Morphological descriptions and photographs of all identified pollen and spore types and the more common or distinctive unknown types are contained in this appendix. All were recorded on Kodak Panatomic-X film using a Carl Zeiss automatic photomicroscope equipped with X 40 and X 100 planapochromatic oil-immersion objectives.

The identification of unknown types was achieved by comparison with the Dept of Biogeography and Geomorphology's collection of nearly 15,000 reference slides of pollen and spores. The matching of unknown grains with the reference material was aided by the use of photographs and punched-card descriptions of sections of the collection, and also by the computer-assisted retrieval system for morphological details of nearly 3,000 of the slides, described by Walker et al. (1968) and Guppy et al. (1973).

Despite its large size, the reference collection tends predominantly to represent material from the New Guinea highlands and temperate Australia. Although this bias was to a small extent rectified during the course of the project, there still remained a lack of adequate representation from the area under study in particular, and from tropical lowlands in general. For this reason many of the identifications set out below remain tentative only, a few relying solely on published accounts, whilst the general level of identification is certainly not as critical as perhaps could otherwise have been achieved.
The degree of certainty of an identification is indicated by the following conventions:

The suffix 'T.' ("type") indicates that the fossil taxon is identical with the named taxonomic unit although not always uniquely so, other taxa also producing grains or spores that are morphologically indistinguishable from the named type.

The prefix 'cf.' signifies that the type is closely similar, but not identical in every respect with the named taxon or taxa.

The prefix '?' indicates a very tentative identification. The unknown type possibly lies within the group or groups of taxa mentioned, but the allocation is by no means certain.

**MORPHOLOGICAL DESCRIPTIONS**

The pollen types are grouped into the morphological classes of Faegri and Iversen (1964), except that the sections Polyplicate, Trichotomocolpate, Dicolarporate, Fenestrate, Dyad, and Polyad have been omitted as no grains of these categories were found during the course of the investigation. For convenience, all Cyperaceae grains have been included as a subsection of the Monoporate category, although many possess more than one pore. In addition to the pollen morphological groups, two classes (Monolete and Trilete) are used to encompass pteridophyte and allied spores. The complete groups and their representation are shown in Table I.1

The terms used in the morphological description of pollen grains are, except where stated, those defined by Faegri and Iversen (1964), whilst terms relating to pteridophyte spore morphology adhere to the usage of Harris (1955). The term 'exine' is used *sensu* Erdtman (1952) to describe the entire outer sporoderm of both pollen and pteridophyte spores. The
perisporium, or perine, is defined as the outermost layer of some spores, whether or not it is supposed part of the exine, or extra exinous. The descriptions employ the minimum number of terms required to describe a taxon uniquely. Except where statistical parameters are given, size measurements are 'typical' rather than results based on a number of systematic measurements.
TABLE I.1.  Pollen- and spore-morphological groups recognised and their representation

<table>
<thead>
<tr>
<th>Number</th>
<th>Morphological category</th>
<th>Identified</th>
<th>Unidentified</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vesiculate</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Inaperturate</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Monocolpate</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Monoporate &amp; Cyperaceae</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Dicolpate</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Tricolpate</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Stephanocolpate</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Tricolporate</td>
<td>53</td>
<td>17</td>
</tr>
<tr>
<td>9.</td>
<td>Stephanocolporate</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>Pericolpate/colporate</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>11.</td>
<td>Diporate</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>Triporate</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>Stephanoporate</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Periporate</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Syncolpate/colporate</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>16.</td>
<td>Heterocolporate</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>17.</td>
<td>Tetrad</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>18.</td>
<td>Monolete</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>19.</td>
<td>Trilete</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>
1. **VESICULATE**

*Phyllocladus* (Podocarpaceae)  
128 PHYLO

Bisaccate grain, oval to rectangular in shape in polar view with narrow, flat, bladders. Size variable, max. dimension 30-40 μm.

*Podocarpus* (Podocarpaceae)  
127 PODOC

Bisaccate grain with large reticulate bladders. Size variable, max. dimension usually between 40-80 μm.

*Dacrycarpus* T. (Podocarpaceae)  
129 DACRY

Trisaccate spherical grain. Diameter c. 60 μm. This type also includes some *Podocarpus* spp., notably *P. imbricatus*, *P. compactus*, *P. papuanus*, and *P. cinctus*.

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2. **INAPERTURATE**

**cf. Cananga odorata** (Annonaceae)  
41 CANAN

Grain flattened, + oval in polar view. Exine thin, sculpturing + psilate, but variable. Size very variable, typically 50-90 μm max. dimension.

**cf. Gnetum** (Gnetaceae)  
130 GNETU

Grain spheroidal, diameter c. 15 μm. Exine covered with regularly distributed micro-echinae less than 1 μm in length. Pattern appears almost foveolate at low focus.

*Pandanus radula* T. (Pandanaceae)  
2 PANDA

Grain a flattened sphere, maximum dimension c. 17 μm. Sculpturing consists of irregularly distributed micro-echinae less than 1 μm in length. A faint porus may be visible. Similar types probably occur in many other *Pandanus* spp.
cf. Colocasia (Araceae)  (Plate I.1, 8)
20 COLOC

Grain + spherical with regularly distributed, broad-based echinae, at least 2 μm in length.

Unknown 274  (Plate I.1, 9)
135 UK274

Grain with thick, heavily sculptured gemmate exine. Gemmae c. 3 μm in length.

3. MONOCOLPATE

?Normanbya T. (Palmae)  (Plate I.1, 10)
18 NORMA

A plano-convex grain in equatorial view, with a long colpus. Exine psilate or faintly scabrate. Slightly similar to several Palmae including Normanbya and Archontophoenix.

cf. Liliaceae  (Plate I.1, 11)
22 LILIA

Grain typically 26 x 22 μm. Exine reticulate, with two distinct layers. Generic affinity unknown. Some Palmae, such as Caryota have slightly similar pollen.

?Palmae  (Plate I.2, 12)
15 PALMA

Grain c. 18 x 12 μm, faintly reticulate. Exine not visibly more than single layered.

cf. Arenga (Palmae)  (Plate I.2, 13)
19 ARENG

Grain circular in polar view, oval in equatorial view. Exine echinate, colpus indistinct.

Unknown 156  (Plate I.2, 14)
136 UK156

Plano-convex grain in equatorial view, with thick exine. Sparsely covered with small verrucae.
FIGURE I.1. Size-class distribution of pollen grains from some common grass species

Leersia hexandra  Coelorchachis rotboelliioides  Sacciolepis myosuroides  Cappillipodium parviflorum  Phragmites karka

Sacciolepis indica  Miscanthus floridulus  Imperata cylindrica  Themeda australis  Ischaemum barbatum
4. MONOPORATE AND CYPERACEAE

4A. Monoporate

Gramineae 1
4  GRAM1
Max. dimension less than 20 µm.

Gramineae 2
5  GRAM2
Max. dimension 20-25 µm.

Gramineae 3
6  GRAM3
Max. dimension 25-30 µm.

Gramineae 4
7  GRAM4
Max. dimension larger than 30 µm.

Gramineae 5
8  GRAM5
(Plate I.2, 15)

Grain with distinct areolate or coarse scabrate pattern, max. dimension greater than 30 µm. The distribution of the morphological types amongst the more common Markham Valley grasses is shown in Fig. 1.1.

Flagellaria (Flagellariaceae)
21  FLAGE
(Plate I.2, 17)

Grain + spherical, c. 16 µm in diameter. Exine reticulate in high focus, becoming almost foveolate in low focus. Porus circular, with annulus, slightly protruding.

Sparganium antipodum T. (Sparganiaceae)
3  SPARG
(Plate I.2, 18)

Typha (Typhaceae)  
1 TYPHA

Grain oval to rectangular in either polar or equatorial aspect. Exine thick with reticulate sculpturing. Porus uneven in shape, sometimes indistinct. Grains frequently found clumped, or in tetrads.

Unknown 292  
137 UK292

Grain ± spherical, exine scabrate. Porus diffuse with ragged edges, no annulus. Cyrtospermum (Araceae) is slightly similar, but larger.

Monoporate (undifferentiated)  
138 MONPU

4B Cyperaceae

Hypolytrum nemorum T. (Cyperaceae)  
14 HYPOL

Grain ± spherical, diameter 16 μm. Exine scabrate. Porus unevenly circular or rectangular with distinct, but ragged edge; no annulus. H. compactum is similar to H. nemorum. Other Hypolytrum spp. differ in their pollen morphology.

Cyperaceae A1  
9 CYPA1

Heteropolar 'pear-shaped' grains less than 30 μm maximum diameter. This type includes c. 8% of two common Cyperus spp., C. platystylis and C. polystachos.

Cyperaceae A2  
10 CYPA2

Heteropolar 'pear-shaped' grain, max. dimension larger than 30 μm. Includes minor proportions of the grains from Eleocharis dulcis, Scirpus grossus, Fuirena ciliaris, and c. 20% of Carex sarawaketensis grains.
Cyperaceae B1
11 CYPB1
Grains rectangular to oval from either aspect, max. dimension less than 30 μm. Includes over 90% of Cyperus polystachos, C. platystylis, Fimbristylis tenuinervia and some Fuirena ciliaris grains.

Cyperaceae B2 (Plate I.2, 23)
12 CYPB2
Grains rectangular to oval in either aspect, max. dimension larger than 30 μm. Includes a large majority of Eleocharis dulcis, Fuirena ciliaris, Fimbristylis dichotoma and Carex sarawaketensis grains.

Cyperaceae C
13 CYPCI
Spherical cyperaceous grains (excluding Hypolytrum nemorum T.). About 15% of Fimbristylis dichotoma grains belong to this group.

5. DICOLPATE

Calamus (Palmae) (Plate I.2, 24)
17 CALAM
Grain oval in polar view. Scabrate-reticulate, or verrucate sculpturing. Colpus margin ragged.

?Metroxylon sagu (Palmae) (Plate I.2, 25)
16 METRO
6. TRICOLPATE

Anisoptera T. (Dipterocarpaceae) (Plate I.3, 26,27)

Grain ± spherical, diameter c. 17 μm, or oblate (split colpi). Exine regularly scabrate or per-reticulate. In polar optical section colpus edges appear rounded; only one layer distinguishable in exine. This type also includes Vatica. Most Hopea grains are 4- or 6-colpate.

Dysophylla T. (Labiatae) (Plate I.3, 28,29)

Grain ± spherical, diameter c. 18 μm, or oblate (split colpi). Exine reticulate with two distinct layers. In polar optical section, colpus edges appear pointed. Similar pollen grains also occur in other families including Hammamelidaceae and Verbenaceae. Many other Labiatae genera produce pollen that is stephanocolpate or tricolpate and psilate.

cf. Verbenaceae/Bignoniaceae (Plate I.3, 30)

Grains spherical, or oblate (split colpi). Size c. 35 x 25 μm. Exine thick, reticulate. Two distinct layers sometimes visible in exine. This type is found in Gmelina and Callicarpa (Verbenaceae) and Haussemanianthes (Bignoniaceae).

Timonius T. (Rubiaceae) (Plate I.3, 31)

Grain ± spherical, sometimes appearing inaperturate. Thick exine, with visible columellae. Sculpturing consists of a large-scale reticulum, diameter of lumina c. 3 μm. Muri become 'bead-like' in low focus. Antirhea produces similar pollen grains.

Nelumbo nucifera (Nymphaceae) (Plate I.3, 32)

Grain ± spherical, although usually found oblate with split colpi. Diameter variable, typically c. 60 μm. Exine c. 4 μm in thickness, semitectate, dense columellae becoming ± fused in surface focus, discrete in low focus.
Ilex (Aquifoliaceae)  
76  ILEXA

Grain prolate to oblate, size variable, diameter typically 18 µm. Exine clavate, clavae becoming smaller towards the psilate colpus. A small circular porus is sometimes visible within the colpus.

Endospermum (Euphorbiaceae)  
72  ENDOS

Grain oblate, size variable. Exine thick, sculpturing consists of verrucae or gemmae that appear angular in optical section. Maximum diameter of elements is 2 µm, becoming smaller towards the colpi.

Unknown 235  
139  UK235

Grain prolate, lobate in polar view, size c. 43 x 24 µm. Sculpturing reticulate, columellae clearly visible in exine optical section.

Unknown 293  
140  UK293

Grain ± circular in equatorial view, inter-hexagonal in polar view. Diameter c. 31 µm. Sculpturing reticulate, scale becoming smaller towards poles. Maximum exine thickness c. 4 µm.

Tricolporate (undifferentiated)  
141  TRICU

7. STEPHANOCOLPATE

cf. Myrsine T. (Myrsinaceae)  
107  MYRSI

Grain prolate to slightly oblate. Three to five colpi, often not parallel to polar axis. Colpus ± straight, with ragged margin. Exine scabrate or faintly microreticulate. Diameter c. 20 µm. Pollen grains of this type from various species of Myrsine have been described by Morley (1976) and Selling (1974). Some Rapanea spp. appear to produce similar grains (van der Hammen et al. 1973).
Nothofagus (Fagaceae)  (Plate I.4, 40)
25 NOTHO

Grain ± hexagonal, depressed oval shape in equatorial view. Colpus short; sculpturing composed of regularly arranged minute baculae. All grains encountered fall within the 'brassii' pollen subtype.

8. TRICOLPORATE

8A. Tricolporate - max. diameter smaller than 15 μm

Elaeocarpus T. (Elaeocarpaceae)  (Plate I.4, 41)
85 ELABO

Grain oblate to prolate, usually inter-sub-angular. Max. dimension 7 - 10 μm. Exine psilate. Meridional colpus interrupted at equator, although no distinct transverse aperture usually distinguishable.

Octomeles sumatrana (Datiscaceae)  (Plate I.4, 42)
96 OCTOM

Grain oblate, ± sub-angular, typically 9.5 x 11 μm. Sculpturing faintly scabrate. Exine Max. thickness greater than 1 μm, becoming thinner towards the colpi. Polar area small, colpus long, unpatterned, although often indistinct. Porus small, ± circular, indistinct especially in surface focus.

Macaranga ovatifolia T. (Euphorbiaceae)  (Plate I.4, 43)
67 MACOV

Grain ± spherical, diameter less than 10 μm. Faintly but distinctly scabrate. Transverse colpus almost slit-like, patterned in surface focus. Apart from the shape and patterning of the transverse colpus, this pollen type is almost identical to that produced by some Aceratium spp. (Elaeocarpaceae). A proportion of grains from other Macaranga spp., in particular M. fimbriata, may be included in this category.

Macaranga (Euphorbiaceae)  (Plate I.4, 44,45)
66 MACAR

Grains prolate or oblate, semi-angular, or inter-sub-angular, maximum diameter usually less than c. 13 μm. Exine scabrate to microreticulate, appearing thickened around the colpi in polar view. Transverse colpus rectangular or slit-like, patterned in surface focus only.
**Macaranga/Mallotus** (Euphorbiaceae)

61 MACMA

Pollen grains of *Macaranga* or *Mallotus* configuration that cannot be assigned with certainty to either genus. Size range c. 13 to 18 μm max. dimension.

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**Rhamnaceae**

(Plate I.4, 46,47)

84 RHAMN

Grains usually oblate to circular in equatorial view, ± angular in polar view. Size variable, max. diameter usually less than 15 μm. Sculpturing psilate to faintly scabrate. Colpus long, transverse porus ± circular, with partial annulus. This type probably includes many rhamnaceous genera with predominantly small pollen grains, such as *Ventilago* and *Gouania*, and a minor proportion of the pollen of others, such as *Zizyphus*, and *Alphitonia*.

**Spiraeopsis** T. (Cunoniaceae)

(Plate I.5, 48)

47 SPIRA

Grains ± spherical, very small, diameter c. 8 μm. Sculpturing faintly reticulate, columellae visible in exine optical section. Transverse porus ± circular, although small and indistinct especially in surface focus. This type also includes a large proportion of grains from the genera *Pulla*, *Aistopetalum*, *Opocunonia*, *Spiraeanthemum* and *Ackama*.

**Weinmannia** T. (Cunoniaceae)

(Plate I.5, 49)

46 WEINM

Grain oblate, semi-angular or sub-angular, c. 10 x 11 μm. Sculpturing faintly reticulate, columellae visible in exine section. Transverse colpus ± rectangular, slightly constricted by the meridional colpus. This type may include a small proportion of grains from other tricolporate genera of Cunoniaceae.

**Hypserpa** (Menispermaceae)

(Plate I.5, 50)

39 HYPSE

Grain oblate to prolate, polar axis c. 12 to 15 μm. Exine distinctly two-layered, sculpturing reticulate or microreticulate. Transverse porus ± circular, patterned in surface focus, sometimes indistinct.
Uncaria T. (Rubiaceae)  
125 UNCAR (Plate I.5, 51,52)

Grain oblate to prolate, maximum diameter usually less than 11 μm. Morphologically similar to Neonauclea, although sculpturing less distinct, usually microreticulate or faintly scabrate, and porus smaller. A small proportion of Neonauclea grains may be included in this type.

Nauclea T. (Rubiaceae)  
124 NAUCL (Plate I.5, 53)

Grains usually oblate, equatorial diameter 11 - 15 μm. Exine up to 1.5μm in thickness, columellae visible in optical section. Sculpturing finely reticulate. Meridional colpus distinct with thickened margo. Porus circular with thickened annulus. The type is also found in Neonauclea, Sarcocephalus and Anthocephalus. Pollen of these genera tends to be smaller with less pronounced sculpturing than that of Nauclea, although ranges overlap. This is perhaps to be expected given the complex generic synonymy of the Naucleae (Ridsdale, 1970). A small proportion of Uncaria grains may also be represented in this category.

Tetracera T. (Dilleniaceae)  
92 TETRA (Plate I.5, 54)

Grain oblate to prolate. Exine visibly two-layered, sculpturing clearly reticulate. Size and shape very variable. Colpus usually splits, enclosing a large + oval porus, unpatterned, with ragged edges. This pollen type also occurs in some species of Hibbertia.

Olea (Oleaceae)  
112 OLEAS (Plate I.5, 55)

Grain oblate, or + spherical, diameter c. 14 μm. Exine thick, distinctly two layered, columellae visible. Sculpturing reticulate in surface focus, discrete columellae visible at low focus. Porus indistinct.

Rapanea cf. achradaefolia T. (Myrsinaceae)  
106 RAPAN (Plate I.5, 56)

Grain prolate, circular to inter-semi-angular in polar view. Sculpturing regularly scabrate, polar area small. Colpus un-patterned with slightly thickened margo, constricted at equator although no clear transverse aperture visible.
Unknown 194 (Plate I.5, 57)
142  UK194

Grain prolate, ± sub-angular, size variable, typically 12 x 10 µm. Exine relatively thick c. 1 µm, sculpturing psilate to faintly scabrate. Meridional colpus interrupted at equator, although transverse aperture not clearly visible.

Unknown 109 (Plate I.5, 58)
143  UK109

Grain ± spherical, diameter c. 12 µm. Exine distinctly two layered; sculpturing scabrate. Meridional colpus narrow; transverse colpus large, rectangular to oval, unpatterned. This type bears a slight similarity to some grains from the genus *Ternstroemia* (Theaceae).

Unknown 104 (Plate I.5, 59)
144  UK104

Grain oblate, almost apiculate in equatorial view, angular in polar view. Diameter c. 12 µm. Max. exine thickness c. 1.5 µm. Sculpturing psilate, or faintly scabrate. Transverse colpus protruding, constricted by meridional colpus, unpatterned.

Unknown 60 (Plate I.5, 60)
145  UK060

Grain ± spherical, diameter c. 14 µm. Sculpturing consists of a fine reticulum of isodiametric elements. Columellae clearly visible in exine optical section. Meridional colpus narrow, unpatterned; transverse colpus rectangular, patterned in surface focus. This type bears a superficial resemblance to the pollen produced by some genera of Sterculiaceae, Euphorbiaceae and Flacourtiaceae.)

Tricolporate, Section A, (undifferentiated)
146  3CPAU
8B. Tricolporate, max. diameter larger than 15 µm sculpturing scabrate or psilate, grain prolate

*Castanopsis* T. (Fagaceae)  (Plate I.5, 61,62)

Grains prolate, polar axis usually 14 - 20 µm, although may be larger. Inter-semi-angular or inter-semi-lobate in polar view. Sculpturing usually psilate or faintly scabrate, a few species coarsely scabrate. Transverse colpus rectangular or slit-like.

*Lithocarpus* spp. are generally more prolate, and larger than those of *Castanopsis*, however ranges of size and morphology overlap considerably.

*Rhizophora* *apiculata* T. (Rhizophoraceae)  (Plate I.5, 63)

Grain prolate, size variable, polar axis usually 17 - 25 µm. Exine thick, evenly scabrate. Columellae sometimes visible. Distinct equatorial colpus is faintly patterned in surface focus.

(cf. *Crotalaria* T. (Leguminosae))  (Plate I.5, 64)

A very variable type, both in size and morphology. Usually prolate, inter-semi-lobate c. 20 x 13 µm. Sculpturing evenly scabrate, or faintly microreticulate. Meridional colpus long, with slightly thickened margo, usually asymmetrically constricted at equator. Transverse colpus oval, patterned in surface focus. This pollen type is produced by some genera of Papilionatae, including *Crotalaria*, and by several species of *Cassia* (Caesalpinioideae).

(cf. *Bischofia* (Euphorbiaceae))  (Plate I.5, 66,67)

Grain circular or prolate in equatorial view, + circular in polar view. Size variable, polar axis c. 14 - 18 µm. Sculpturing microreticulate or regularly scabrate. Distinct columellae visible in exine section. Transverse colpus rectangular, patterned in surface focus, often slit-like. Meridional colpus narrow, un-patterned at any level.
**Antidesma (Euphorbiaceae)**

68  **ANTID**

Grain prolate, often lobate. Size variable, typically 18 x 12 μm. Transverse colpus rectangular, bordered by distinct, parallel costae.

**Euphorbia hirta** T. (Euphorbiaceae)

59  **EUPHI**

Grain prolate, inter-semi-lobate, c.24 x 16 μm. Exine thick, up to 3 μm, with distinct columellae; sculpturing coarsely scabrate, or almost microreticulate. Exine becomes thinner around the psilate colpus area. Transverse colpus ± oval or rectangular. This type is also found in other Euphorbia spp. including *E. velutina*.

cf. **Euphorbia** (Euphorbiaceae)

58  **EUPHA**

Grains prolate c. 25 x 20 μm, with small polar area. Sculpturing coarsely scabrate to unevenly reticulate. Exine thick, two layers visible. Type found in some Euphorbia spp. and may also include representatives from other genera of the family, such as *Sapium*.

**Rhus** T. (Anacardiaceae)

75  **RHUST**

Grain prolate, sub-angular, or semi-angular. Sculpturing scabrate to microreticulate. Transverse colpus rectangular, very equatorially elongated, edges ragged. This type closely resembles *Rhus taitensis* and similar forms occur in other genera of Anacardiaceae.

**Diospyros cf. ferrea** (Ebenceae)

110  **DIOSP**

Grain prolate, inter-hexagonal to semi-lobate. Exine faintly scabrate to psilate. Meridional colpus faint in surface focus, transverse colpus ± circular, with indistinct edges.

**Planchonella** T. (Sapotaceae)

108  **PLANC**

Grain prolate, size variable but polar axis usually larger than 30 μm. Colpus long and narrow. Porus well defined, circular or oval, unpatterned, without thickened annulus; often protruding. This type also includes *Chrysophyllum* and *Pouteria*. Most other genera of Sapotaceae produce 4-colporate pollen predominantly.
cf. *Palaquium* (Sapotaceae) *(Plate I.6, 76)*

109 PALAQ

Grain prolate, sub-angular, c. 31 x 26 μm. Sculpturing evenly scabrate or faintly microreticulate. Faint columellae visible in exine optical section. Transverse colpus oval, equatorially elongated. This type resembles a proportion of grains from the genus *Palaquium* but differs from *Planchonella* T. only in the sculpturing pattern and transverse colpus morphology.

Unknown 79 *(Plate I.6, 77,78)*

147 UK079

Grain prolate, inter-semi-angular size c. 18 x 12 μm. Sculpturing psilate or faintly scabrate. Colpus long and narrow, polar area small. Transverse aperture small, shape indistinct. Thickened costae visible around aperture especially in optical section.

Unknown 119 *(Plate I.6, 79)*

148 UK119

Grain prolate, inter-sub-angular, size c. 18 x 11 μm. Sculpturing scabrate. Exine max. thickness c. 2.5 μm. Meridional colpus long, polar area small. Transverse colpus wide, slit-like, patterned, with distinct thickened costae.

Unknown 174 *(Plate I.6, 80)*

149 UK174

Grain prolate, apiculate in equatorial view, sub-angular in polar view. Sculpturing coarsely scabrate to microreticulate. Polar area small. Transverse aperture indistinct.

Tricolporate, Section B, (undifferentiated)

150 3CPBU

8C. Tricolporate, larger than 15 μm, sculpturing scabrate or psilate, grain spherical to oblate

cf. *Euphorbiaceae* *(Plate I.6, 81)*

56 EUPHT

Grain oblate c. 14 x 15.5 μm. Sculpturing scabrate, meridional colpus narrow, polar area small. Transverse colpus patterned in surface focus; faint costae present.
Mallotus T. (Euphorbiaceae) (Plate I.6, 82)

Grain spherical to oblate, max. diameter larger than 17 μm. Two broad types may be distinguished:
M. philippinensis T. with very short colpi, + circular in polar view.
M. paniculata T. with longer colpi, semi-angular or almost inter-hexagonal in polar view. (Includes M. ricinoides).

Cleidion T. (Euphorbiaceae) (Plate I.6, 83)

Grain inter-semi-lobate, + circular in equatorial view. Max. diameter c. 17 - 20 μm. Transverse colpus wide, patterned in surface focus.

cf. Muehlenbeckia (Polygonaceae) (Plate I.6, 84)

Grain spherical to prolate, diameter c. 18 μm. Exine coarsely scabrate. Polar area small. Transverse colpus rectangular to oval, equatorially elongated.

cf. Rumex brownii (Polygonaceae) (Plate I.7, 85)

Grain inter-sub-angular, oblate, c. 20 x 22 μm. Sculpturing scabrate to unevenly reticulate. Porus + circular, with slightly thickened annulus. Heteropolar, with arci linking colpi at one pole.

Dodonaea (Sapindaceae) (Plate I.7, 86)

Grain + spherical, size variable. Colpus narrow and long, polar area small. Porus circular to slightly oval, equatorially elongated, and protruding. This type is characteristic of some New Guinea and North Queensland Dodonaea spp.

Acaena (Rosaceae) (Plate I.8, 87)

Grain spherical, or oblate, max. diameter c. 27 μm. Sculpturing coarsely scabrate. Meridional colpus short, often indistinct. Transverse colpus + oval, equatorially elongated, with thin protruding operculum.
?Parinari (Rosaceae) (Plate I.7, 88)
49  PARIN

Grain oblate to prolate, semi-angular. Size variable. Sculpturing coarsely scabrate. Polar area small. Meridional colpus with slightly thickened margo. Transverse colpus indistinct. This type slightly resembles pollen from some species of Thea and Gordonia (Theaceae), Indigofera (Leguminosae).

Unknown 123 (Plate I.7, 89)
151  UK123

Grain oblate to prolate, inter-semi-angular. Max. diameter c. 16 μm. Sculpturing microreticulate, elements less than 1 μm in diameter. Columellae clearly visible in exine section. Meridional colpus constricted at equator although clear transverse aperture not visible in surface focus.

Unknown 221 (Plate I.7, 90)
152  UK221

Grain oblate, + sub-angular, c. 15 x 17 μm. Sculpturing coarsely scabrate, colpus area psilate. Polar area small. Porus + oval, equatorially elongated, extending to the margin of the meridional colpus.

Unknown 218 (Plate I.7, 91)
153  UK218


Tricolporate, Section C (undifferentiated)
154  3CPCU
8D. Tricolporate, larger than 15 μm, sculpturing reticulate

Vandasia T. (Leguminosae) (Plate I.7, 92)

Grain + circular in equatorial view, semi-angular in polar view. Max. diameter c. 16 μm. Sculpturing a small scale reticulum, with a psilate margo around the meridional colpus. Transverse colpus rectangular to oval, unpatterned. Morphologically similar grains occur in other genera of the Papilionatae, including Pterocarpus, Fueraria, and Tephrosia, and in some species of Ternstroemia (Theaceae).

cf. Sterculia edelfeltii (Sterculiaceae) (Plate I.7, 93,94)

Grain + spherical, diameter c. 18 μm. Reticulate sculpturing consisting of elongated elements of variable size. Transverse colpus + rectangular, patterned in surface focus.

Platea excelsa (Icacinaceae) (Plate I.7, 95)

Grain + spherical. Exine c. 2.5 μm thick, two layered, with clearly visible columellae. Reticulum breaks up into separate columellae in low focus. Transverse colpus + rectangular, indistinct in surface focus.

Melanolepis T. (Euphorbiaceae) (Plate I.7, 96,97,98)

Grain spherical to oblate, diameter c. 25 μm. Exine thick, sculpturing reticulate. Transverse colpus + rectangular, patterned in surface focus only. This type is found also in Bridelia and Cleistanthus, although the grains are usually slightly smaller. In some Bridelia spp., the muri are aligned to form 'pseudo-striations' sensu Punt (1962), whereas in Cleistanthus, the reticulum is less distinct.

Boerlagiodendron (Araliaceae) (Plate I.7, 99,100)

Grain angular to sub-angular, oblate. Sculpturing dimorphic: microreticulate around colpi and porae, and disjunctly reticulate between the colpi.
Morinda (Rubiaceae) (Plate I.7, 101)

123 MORIN

Oblate to spherical grain, size variable. Sculpturing reticulate, colpus area psilate. Porus large, ± circular with heavily thickened annulus.

Echium cf. plantagineum (Boraginaceae) (Plate I.8, 102)

116 ECHIP

Grain heteropolar, 'pear-shaped' c. 22 x 15 μm. Exine microreticulate. Porus oval, with slightly thickened annulus.

Evodia T. (Rutaceae) (Plate I.8, 103,104)

55 EVODI

Grain prolate c. 18 x 13 μm. Exine two-layered, evenly reticulate. Transverse colpus rectangular, unpatterned. This type includes E. xanthoxyloides and other Evodia spp., and some species of Melicope.

Aporosa (Euphorbiaceae) (Plate I.8, 105,106)

69 APORO

Grain inter-sub-angular, prolate to circular in equatorial view, size c. 18 x 14 μm. Exine finely reticulate. Transverse colpus narrow, slit-like, c. 6 μm in length.

?Leguminosae (Papilionatae) D (Plate I.8, 107,108)

51 LEGPD

Grains prolate, inter-sub-angular or inter-semi-lobate. Max. diameter 18-25 μm. Sculpturing distinctly microreticulate. Meridional colpus, long, constricted or distorted at equator by the transverse aperture. This type is found in genera of the Papilionatae such as Pueraria, and Gompholobium and in several species of Hypericum (Guttiferae).

Brachychiton T. (Sterculiaceae) (Plate I.8, 109)

88 BRACH

Grain prolate, size variable. Exine two layered; sculpturing reticulate; max. diameter of luminae c. 2 μm, smaller towards colpi. Meridional colpus unpatterned, sharply defined. Transverse aperture oval or rectangular. Grains of this type occur in some Brachychiton, Argyrodendron, Pterocymbium, and Sterculia species.
Microcos T. (Tiliaceae)  
86 MICRO  
Grain prolate to spherical, typically 21 x 14 µm. Reticulum similar to Trichospermum, but smaller scale, and more uniform in size. Transverse colpus wide but indistinct. Similar grains are produced by Columbia, and Grewia paniculata.

Trichospermum (Tiliaceae)  
87 TRICO  
Grain prolate c. 30 x 18 µm. Exine reticulate, largest diameter of luminae c. 2.5 µm, decreasing in size towards the colpi.

Rutaceae/Araliaceae T.  
54 RUTAR  
Grains prolate, usually 20 - 30 µm polar axis. Exine reticulate, often distinctly two layered. Meridional colpus clearly interrupted by transverse aperture, usually rectangular, which may be patterned in surface focus. A diverse type found in many genera including Evodiella, Acronychia and Flindersia (Rutaceae), and Schefflera and Harmsiopanax (Araliaceae).

Unknown 309  
155 UK309  
Grain slightly oblate, semi-angular, size c. 20 x 22 µm. Sculpturing finely reticulate, colpus area psilate. Porus oval, meridionally elongated, unpatterned.

Unknown 310  
156 UK310  
Grain ± spherical, diameter c. 40 µm. Max. exine thickness c. 2.5 µm. Sculpturing a reticulum consisting of ± circular elements. Colpus area psilate. Porus unpatterned, ± circular, without annulus, fully enclosed by colpus. Polar area small.

Tricolporate, Section D, (undifferentiated)  
157 3CPDU
8E. Tricolporate, larger than 15 µm. Other sculpturing configurations.

Anacardiaceae (Plate I.8, 116,117)
74 ANACA

Grains ± spherical with long meridional colpus and distinct + rectangular transverse colpus. Sculpturing faintly striate. Pollen similar to this type is produced by several genera of Anacardiaceae, including Euroschinus and Semecarpus.

cf. Vitex acuminata (Verbenaceae) (Plate I.9, 118)
118 VITEX

Grain prolate, inter-sub-angular, size c. 18 x 12 µm. Exine thick with strongly striate sculpturing. Transverse colpus + oval to rectangular. This type is very similar to V. acuminata, although is generally slightly smaller, and has more pronounced sculpturing. Slightly similar striate grains are found in several genera of the Anacardiaceae.

Ganophyllum falcatum (Sapindaceae) (Plate I.9, 119,120)
82 GANOP

Grain ± spherical to prolate. Size variable, polar axis c. 12 - 16 µm. Exine sparsely covered with minute verrucate or baculate elements less than 1 µm in height. Porus ± circular, patterned in surface focus.

Trichadenia philippinensis (Flacourtiaceae) (Plate I.9, 121)
95 TRICA

Grain spherical to prolate, c. 23 x 20 µm, size variable. Sculpturing dimorphic; ± regularly arranged gemmae, c. 2 - 3 µm in width interspersed with smaller (less than 1 µm) gemmate elements.

Compositae (Tubuliflorae) (Plate I.9, 122)
126 COMPT

Grains usually oblate to spherical, size variable. Exine thick, with echinate sculpturing of variable size and density. An unpatterned, usually circular, porus may be visible. This type includes the majority of genera in the Tubuliflorae sub-family.

Tricolporate, Section E, (undifferentiated)
158 3CPEU
9. STEPHANOCOLPORATE

*Acalypha* (Euphorbiaceae)  (Plate I.9, 123)

Grain circular to oblate, 3- or 4-colporate. Colpus very short, often indistinct. Exine scabrate. Porus ± circular, with irregular annulus, slightly protruding in polar view.

*Quintinia* (Saxifragaceae)  (Plate I.9, 124,125)

Grain prolate, 5-colporate, c. 15 x 13 μm. Exine thick, psilate to slightly scabrate. Colpus interrupted at equator, although clear porus not always visible in surface focus.

*Claoxylon* (Euphorbiaceae)  (Plate I.9, 126)

Grain prolate, 4- or 3-colporate. Exine faintly reticulate, transverse colpus indistinct.

*Phyllanthus cf. urinaria* (Euphorbiaceae)  (Plate I.9, 127,128)

Grain prolate, 21 x 14 μm, 5-colporate, or 3-colporate. Exine thick, c. 2.5 μm, columellae visible in optical section, strongly reticulate. Colpus straight, porus small, circular, patterned in top focus only. This type closely resembles *Phyllanthus urinaria* although the slide in the ANU collection has predominantly 4-colporate grains. Punt and Rentrop (1973) describe a similar 5-colporate morphology for *P. caroliniensis*.

*Glochidion T.* (Euphorbiaceae)  (Plate I.9, 129)

Grain 4-colporate or 4-colpate, usually prolate, circular in polar view. Exine c. 3 μm thick, with reticulate sculpturing; diameter of luminae up to 2 μm. Colpus straight, very distinct, small circular porus sometimes visible. Closely similar types are found in some *Phyllanthus* spp.
10. PERICOLPATE/COLPORATE

?Evolvulus (Convolvulaceae) (Plate I.9, 131)
115 EVOLV

Grain + spherical, diameter c. 21 μm, with six short colpi. Exine minutely baculate in surface focus, becoming scabrate to reticulate in low focus. Colpus patterned in surface focus. This type slightly resembles Evolvulus, and some Merremia spp. (Convolvulaceae), although these are generally larger than 30 μm in diameter, and have a less complex exine pattern.

?Euphorbiaceae (Plate I.9, 132)
57 EUPHO

Grain 5- or 6-colporate, reticulate. Transverse colpus and sculpturing similar to some euphorbiaceous taxa such as Claoxylon.

11. DIPORATE

Urticaceae/Moraceae (diporate) (Plate I.9, 133)
30 URMO2

Grain + circular in polar view, oval in equatorial view. Psilate or scabrate. Porus small with thickened annulus. Includes the genera Elatostema, Debregeasia, Laportia and Cypholophus (Urticaceae) and Maclura and Malaisia (Moraceae).
**Pilea T.** (Urticaceae)  
(Plate I.9, 134)

33  PILEA

Grain oval in both polar and equatorial view. Psilate or faintly scabrate. Small, circular porus with annulus. Small proportions of this type are produced by other genera of Urticaceae.

**Streblus T.** (Moraceae)  
(Plate I.9, 135)

32  STREB

Grain oval in polar view. Exine scabrate, porus circular without annulus. This type also includes *Antiaris*.

**Trema** (Ulmaceae)  
(Plate I.9, 136)

28  TREMA

Grain circular or oval in polar view. Sculpturing unevenly scabrate, with columnellae visible in optical cross-section. Porus circular with slightly thickened annulus.

**Sphenostemon cf. papuanum** (Aquifoliaceae)  
(Plate I.9, 137)

77  SPHEN

Grain diporate or triporate; depressed oval shape in equatorial view. Exine reticulate with two distinct layers. Porus un-patterned, circular, without annulus.

**Polyporandra scandens** (Icacinaceae)  
(Plate I.9, 138)

78  POLYP

Oblate grain with sparse echinae. Porus circular with thickened annulus. Size c. 16 x 18 μm.

**Alyxia** (Apocynaceae)  
(Plate I.10, 139)

114  ALYXI

Asymmetrical plano-convex grain. Exine reticulate; porus circular, very large.

**Unknown 279**  
(Plate I.10, 140)

161  UK279

Reticulate grain with distinctly two-layered exine. Porus circular with annulus.
Diporate (undifferentiated)
162 DIPOU

12. TRIPORATE

Urticaceae/Moraceae (Triporate) (Plate I.10, 141)
31 URM03

Grain circular in polar view. Exine psilate or scabrate, porus small with thickened annulus. Type includes Elatostema, Pipturus, and Pouzolzia (Urticaceae) and Morus and Malaisia (Moraceae).

Stemonurus (Icacinaceae) (Plate I.10, 142)
79 STEM0

Oblate semi-angular grain, psilate or faintly scabrate. Exine thickened around edge of porus in optical section. Equatorial diameter c. 12 μm.

Helicia (Proteaceae) (Plate I.10, 143)
34 HELIC

Oblate angular grain with protruding vestibulate porae. Sculpturing scabrate; size 10 x 19 μm.

Celtis (Ulmaceae) (Plate I.10, 144)
27 CELTI

Grain + circular in polar view, oblate. Sculpturing coarsely scabrate, columellae distinctly visible in optical cross-section. Porus circular with thickened annulus, sometimes slightly protruding. Max. diameter typically 15 - 17 μm.

cf. Engelhardtia (Juglandaceae) (Plate I.10, 145)
24 ENGEL

Grain oblate + circular in polar view with scabrate to faintly microreticulate sculpturing. Porus indistinct, not protruding. Equatorial diameter c. 18 μm.
Casuarina (Casuarinaceae) (Plate I.10, 146)
23 CASUA

Spherical, or oblate grain with protruding porae. Exine generally + scabrate. Equatorial diameter typically 25 μm, and not usually less than 20 μm.

Halaragis (Halaragaceae) (Plate I.10, 147)
103 HALOR

Oblate grain, circular in polar view. Oval or slit-like porus (or colpus), protruding. The Halaragis spp. in the ANU reference collection are predominantly 4- or 5-stephanoporate or colpate.

Polyosma (Saxifragaceae) (Plate I.10, 148,149)
45 POLYO

Oblate + circular grain with protruding porae. Exine psilate or faintly scabrate, except around porus where it is unevenly reticulate and thickened. Porus + round, with diffuse margin.

Sonneratia caseolaris (Sonneratiaceae) (Plate I.10, 150,151, 152)
97 SONNE

Prolate grain with protruding porae and dimorphic sculpturing. An equatorial band is finely verrucate, whilst the polar caps are psilate or scabrate. This type corresponds to several of the S. caseolaris sub-types proposed by Muller (1969), but is considerably smaller than any, with a polar axis 32 -38 μm in length. The pollen is identical in morphology and size to that of Havel and Kairo's collection from Labu Swamp (NGF 17198).

Stephania japonica T. (Menispermaceae) (Plate I.10, 153)
38 STEPJ

Oblate, semi-angular grain with a thick reticulate exine. Porus not very distinct in equatorial view. Size typically 11 x 13 μm. This type includes S. hernandifolia. S. erecta is 4-porate.

Kleinhovia hospita (Sterculiaceae) (Plate I.11, 154)
89 KLEIN

Semi-angular, oblate grain, typically 7 x 18 μm in size. Distinctly or faintly reticulate sculpturing, with columnellae visible in exine optical section. Porus sometimes protruding, or almost vestibulate.
cf. Sterculia (Sterculiaceae) (Plate I.11, 155)

90 STERC

Grain ± circular, oblate, max. diameter c. 17 - 20 µm. Exine thick, sculpturing reticulate, with luminae of varying size and shape, often elongated. Porus ± circular, indistinct in surface focus, without annulus. This type is very similar to the pollen of a Sterculia sp. (Craven and Schodde coll. no. 1388) from Morobe Province.

Symplocos (Symplocaceae) (Plate I.11, 156)

111 SYMPL

Semi-angular, oblate grain with slightly protruding porae. Exine sculpturing sparsely echinate. Similar to New Guinea Symplocos spp.

Unknown 147 (Plate I.11, 157)

163 UK147

Spherical to oblate grain with thick reticulate exine. Porus + circular with thickened annulus.

Triporate (undifferentiated)

164 TRIFU

13. STEPHANOPORATE

cf. Aphananthe (Ulmaceae) (Plate I.11, 158)

29 APHAN

Oblate grain c. 20 x 26 µm. Exine faintly scabrate. Four small, circular porae, unpatterned, with slight annulus.

Stephanoporate (undifferentiated)

165 STEPU
14. **PERIPORATE**

*Plantago* (Plantaginaceae)  
120  **PLANT**

Spherical grain with 8 to 13 porae. Scabrate to faintly reticulate sculpturing. Porus circular, unpatterned, with a narrow annulus.

cf. *Trimenia* (Monimiaceae)  
42  **TRIME**

Grain with about 8 porae. Exine thick, coarsely scabrate. Porus + circular, unpatterned, without annulus.

Unknown 290  
166  **UK290**

Grain c. 15 - 18 μm in diameter, with 5 to 7 porae. Exine coarsely scabrate.

15. **SYNCOLPATE AND SYNCOLPORATE**

15A. Syncolpate

*Tinospora* (Menispermaceae)  
40  **TINOS**

Inter-sub-angular grain with thick, reticulate exine. Circular to prolate in equatorial view, diameter c. 20 μm.

*Barringtonia T.* (Barringtoniaceae)  
98  **BARRI**

Grain with thick + psilate exine, often becoming reticulate towards the colpi. Circular to prolate in equatorial view, size variable, typically 40 x 30 μm. *Planchonia* is similar.

*Nymphoides* (Gentianaceae)  
113  **NYMPH**

Oblate semi-angular grain, sparsely scabrate, with distinct 'island' at pole. Size variable, typically 20 x 28 μm.
15B. Syncolporate

**Tristiropsis T. (Sapindaceae)**

(Oblate semi-lobate grain. Scabrate or microreticulate with distinct, patterned 'island' at pole. Grain oval in equatorial view, with colpi appearing arcate. Large circular porus.)

Myrtaceae

(Oblate semi-angular, semi-lobate, or sub-angular. Depressed oval shape in equatorial view. Small transverse colpus. Size and sculpturing very variable.)

16. **HETEROCOLPORATE**

*Poikilogyne T. (Melastomataceae)*

(Grains spherical to slightly prolate. Tricolporate with three intervening, less indented 'pseudo-colpi'. Sculpturing psilate to scabrate. Porus usually distinct + rectangular. Although not very distinct. This type also includes Beccarianthus, Medinella, Everettia, Sonerila, Marumia, and probably other melastomataceous genera.)

Combretaceae/Melastomataceae

(Grain prolate, tricolporate with intervening 'pseudo-colpi' as indented as the compound colpi. Porus usually distinct + rectangular. Sculpturing psilate to scabrate. This type includes Combretum and Terminalia (Combretaceae) and also some genera or species of Melastomataceae, notably Melastoma affine, and some Osbeckia grains.)

17. **TETRAD**

*Gardenia (Rubiaceae)*

(Psilate grain with tetrad diameter of c. 40 \(\mu m\). Porus circular with thickened annulus.)
Epacridaceae

105  EPACR

(Plate I.12, 175)

Exine sculpturing psilate to scabrate. Tetrad diameter usually less than 40 μm. This type may include some genera of Ericaceae such as Vaccinium and Diplocosia.

Drimys T. (Winteraceae)

94  DRIMY

(Plate I.12, 176)

Compact tetrad with a diameter of 20 - 30 μm. Exine thick, with large reticulate sculpturing. Bubbia is similar.

Nepenthes (Nepenthaceae)

43  NEPEN

(Plate I.12, 177)

Tetrad of sparsely echinate spheroidal monads.

18. MONOLETE SPORES

Monolete psilate spore (smaller than 30 μm)

189  MONLS

(Plate I.12, 178)

Spores without perisporium, or psilate or only faintly sculptured, less than 30 μm in length. This type is found in many Polypodiaceae sensu lato, including Nephrolepis, Cystodium, Cyclosorus, Thelypteris, Asplenium, Lastreopsis, Tectaria and Blechnum.

Monolete psilate spore (larger than 30 μm)

190  MONLL

(Plate I.12, 179)

Similar to previous type, but with a max. dimension exceeding 30 μm. Many genera fall into this group, some of the more common being Hypolepis, Nephrolepis, Arthropteris, Gleichenia, Cyclosorus, Athyrium, Stenolepis, Lomariopsis and Blechnum.

Microsorium T. (Polypodiaceae)

188  MICSO

(Plate I.12, 179)

Concavo-convex spore with thick exine. Sculpturing is scabrate to faintly reticulate. Size measurements (ANU 21014)

Equatorial: Range 34-54 μm, Mean 44.8 μm, S.D. 4 μm
Polar: Range 20 - 38.5 μm, Mean 28.5 μm, S.D. 3.8 μm.
Nephrolepis (Oleandraceae)  
176  NEPHR  
(Plate I.13, 180)

Slightly concavo-convex, or plano-convex. Thick exine, sculpturing punctate to unevenly reticulate. Size measurements (ANU 21015)  
Equatorial: Range 27 - 36.5 μm, Mean 31.5 μm, S.D. 2 μm  
Polar: Range 13.5 - 21 μm, Mean 16.5 μm, S.D. 1.7 μm.

Cyclosorus T. (Thelypteridaceae)  
181  CYCLO  
(Plate I.13, 181)

Plano-convex to slightly concavo-convex spore. Max. dimension 35-50 μm. Perisporium sculpturing coarsely scabrate, or verrucate. Similar spores occur in some Athyrium spp.

Histiopteris incisa T. (Dennstaedtiaceae)  
174  HISTI  
(Plate I.13, 182)

Plano-convex or concavo-convex spore with large scale, unevenly distributed verrucate sculpturing. Size typically 35 x 25 μm. Belvisia is similar, but larger.

Davallia T. (Davalliaceae)  
175  DAVAL  
(Plate I.13, 183)

Large plano- or concavo-convex spore. Thick exine with rounded, discrete, and regularly distributed verrucae. This type includes other Davalliaceae such as Scyphularia and Humata.

Stenochlaena palustris (Blechnaceae)  
187  STENO  
(Plate I.13, 184)

Biconvex or plano-convex spore. Distinctive sculpturing of sparse, rounded triangular verrucae. Size measurements (ANU 21045)  
Equatorial: Range 36 - 47 μm, Mean 42 μm, S.D. 2.5 μm  
Polar: Range 20.5 - 30 μm, Mean 25 μm, S.D. 2.2 μm.

cf. Tectaria (Aspidaceae)  
184  TECTA  
(Plate I.13, 185)

Small spore, c. 31 x 20 μm. Thick perisporium with verrucate ridges.
Stenochlaena laurifolia (Blechnaceae) (Plate I.13, 186)

Distinctive plano-convex or concavo-convex spore c. 45 x 28 μm. Sculpturing of large verrucae aligned in ridges, ± parallel to the equatorial axis.

Asplenium T. (Aspleniaceae) (Plate I.13, 187)

Spores with a distinct, thin, folded or lightly sculptured perisporium. A large and diverse type including, as well as Aspleniaceae, many Dennstaedtiaceae, Aspidaceae, and Blechnaceae.

?Arthropteris cf. tenella (Oleandraceae) (Plate I.14, 188)

Spore with thin perisporium formed into long (15 μm) echinate projections. This type may also occur in other families, in particular Aspleniaceae.

cf. Cyclosorus archboldiana T. (Thelypteridaceae) (Plate I.14, 189)

Concavo-convex spore. Perisporium covered with sparse echinae, c. 3 μm in length. Similar echinate types occur in C. unitus, Drynaria, and baculate types in Drynaria and Selliguea.

Cyclosorus truncatus T. (Thelypteridaceae) (Plate I.14, 190)

Spore with dense, curved triangular echinae. Slightly similar types occur in other Cyclosorus spp.

cf. Stenochlaena areolaris (Blechnaceae) (Plate I.14, 191)

Identification based on descriptions by Holttum (1932) and Anderson and Muller (1975). Large spore 80 x 45 μm, with sparse echinae up to 12 μm in length.

Unknown 19 (Plate I.14, 192)

Monolete spores (undifferentiated)

193 MONLU

19. TRILETE SPORES

cf. *Adiantum diaphanum* T. (Adiantaceae)  (Plate I.14, 193)

173 ADIAN

Spore with distinct, but faint, reticulate pattern, and wide, unthickened tri-radiate scar. Max. dimension c. 32 µm. Many other genera produce morphologically very similar spores.

Cyatheaceae 1  (Plate I.14, 194)

178 CYAT1

Psilate spore of diverse shape, thick unpatterned exine. Perisporium absent, or psilate. Equatorial diameter c. 35 – 40 µm.

Cyatheaceae 2  (Plate I.15, 195, 196)

179 CYAT2

Psilate spore with loose, patterned perisporium. Sculpturing often papillate or striate, and denser on the distal surface. Size similar to psilate Cyatheaceae. Spores of this morphology are not well represented in the ANU reference collection, but have been described by Harris (1955), Tindale (1956), and Murillo and Bless (1974).

*Lycopodium cernuum* T. (Lycopodiaceae)  (Plate I.15, 197)

167 LYCO

Small spore c. 25 x 10 µm. Thin tri-radiate scar. Rugulate sculpturing on distal surface.

*Lycopodium squarrosum* T. (Lycopodiaceae)  (Plate I.15, 198)

169 LYCO

Spore c. 45 µm equatorial diameter with thin trilete scar. Thick unpatterned exine, psilate on proximal surface, sparsely foveolate on distal surface. Similar spores occur in *L. macygregorii* and *L. apiculata*. 
Lycopodium cf. volubile T. (Lycopodiaceae) (Plate I.15, 199)
168  LYCOV

Spore circular in polar view. Loose, reticulate perisporeum. Similar types are found in other Lycopodium spp., including L. fastigatum and L. complanatum.

Pteris (Pteridaceae) (Plate I.15, 200)
172  PTERI

Spore triangular in polar view, with thick (c. 5 μm) exine. Thickened trilete scar. Psilate on proximal surface, some degree of verrucate patterning on the distal surface. The type occurs in many New Guinea Pteris spp., although not in P. molluccana.

cf. Anemia hirsuta (Schizeaceae) (Plate I.15, 201,202)
171  ANEMI

A very large spore, equatorial diameter c. 100 μm. Thick striations or ridges parallel the scar and the equatorial axis.

Lygodium microphyllum T. (Schizeaceae) (Plate I.16, 203)
170  LYGOD

Spore triangular to circular in polar view, with distinctive foveo-reticulate exine. Size variable, equatorial diameter c. 55 – 90 μm.

Unknown 312 (Plate I.16, 204)
194  UK312

Spore triangular in polar view with sparsely verrucate perisporeum. Long, thin trilete scar. Equatorial diameter c. 28 μm.

Unknown 170 (Plate I.16, 205)
195  UK170


Unknown 172 (Plate I.16, 206)
196  UK172

Large spore, triangular in polar view with loose, faintly reticulate perisporeum.
Trilete ferns (undifferentiated)
197 TRILU

UNCATEGORISED PALYNOMORPHS
198 UNCAT

Palynomorphs unable to be assigned with certainty to any of the above 19 morphological categories.

INDETERMINABLE PALYNOMORPHS
199 INDET

Pollen or spores too corroded or degraded (sensu Cushing, 1964) to describe adequately the morphological features, or those too crumpled, fragmented or obscured by immovable debris to identify.

NOTES ON THE PHOTOMICROGRAPHS

All photomicrographs of pollen and spore taxa are reproduced at a magnification of X 1000. The scale at the foot of each plate represents 50 μm. As all photographs are of sub-fossil specimens, or those from contemporary surface samples, extraneous debris is occasionally visible. Each number represents a different grain, whilst views of the same individual are indicated by the suffix a,b, etc. Also indicated is the sample from which the illustrated grain was recovered.
<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Code/Measurement</th>
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<tbody>
<tr>
<td>1a, b</td>
<td><em>Phyllocladus</em> (Podocarpaceae)</td>
<td>YAN 2, 990 cm</td>
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<tr>
<td>2,3</td>
<td><em>Podocarpus</em> (Podocarpaceae)</td>
<td>YAN 2, 476 cm</td>
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<td>4</td>
<td><em>Dacrycarpus</em> T. (Podocarpaceae)</td>
<td>YAN 2, 830 cm</td>
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<tr>
<td>5</td>
<td>cf. <em>Cananga odorata</em> (Annonaceae)</td>
<td>SS 18</td>
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<tr>
<td>6a, b, c</td>
<td>cf. <em>Gnetum</em> (Gnetaceae)</td>
<td>SS 13-15</td>
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<td>7a, b, c</td>
<td><em>Pandanus radula</em> T. (Pandanaceae)</td>
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<tr>
<td>8a, b</td>
<td>cf. <em>Colocasia</em> (Araceae)</td>
<td>LW II, 1930 cm</td>
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<td>9</td>
<td>Unknown</td>
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<tr>
<td>10</td>
<td>?<em>Normanbya</em> T. (Palmae)</td>
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<tr>
<td>11a, b</td>
<td>cf. <em>Liliaceae</em></td>
<td>YAN 2, 160 cm</td>
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<td>Plate 1.2</td>
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<td>12a,b</td>
<td>?Palmae</td>
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<td>13a,b</td>
<td>cf. Arenga (Palmae)</td>
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<td>14a,b</td>
<td>Unknown 156</td>
<td>YAN 2, 1150 cm</td>
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<td>15a,b</td>
<td>Gramineae 3</td>
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<tr>
<td>16a,b</td>
<td>Gramineae 5</td>
<td>LW II, 1490 cm</td>
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<tr>
<td>17a,b</td>
<td>Flagellaria (Flagellariaceae)</td>
<td>YAN 2, 160 cm</td>
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<tr>
<td>18a,b,c</td>
<td><em>Sparganium antipodum</em> T. (Sparganiaceae)</td>
<td>LW II, 1970 cm</td>
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<td>19</td>
<td>Typha (Typhaceae)</td>
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<td>20a,b</td>
<td>Unknown 292</td>
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<tr>
<td>21a,b,c</td>
<td><em>Hypolytrum nemorum</em> T. (Cyperaceae)</td>
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<tr>
<td>22</td>
<td>Cyperaceae A1</td>
<td>SS 23</td>
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<tr>
<td>23</td>
<td>Cyperaceae B2</td>
<td>YAN 2, 870 cm</td>
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<tr>
<td>24a,b</td>
<td>Calamus (Palmae)</td>
<td>YANMC 1 SS</td>
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<tr>
<td>25a,b</td>
<td>?Metroxylon sagu (Palmae)</td>
<td>YAN 2, 920 cm</td>
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<td>Species</td>
<td>Volume, Length</td>
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<td>26a,b</td>
<td><em>Anisoptera</em> T. (Dipterocarpaeae)</td>
<td>YAN 2, 320 cm</td>
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<tr>
<td>27a,b</td>
<td><em>Anisoptera</em> T. (Dipterocarpaeae)</td>
<td>LW II, 1890 cm</td>
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<tr>
<td>28a,b</td>
<td><em>Dysophylla</em> T. (Labiatae)</td>
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<td>29</td>
<td><em>Dysophylla</em> T. (Labiatae)</td>
<td>LW II, 1907 cm</td>
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<tr>
<td>30a,b,c</td>
<td>cf. Verbenaceae/Bignoniaceae</td>
<td>YAN 2, 200 cm</td>
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<td>31a,b,c</td>
<td><em>Timonius</em> T. (Rubiaceae)</td>
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<td>32a,b</td>
<td><em>Nelumbo nucifera</em> (Nymphaeae)</td>
<td>LW II, 685 cm</td>
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<td>PLATE I.4</td>
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<td>33a,b,c,</td>
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<tr>
<td>34a,b</td>
<td><em>Ilex</em> (Aquifoliaceae)</td>
<td>LW II, 1530 cm</td>
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<td>35a,b</td>
<td><em>Endospermum</em> (Euphorbiaceae)</td>
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<td>36a,b</td>
<td>Unknown 235</td>
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<tr>
<td>37a,b</td>
<td>Unknown 293</td>
<td>PT 1</td>
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<tr>
<td>38a,b</td>
<td>cf. <em>Myrsine</em> T. (Myrsinaceae)</td>
<td>SQ 40</td>
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<td>39</td>
<td>cf. <em>Myrsine</em> T. (Myrsinaceae)</td>
<td>YAN 2, 1030 cm</td>
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<tr>
<td>40a,b,c</td>
<td><em>Nothofagus</em> (Fagaceae)</td>
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<td>41a,b,c</td>
<td><em>Elaeocarpus</em> T. (Elaeocarpaceae)</td>
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<td>42a,b,c,d</td>
<td><em>Octomeles sumatrana</em></td>
<td>LW II, 1980 cm</td>
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<td>(Datiscaceae)</td>
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<td>43a,b,c</td>
<td><em>Macaranga ovatifolia</em> T.</td>
<td>PT 1</td>
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<tr>
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<td>(Euphorbiaceae)</td>
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<tr>
<td>44a,b,c,d</td>
<td><em>Macaranga</em> (Euphorbiaceae)</td>
<td>LW II, 1490 cm</td>
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<td>45a,b</td>
<td><em>Macaranga</em> (Euphorbiaceae)</td>
<td>LW II, 730 cm</td>
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<tr>
<td>46a,b</td>
<td>Rhamnaceae</td>
<td>YAN 2, 400 cm</td>
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<tr>
<td>47a,b</td>
<td>Rhamnaceae</td>
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PLATE I.5

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<th>Measurement</th>
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<tr>
<td>48a,b,c</td>
<td><em>Spiraeopsis</em> T. (Cunoniaceae)</td>
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</tr>
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<td>49a,b</td>
<td><em>Weinmannia</em> T. (Cunoniaceae)</td>
<td>PT 1</td>
</tr>
<tr>
<td>50a,b,c</td>
<td><em>Hypserpa</em> (Menispermaceae)</td>
<td>LW II, 1610 cm</td>
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<td>51</td>
<td><em>Uncaria</em> T. (Rubiaceae)</td>
<td>LW II, 1530 cm</td>
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<tr>
<td>52</td>
<td><em>Uncaria</em> T. (Rubiaceae)</td>
<td>SQ 40</td>
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<tr>
<td>53a,b,c</td>
<td><em>Nauclea</em> T. (Rubiaceae)</td>
<td>LW II, 1490 cm</td>
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<tr>
<td>54a,b,c</td>
<td><em>Tetracera</em> T. (Dilleniaceae)</td>
<td>PT 1</td>
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<td>55a,b,c,d</td>
<td><em>Olea</em> (Oleaceae)</td>
<td>YAN 2, 1070 cm</td>
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<tr>
<td>56</td>
<td><em>Rapanea</em> cf. <em>achradaefolia</em> T. (Myrsinaceae)</td>
<td>YAN 2, 830 cm</td>
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<tr>
<td>57a,b</td>
<td>Unknown 194</td>
<td>YAN 2, 160 cm</td>
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<td>58</td>
<td>Unknown 109</td>
<td>LW II, 1970 cm</td>
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<tr>
<td>59a,b</td>
<td>Unknown 104</td>
<td>LW II, 1970 cm</td>
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<tr>
<td>60a,b,c,d</td>
<td>Unknown 60</td>
<td>LW II, 1770 cm</td>
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<td>61a,b, 62</td>
<td><em>Castanopsis</em> T. (Fagaceae)</td>
<td>PT 1</td>
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<tr>
<td>63a,b,c</td>
<td><em>Rhizophora apiculata</em> T. (Rhizophoraceae)</td>
<td>LW II, 790 cm</td>
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<tr>
<td>64a,b,c</td>
<td>cf. <em>Crotalaria</em> T. (Leguminosae)</td>
<td>LW II, 685 cm</td>
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<tr>
<td>65a,b</td>
<td>?Leguminosae (Papilionatae) B</td>
<td>YAN 2, 240 cm</td>
</tr>
<tr>
<td>66a,b,c,d,e</td>
<td>cf. <em>Bischofia</em> (Euphorbiaceae)</td>
<td>LW II, 685 cm</td>
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<tr>
<td>67</td>
<td>cf. <em>Bischofia</em> (Euphorbiaceae)</td>
<td>YAN 2, 990 cm</td>
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### PLATE I.6

<table>
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<tr>
<th>Plate</th>
<th>Specimen Description</th>
<th>Measurements</th>
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<tr>
<td>68</td>
<td>Antidesma (Euphorbiaceae)</td>
<td>LWMC 3 SS</td>
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<tr>
<td>69a,b</td>
<td>Antidesma (Euphorbiaceae)</td>
<td>YAN 2, 910 cm</td>
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<tr>
<td>70a,b,c</td>
<td>Euphorbia hirta T. (Euphorbiaceae)</td>
<td>LW II, 730 cm</td>
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<tr>
<td>71a,b</td>
<td>cf. Euphorbia (Euphorbiaceae)</td>
<td>LW II, 790 cm</td>
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<tr>
<td>72a,b,c</td>
<td>Rhus T. (Anacardiaceae)</td>
<td>YAN 2, 670 cm</td>
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<tr>
<td>73a,b,c</td>
<td>Diospyros cf. ferrea (Ebenaceae)</td>
<td>SS 18</td>
</tr>
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<td>74</td>
<td>Planchonella T. (Sapotaceae)</td>
<td>LW II, 1810 cm</td>
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<td>75</td>
<td>Planchonella T. (Sapotaceae)</td>
<td>PT 4</td>
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<tr>
<td>76</td>
<td>cf. Palaquim (Sapotaceae)</td>
<td>YANMC 1 SS</td>
</tr>
<tr>
<td>77a,b</td>
<td>Unknown 79</td>
<td>LW II, 790 cm</td>
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<tr>
<td>78</td>
<td>Unknown 79</td>
<td>LW II, 730 cm</td>
</tr>
<tr>
<td>79a,b</td>
<td>Unknown 119</td>
<td>LW II, 1346 cm</td>
</tr>
<tr>
<td>80a,b</td>
<td>Unknown 174</td>
<td>YAN 2, 1030 cm</td>
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<tr>
<td>81a,b,c</td>
<td>cf. Euphorbiaceae</td>
<td>LW II, 1930 cm</td>
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<tr>
<td>82a,b,c</td>
<td>Mallotus T. (Euphorbiaceae)</td>
<td>LW II, 790 cm</td>
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<tr>
<td>83a,b</td>
<td>Cleidion T. (Euphorbiaceae)</td>
<td>YAN 2, 670 cm</td>
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<td>84a,b,c</td>
<td>cf. Muehlenbeckia (Polygonaceae)</td>
<td>LW II, 1346 cm</td>
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PLATE I.7

85a,b,c  cf. *Rumex brownii* (Polygonaceae)  YAN 2, 830 cm
86  *Dodonaea* (Sapindaceae)  YAN 2, 240 cm
87a,b  *Acaena* (Rosaceae)  YAN 2, 910 cm
88a,b  ?*Parinari* (Rosaceae)  PT 1
89a,b,c  Unknown 123  LW II, 1310 cm
90a,b  Unknown 221  YAN 2, 400 cm
91a,b  Unknown 218  YAN 2, 400 cm
92a,b,c  *Vandasia T.* (Leguminosae)  PT 5
93  cf. *Sterculia edelfeltii* (Sterculiaceae)  YAN 2, 1030 cm
94a,b  cf. *Sterculia edelfeltii* (Sterculiaceae)  YAN 2, 320 cm
95a,b,c  *Platea excelsa* (Icacinaceae)  PT 1
96a,b,c  *Melanolepis T.* (Euphorbiaceae)  PT 5
97  *Melanolepis T.* (Euphorbiaceae)  YAN 2, 320 cm
98  *Melanalepis T.* (Euphorbiaceae)  PT 5
99a,b  *Boerlagiodendron* (Araliaceae)  YAN 2, 910 cm
100  *Boerlagiodendron* (Araliaceae)  YAN 2, 670 cm
101a,b  *Morinda* (Rubiaceae)  YAN 2, 240 cm
| 102 | *Echium cf. plantagineum* (Boraginaceae) | YAN 2, 476 cm |
| 103a,b | *Evodia T.* (Rutaceae) | YAN 2, 870 cm |
| 104a,b | *Evodia T.* (Rutaceae) | SS 20 |
| 105 | *Aporosa* (Euphorbiaceae) | PT 4 |
| 106a,b | *Aporosa* (Euphorbiaceae) | PT 1 |
| 107 | *?Leguminosae (Papilionatae)* D | LW II, 1730 cm |
| 108a,b | *?Leguminosae (Papilionatae)* D | YAN 2, 1030 cm |
| 109a,b | *Brachychiton T.* (Sterculiaceae) | LW II, 1770 cm |
| 110 | *Microcos T.* (Tiliaceae) | LW II, 1770 cm |
| 111a,b,c | *Trichospermum* (Tiliaceae) | LW II, 1730 cm |
| 112 | *Rutaceae/Araliaceae T.* | YAN 2, 400 cm |
| 113a,b | *Rutaceae/Araliaceae T.* | YAN 2, 1150 cm |
| 114a,b,c | Unknown 309 | YANMC 1 SS |
| 115a,b | Unknown 310 | YANMC 1 SS |
| 116 | *Anacardiaceae* | YAN 2, 1030 cm |
| 117 | *Anacardiaceae* | PT 1 |
PLATE I.9

118a,b,c  cf. Vitex acuminata (Verbenaceae) LW II, 685 cm

119a,b  Ganophyllum falcatum (Sapindaceae) PT 4

120  Ganophyllum falcatum (Sapindaceae) PT 5

121a,b,c  Trichadenia philippinensis (Flacourtiaceae) LW II, 1610 cm

122a,b  Compositae (Tubuliflorae) LW II, 910 cm

123a,b  Acalypha (Euphorbiaceae) LW II, 910 cm

124  Quintinia (Saxifragaceae) YAN 2, 200 cm

125  Quintinia (Saxifragaceae) YAN 2, 1030 cm

126a,b  Claoxylon (Euphorbiaceae) YAN 2, 790 cm

127a,b  Phyllanthus cf. urinaria (Euphorbiaceae) LW II, 1490 cm

128  Phyllanthus cf. urinaria (Euphorbiaceae) LW II, 1490 cm

129a,b,c  Glochidion T. (Euphorbiaceae) LW II, 910 cm

130a,b,c  Unknown 106 SS 22

131a,b  ?Evolvulus (Convolvulaceae) YANMC 1 SS

132  ?Euphorbiaceae YAN 2, 870 cm

133  Urticaceae/Moraceae (diporate) YAN 2, 120 cm

134  Pilea T. (Urticaceae) SS 18

135a,b  Streblus T. (Moraceae) LW II, 1970 cm

136a,b  Trema (Ulmaceae) LW II, 1490 cm

137a,b  Sphenostemon cf. papuanum (Aquifoliaceae) SS 22

138a,b  Polyporandra scandens (Icacinaceae) SS 20
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<td>Urticaceae/Moraceae (triporate)</td>
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<td>Stemonurus (Icacinaceae)</td>
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<td>143a,b</td>
<td>Helicia (Proteaceae)</td>
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<td>Celtis (Ulmaceae)</td>
<td>YAN 2, 950 cm</td>
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<td>145a,b</td>
<td>cf. Engelhardtia (Juglandaceae)</td>
<td>LW II, 1010 cm</td>
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<td>Casuarina (Casuarinaceae)</td>
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<td>147a,b</td>
<td>Haloragis (Haloragaceae)</td>
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<td>Polyosma (Saxifragaceae)</td>
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<td>149</td>
<td>Polyosma (Saxifragaceae)</td>
<td>PT 1</td>
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<td>Sonneratia caseolaris (Sonneratiaceae)</td>
<td>LW II, 1980 cm</td>
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<td>Sonneratia caseolaris (Sonneratiaceae)</td>
<td>LW II, 790 cm</td>
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<td>152</td>
<td>Sonneratia caseolaris (Sonneratiaceae)</td>
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<td>153a,b,c</td>
<td>Stephania japonica (Menispermaceae)</td>
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<td>PLATE I.11</td>
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<td>154a,b,c</td>
<td>Kleinhovia hospita (Sterculiaceae) PT 4</td>
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<td>155a,b</td>
<td>cf. Sterculia (Sterculiaceae) PT 5</td>
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<td>156a,b</td>
<td>Symlocos (Symplocaceae) YAN 2, 1030 cm</td>
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<td>157a,b</td>
<td>Unknown 147 YAN 2, 240 cm</td>
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<td>158a,b</td>
<td>cf. Aphananthe (Ulmaceae) YAN 2, 990 cm</td>
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<td>159</td>
<td>Plantago (Plantaginaceae) YAN 2, 560 cm</td>
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<td>Plantago (Plantaginaceae) LW II, 870 cm</td>
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<td>161a,b</td>
<td>cf. Trimenia (Monimiaceae) LWMC 3 SS</td>
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<td>162</td>
<td>Unknown 290 PT 1</td>
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<td>163a,b,c</td>
<td>Tinospora (Menispermaceae) PT 4</td>
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<td>164a,b</td>
<td>Barringtonia T. (Barringtoniaceae) SS 18</td>
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<td>Nymphoides (Gentianaceae) LW II, 1530 cm</td>
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<td>166a,b</td>
<td>Nymphoides (Gentianaceae) LW II, 1530 cm</td>
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<td>167a,b</td>
<td>Tristiropsis T. (Sapindaceae) PT 4</td>
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<tr>
<td>168</td>
<td>Myrtaceae LW II, 1490 cm</td>
<td></td>
</tr>
<tr>
<td>169a,b</td>
<td>Myrtaceae YAN 2, 990 cm</td>
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### Plate I.12

<table>
<thead>
<tr>
<th>Number</th>
<th>Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td><em>Poikilogyne</em> T. (Melastomataceae)</td>
<td>LW II, 1191 cm</td>
</tr>
<tr>
<td>171a,b</td>
<td><em>Poikilogyne</em> T. (Melastomataceae)</td>
<td>YAN 2, 120 cm</td>
</tr>
<tr>
<td>172a,b</td>
<td><em>Combretaceae/Melastomataceae</em></td>
<td>SQ 40</td>
</tr>
<tr>
<td>173a,b</td>
<td><em>Combretaceae/Melastomataceae</em></td>
<td>YAN 2, 120 cm</td>
</tr>
<tr>
<td>174a,b</td>
<td><em>Gardenia</em> (Rubiaceae)</td>
<td>SS 13-15</td>
</tr>
<tr>
<td>175a,b</td>
<td><em>Epacridaceae</em></td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>176a,b,c</td>
<td><em>Drimys</em> T. (Winteraceae)</td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>177a,b</td>
<td><em>Nepenthes</em> (Nepenthaceae)</td>
<td>LW II, 870 cm</td>
</tr>
<tr>
<td>178</td>
<td>Monoolete psilate spore, larger than 30 µm</td>
<td>SS 13-15</td>
</tr>
<tr>
<td>179</td>
<td><em>Microsorium</em> T. (Polypodiaceae)</td>
<td>LW II, 790 cm</td>
</tr>
<tr>
<td>PLATE I.13</td>
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<tr>
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</tr>
<tr>
<td>180a,b</td>
<td><em>Nephrolepis</em> (Oleandraceae)</td>
<td>LW II, 1110 cm</td>
</tr>
<tr>
<td>181a,b</td>
<td><em>Cyclosorus</em> T. (Thelypteridaceae)</td>
<td>PT 1</td>
</tr>
<tr>
<td>182</td>
<td><em>Histiopteris incisa</em> T. (Dennstaedtiaceae)</td>
<td>LW II, 1810 cm</td>
</tr>
<tr>
<td>183</td>
<td><em>Davallia</em> T. (Davalliaceae)</td>
<td>LW II, 1730 cm</td>
</tr>
<tr>
<td>184a,b</td>
<td><em>Stenochaena palustris</em> (Blechnaceae)</td>
<td>LW II, 1890 cm</td>
</tr>
<tr>
<td>185a,b</td>
<td>cf. <em>Tectaria</em> (Aspidaceae)</td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>186a,b</td>
<td><em>Stenochlaena laurifolia</em> (Blechnaceae)</td>
<td>SS 18</td>
</tr>
<tr>
<td>187a,b</td>
<td><em>Asplenum</em> T. (Aspleniaceae)</td>
<td>YAN 2, 710 cm</td>
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<td>Plate 1.14</td>
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<tr>
<td>188a,b</td>
<td><em>?Arthropteris</em> cf. <em>tenella</em>  (Oleandraceae)</td>
<td>SS 18</td>
</tr>
<tr>
<td>189a,b</td>
<td>cf. <em>Cyclosorus archboldiana</em> T.  (Thelypteridaceae)</td>
<td>YANMC 1 SS</td>
</tr>
<tr>
<td>190a,b</td>
<td><em>Cyclosorus truncatus</em> T.  (Thelypteridaceae)</td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>191</td>
<td>cf. <em>Stenochlaena areolaris</em>  (Blechnaceae)</td>
<td>SS 23</td>
</tr>
<tr>
<td>192</td>
<td>Unknown 19</td>
<td>LW II, 1490 cm</td>
</tr>
<tr>
<td>193</td>
<td>cf. <em>Adiantum diaphanum</em> T.  (Adiantaceae)</td>
<td>PT 4</td>
</tr>
<tr>
<td>194</td>
<td><em>Cyatheaceae</em> 1</td>
<td>LW II, 1490 cm</td>
</tr>
<tr>
<td>Page</td>
<td>Specimen</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>195</td>
<td>Cyatheaceae 2</td>
<td>LW II, 685 cm</td>
</tr>
<tr>
<td>196</td>
<td>Cyatheaceae 2</td>
<td>YAN 2, 670 cm</td>
</tr>
<tr>
<td>197a,b</td>
<td><em>Lycopodium cernuum</em> T. (Lycopodiaceae)</td>
<td>PT 1</td>
</tr>
<tr>
<td>198</td>
<td><em>Lycopodium squarrosum</em> T. (Lycopodiaceae)</td>
<td>YAN 2, 870 cm</td>
</tr>
<tr>
<td>199</td>
<td><em>Lycopodium</em> cf. <em>volubile</em> T. (Lycopodiaceae)</td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>200, 201</td>
<td><em>Pteris</em> (Pteridaceae)</td>
<td>LW II, 1191 cm</td>
</tr>
<tr>
<td>202</td>
<td>cf. <em>Anemia hirsuta</em> (Schizaceae) (fragment)</td>
<td>LW II, 1870 cm</td>
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</tbody>
</table>
**PLATE I.16**

<table>
<thead>
<tr>
<th>Site</th>
<th>Specimen</th>
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<tr>
<td>203a,b</td>
<td><em>Lygodium microphyllum</em> T.</td>
<td>LW II, 1490 cm</td>
</tr>
<tr>
<td>204</td>
<td>Unknown 312</td>
<td>SS 27 and 28</td>
</tr>
<tr>
<td>205</td>
<td>Unknown 170</td>
<td>YAN 2, 1030 cm</td>
</tr>
<tr>
<td>206</td>
<td>Unknown 172</td>
<td>YAN 2, 790 cm</td>
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</tbody>
</table>