. The last primary peat swamp forest in Thailand should therefore be protected as either a National Park or a Wildlife Sanctuary. Further research on this ecosystem could then help to develop a management strategy for the future.

Peat swamp forest 1. primary peat swamp forest; 2. Melaleuca forest and 3. grasses and sedges

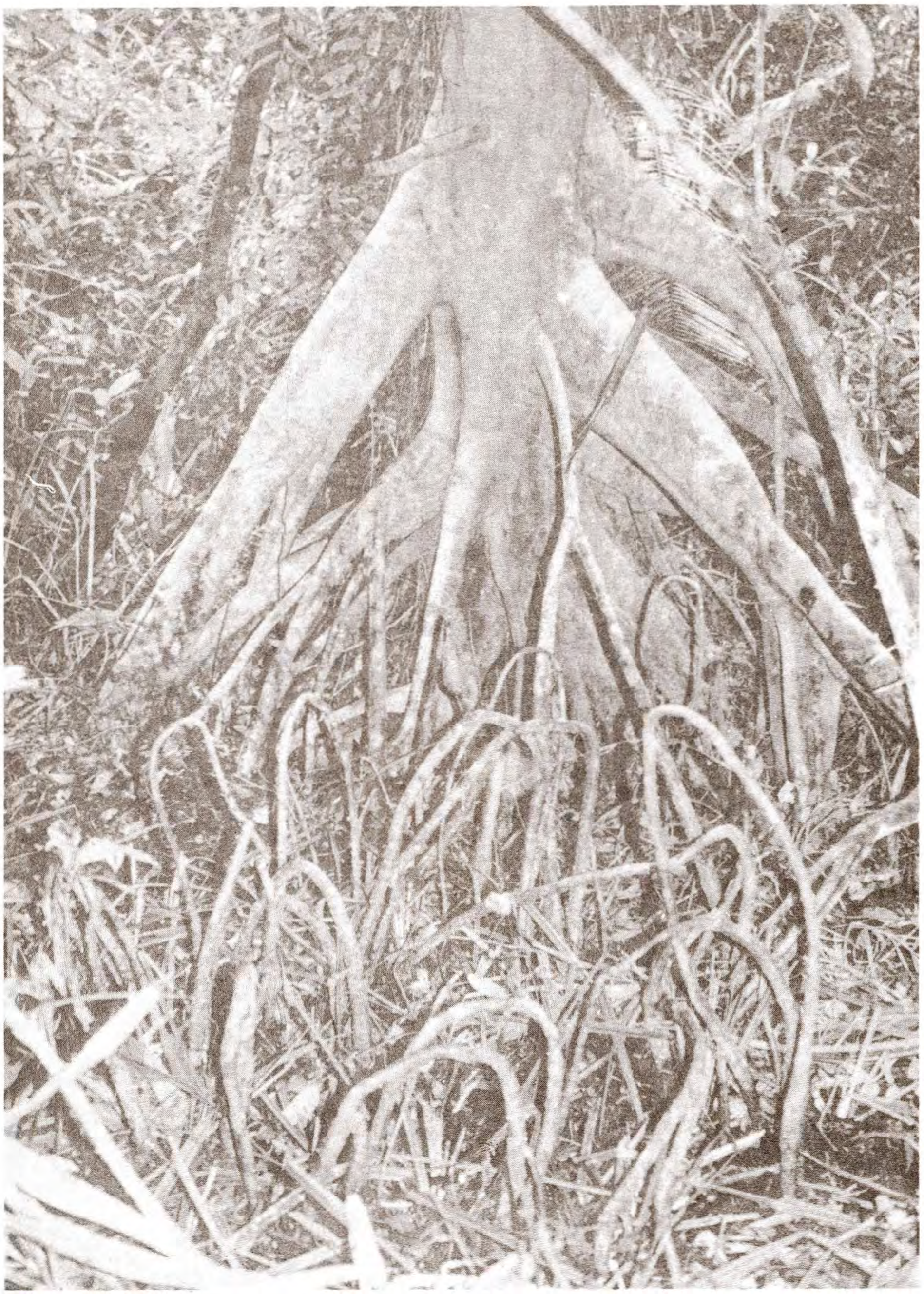
Tree canopies of 1. *Parastemon urophyllus* A. DC., 2. *Elaeocarpus macrocerus* Merr., 3. *Calophyllum teysmannii* Miq. var. *inophylloide* Stevens, 4. *Eugenia tumida* Duth., 5. *Campnosperma coriaceum* (Jack) Hall.f. and 6. *Ganau motleyana* Pierre.

Cyrtostachys renda Bl.



Root systems of 1. *Parishia insignis* Kook.f. 2., 5. and 6. *Elaeocarpus macrocerus* Merr., 3. and 7. *Eugenia caudata* King, and 4. *E. tumida* Duth.

Buttresses of *Parishia insignis* Hook.f.



Stilt roots and pneumatophores of *Xylopia fusca* Maing.

Pneumatophores of *Stemonurus secundiflorus* Bl.

Pneumatophores of *Neesia altissima* Bl.

Pheumatophores of *Elaeocarpus macrocerus* Merr.

Pneumatophores of *Calophyllum teysmannii* Miq. var. *inophylloide* Stevens.

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