

**A FIELD GUIDE TO
PANDANUS
IN NEW GUINEA,
THE BISMARCK ARCHIPELAGO
AND THE SOLOMON ISLANDS**

by
Matthew Jebb

**A Field Guide to Pandanus in New Guinea, The Bismarck Archipelago
and the Solomon Islands**

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Dedicated
to
Benjamin Clement Stone
[1933 to 1994]
in memory
of a lifetime in pursuit
of the *Big Game*
of the plant world

[illegible]

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I would also like to thank Rosemary Wise for her drawings, as well as Ben Stone and other unknown artists for their previous illustrations which I have copied from the literature. Many previously unpublished drawings from the National Herbarium in Lae, mostly prepared by Terry Nolan, have also been used. All illustrations are credited in Appendix 7.

Particular thanks go to present and past collectors of *Pandanus*, amongst the really industrious collectors in the region are Leonard Brass, Harold St. John, Benjamin Stone, Heinar Streimann and Tim Whitmore, between them they account for over half the total collections from the region.

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INTRODUCTION

Nowhere has the divorce between the herbarium and the world of nature been as great as with tropical floras. The massive primary construction of tropical monocots in particular, with leaves and inflorescences often many metres long, has led to a fearful divide between the dried fragments studied in the herbarium and the plants themselves. Like Palms, Pandans can only be studied properly in the field, and this book attempts to provide the full extent of our herbarium knowledge in a format that can be taken to the field and compared with the living plants.

Pandans are not only unpleasant to collect, but up till now have also been difficult to identify. As a consequence *Pandanus* spp. are seldom collected. This further compounds the taxonomic problems, since the scarcity of specimens means that many species are known from their holotype alone, or a mere handful of specimens, and intra-specific variation cannot be properly understood. This impasse can only be resolved by providing a field guide which will enable plant collectors to feel more purposeful in collecting *Pandanus* and so allow the gaps in our knowledge to be more rapidly filled. These plants form a significant element in New Guinea vegetation, and this guide will hopefully enable botanists, ecologists, and ethnologists to identify the majority of species that they may encounter, and encourage them to make collections. New species almost certainly await discovery.

Pandanus is a big genus, with at least 600 species. There are only two other genera placed in the same family: *Sararanga* with 2 species (both trees), and *Freycinetia*, a genus almost exclusively of climbers, with about 180 species. At first sight, *Pandanus* often strike people as uniform in appearance, and the field notes of collectors reveal that the plants are almost always regarded as 'Pandanus-like', and very few details of the considerable variation in overall appearance have been noted. The illustrations in this guide should demonstrate that the uniformity of *Pandanus* trees is entirely superficial.

An infrageneric classification of sub-genera, sections and sub-sections, divides the massive genus *Pandanus* into a comprehensible hierarchy. In this handbook I have utilised the system as last revised by Stone (1974b), and subsequently amended by Huynh (1976) and Stone (1978). *Pandanus* was last revised in its entirety by Warburg in 1900, when 156 species were known world-wide. The regional flora at that time stood at 19, but was further added to by Martelli (1904 to 1929) with 26 new species, Merrill & Perry (1939, 1940) with 24 and Kanehira (1940, 1941) with 8 new species. Since 1960, St. John has published numerous new species, as has his former student Stone. Between them these latter two pandanologists have more than doubled the number of species names in the region to 176. The *Pandanus* flora of the Solomons has been revised and published (Stone 1972b & 1973), as has that of the Bismarck and Admiralty Islands (St. John 1989) but only a single recent paper has attempted any form of synthesis towards an understanding of the genus in New Guinea (Stone 1982a).

As a consequence of this history, descriptions of the Papuan species are scattered in the literature, and in many cases have never been adequately illustrated. This guide attempts to draw together all the published material and to place it in a single publication. Some of the gaps have been filled with new illustrations by myself and Rosemary Wise, although the remainder have been shamelessly photocopied or redrawn from the literature (especially from the excellent illustrations of Ben Stone) as well as from the archives of the National Herbarium of PNG in Lae. Sources of all illustrative material are acknowledged in Appendix 7.

Very little of the information in this guide is new. I began writing it to overcome a personal frustration at not understanding the genus, or being able to identify specimens. It is not the intention of this book to provide an updated taxonomy of the group, but to provide a fresh starting point for the collection of material for a revision in the not too distant future.

HOW TO USE THIS BOOK

There are three parts to this book.

INTRODUCTION: This provides a general introduction to the genus, and a summary of the structure of the Pandan plant. Descriptions of how to collect and how to identify a *Pandanus* specimen are then given. The key on page 20 leads to sub-genera key pages. A § before a name denotes a sub-genus, while §§ denotes a section or sub-section.

SPECIES ACCOUNTS: Each species (or in some cases several, closely related species) has a page to itself. Drupes or phalanges, and leaf details are drawn at full size. The entire cephalium may be drawn at full size for small species, but otherwise is somewhat, to greatly, reduced, and is then provided with a scale bar of 5 cm. Habit drawings of the whole tree are drawn to various scales, and a human scale, or a 1 metre scale bar is provided. A brief description is given of the habit, size, prop roots, leaves, cephalium and drupes, male inflorescence, and ecology of the species. The distribution map shows information gathered from the literature, and my own observations, but chiefly from herbarium material examined at Kew and LAE.

The species are arranged alphabetically by section, which in turn are arranged alphabetically under the sub-genera. Each sub-genus is introduced by a summary of the sections, which provides a synoptic key to the sections in the region.

APPENDICES: Nomenclatural detail has been removed to an appendix (Appendix 2), as has a taxonomic commentary (Appendix 1). Much of the synonymy in the text is of my own making, and although some of these reductions have been alluded to by Stone in publications (esp. 1974b and 1982), few have been previously published. I have located nearly 100 manuscript names attached to specimens, clearly with the intention of making these the type specimens. These again are all listed in Appendix 2, and where I have considered them to represent an undescribed species (2 cases) I have refrained from attaching these epithets to them to prevent nomenclatural confusion. Eight new taxa are included in this guide, and these have been assigned working names: 'species 1' to 'species 8'.

Other appendices cover the ecological and altitudinal ranges of species in New Guinea (Appendix 3); a bibliography of edible *Pandanus* in New Guinea (Appendix 4); an annotated bibliography of selected publications (Appendix 5); a listing of specimens examined (Appendix 6); and sources of illustrations used in the guide (Appendix 7).

PANDANACEAE R.Br.

Trees, shrubs or lianes, the stem without secondary growth, with adventitious prop-roots. Leaves in 3 ranks (4 in some axes of *Sararanga*), simple, with an open sheathing base, the ranks arranged in a spiral; blade fibrous and xeromorphic; parallel-veined; margin and midrib thorned. Flowers unisexual, lacking perianth.

With 3 genera:-

FREYCINETIA Gaudich.

Lianes; with clasping aerial roots. Leaves in 3 ranks. Inflorescence racemose, but highly telescoped, forming a pseudo-umbel of (1-) 3-7 spikes. Fruit many-seeded fleshy berries.

Sri Lanka, Malesia, Hawaii; with c.180 species.

PANDANUS Parkinson

Trees or shrubs, rarely lacking a stem; usually with proproots arising from stem and rarely from branches. Leaves in 3 ranks. Inflorescence a solitary cephalium, or raceme of cephalia. Fruits either 1-loculed, fleshy or woody drupes, or woody phalanges of polydrupes.

West Africa to the Pacific; with c.600 species.

SARARANGA Hemsley

Trees; base of trunk with palm-like adventitious roots. Leaves in 3 ranks, except in secondary axes, in which often 2-ranked, giving the impression of being 4-ranked, each pair being perpendicularly arranged to the last. Inflorescence a massive panicle. Fruit a fleshy drupe with 20-80 pyrenes, smelling of raspberries.

Philippines, New Guinea & Solomon Islands; with 2 species.

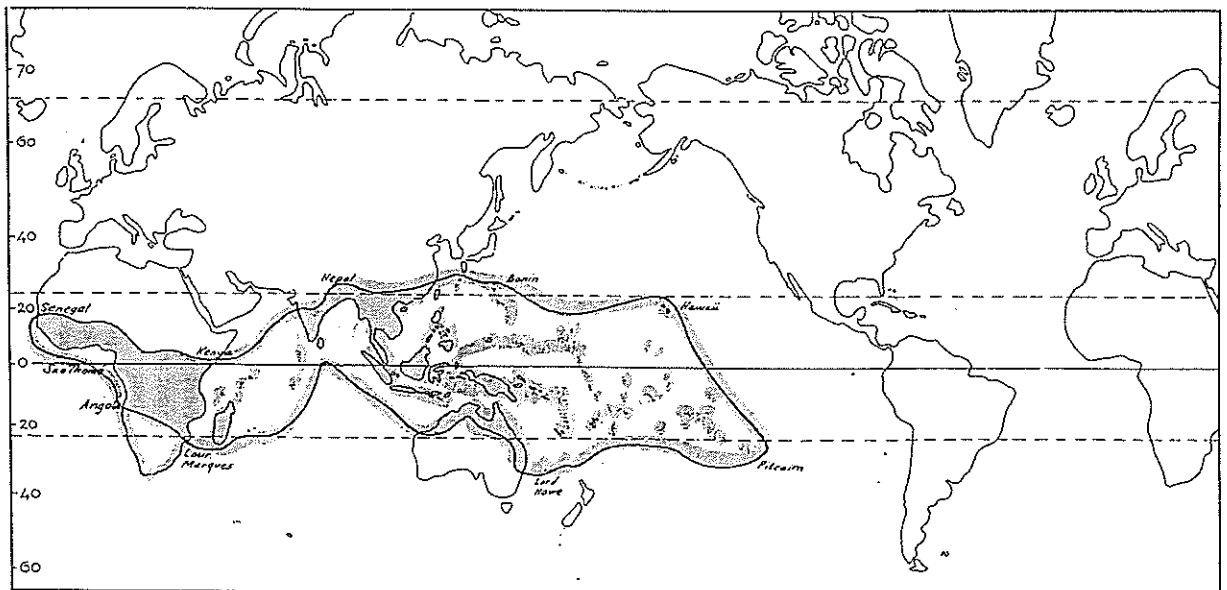


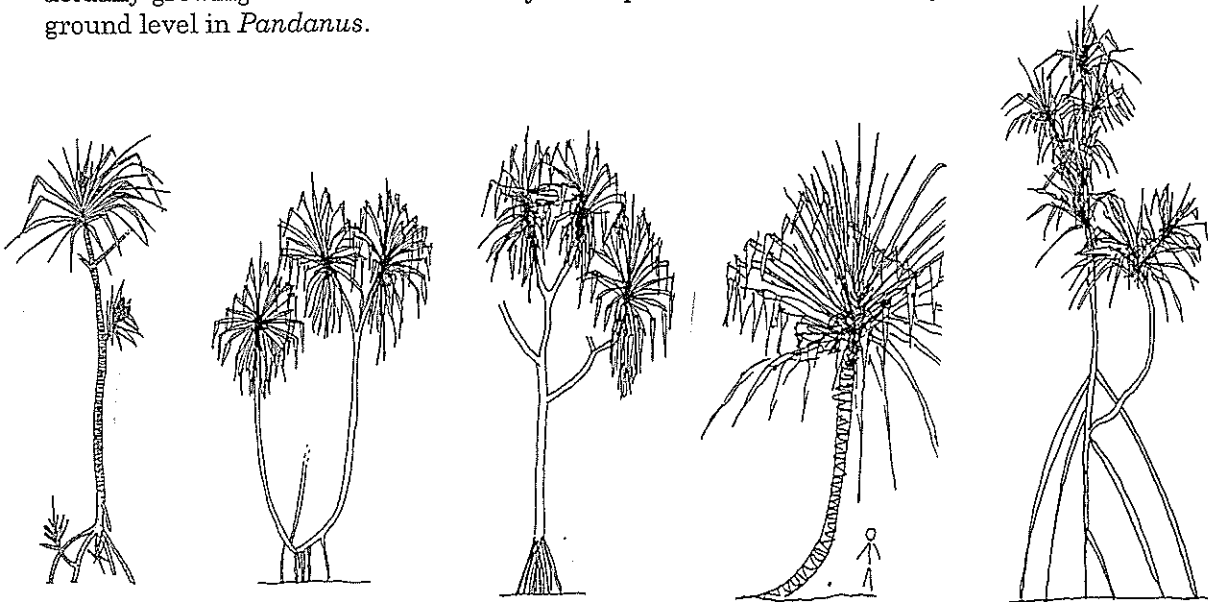
Fig. 12 Distribution of the genus *Pandanus* Park. (after St. John 1965).

Distribution map of the genera: *Pandanus* = *Freycinetia* = *Sararanga* =

THE PANDANUS PLANT

The habit of species shows considerable variation, from small caespitose or slender-stemmed shrubs, to clump-forming species which branch at their base or have numerous sucker shoots, to huge 33 metre tall trees. Some species have characteristic branching patterns such as a tall slender trunk with short side branches, a large flattened canopy or more typically, a pyramidal canopy, whilst some species rarely, if ever, branch.

Pandanus lacks the ability to produce secondary vascular tissue. As a consequence special constructional features apply. As with Palms the meristem contained in the seed must develop into the massive primary meristem of the adult plant through very gradual change: successive nodes becoming progressively wider than the previous one. This step-wise enlargement of the meristem has been termed 'establishment growth' in Palms (Tomlinson & Zimmermann 1967). In the majority of Palms such growth takes place below ground level, either through specialised growth of the cotyledonary organ, or through the axis actually growing downwards or sideways for a period. In contrast, this growth occurs above ground level in *Pandanus*.

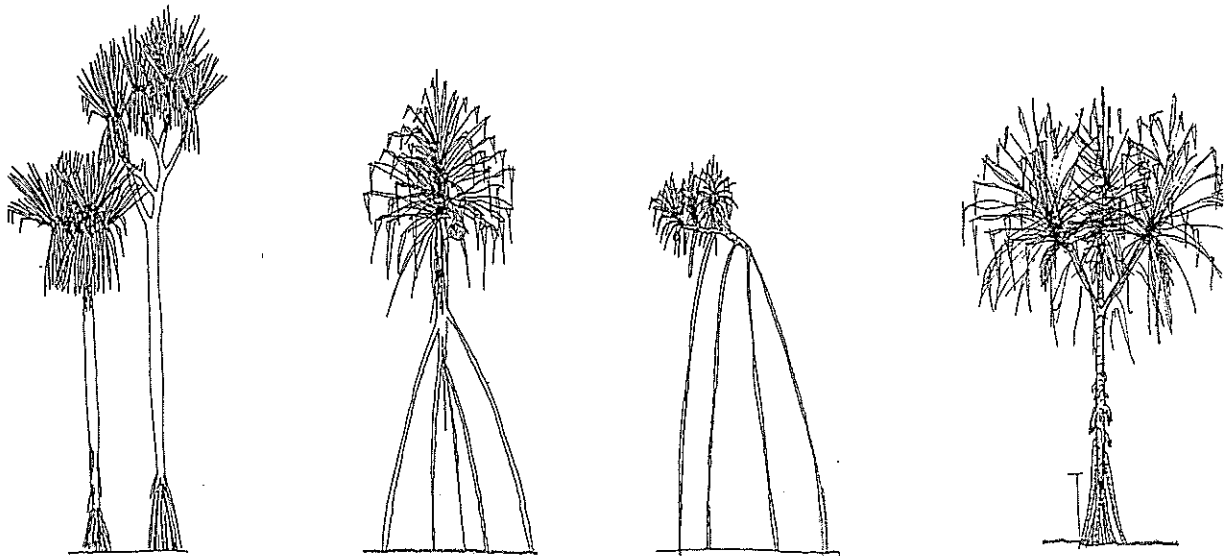


The development of adventitious roots, each progressively larger, but always in proportion to the axis, provide the transport needs of the developing Pandan. Each of these roots is wholly primary in construction, with a massive root cap at its tip. The rate of enlargement of the meristem thus governs the appearance of the plant. In species in which the proproots are poorly developed or absent, establishment growth may occur in a different way, either by the trunk being decumbent for an extended period (*P. lauterbachii*), or enlarging in much the same way as palms (*P. rex*). Unfortunately no observations have yet been made. In other species the proproots may be exceptionally long, often arising from branches as well as the trunk (*P. hystrix*, *P. concinnus*). In these species, establishment growth seems to be much extended, if it ceases at all, with the broadest part of the trunk often high in the tree.

In the majority of species the proproots arise from the trunk at a relatively broad angle, and curve gradually downwards, in one species they curve in an opposite manner, arising at a slight angle and gradually spreading away from the trunk as they approach the ground (*P. pendulinus*). They may be comparatively slender (*P. brosimos*, *P. tectorius*) but are more usually a third to half as thick as the trunk itself. They range from wide spreading (*P. papuanus*, *P. dolichopodus*, *P. leiophyllus*, §§Maysops) to upright (*P. brosimos*, *P. tectorius*), and may occasionally branch (*P. kaernbachii*). Damaged proproots are able to regenerate through the development of several, smaller adventitious roots around the perimeter of the cut root.

Unlike the case in Palms, almost all species of *Pandanus* branch. Either the trunk splits into three (or more) equal-sized, and equally diverging branches, or it may maintain a dominant axis producing one, two or three branches at a time. Side branches will usually only bifurcate, sometimes repeatedly. Where the branch is smaller than the main axis, it often arises from a distinct pulvinus, a morphological device for spreading the branch once the subtending leaf has fallen (Alistair Hay pers. comm.). Branching, as in many woody monocotyledons, is therefore regular and predictable.

Where adventitious propoots do not arise from them, branches become progressively narrower, and the ultimate size of the tree therefore depends upon the diameter of the main axis. Once the axes reach a minimum size it ceases to branch, each shoot being continued after flowering by a single replacement shoot. Male plants tend to be more richly branched, with proportionately smaller leaves (Stone 1975; Ash 1987): a consequence, no doubt, of the proportionately smaller male inflorescence. Due to these growth constraints, branching is often limited to the 4th or 5th degree.



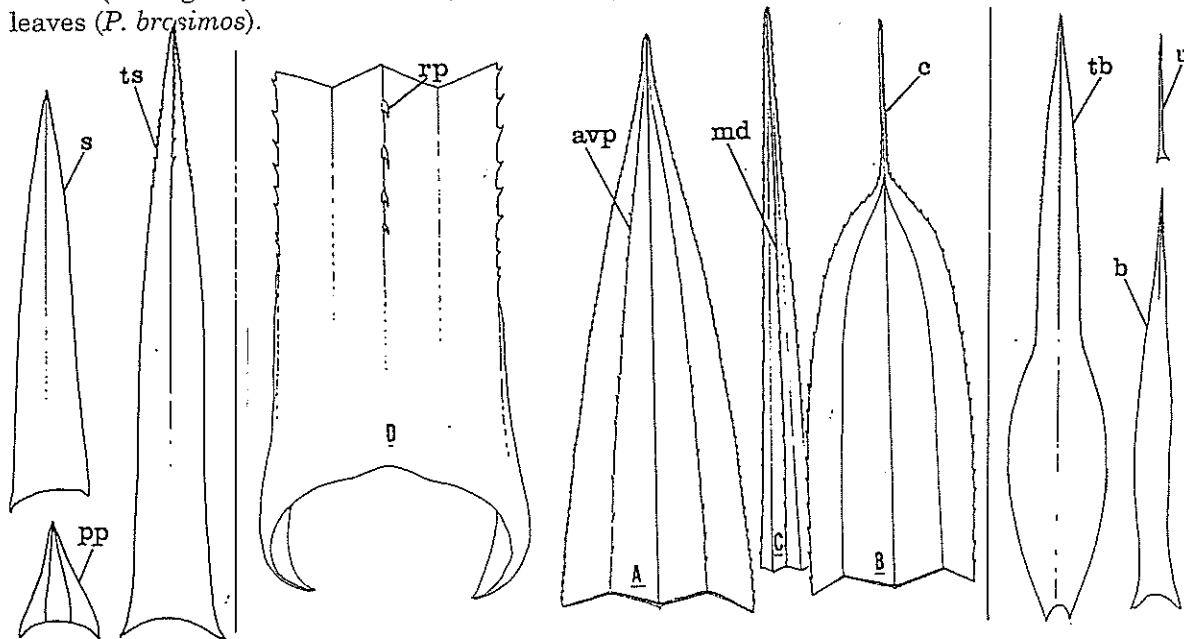
Stunted growth, due to poor soil conditions or low light levels, can lead to permanently 'miniaturised' plants, since the diameter of the primary axis is fixed during early growth. Those species with an extended period of 'establishment growth', however, may be able to adapt to changing conditions, such as increasing light levels with increasing height, or through successional changes to vegetation.

Although seemingly homogeneous in appearance, New Guinea *Pandanus* conform to a number of architectural models (Hallé, Oldeman & Tomlinson 1978). Whilst the majority exhibit Leeuwenberg's model, a few represent Corner's model (*P. clarkei*, *P. danckelmannianus*), Tomlinson's (*P. adinobotrys*, *P. aggregatus*) or Stone's (*P. polycephalus*, *P. lamprocephalus*).

The axis is sympodial, and is terminated by the inflorescence. Following flowering, a new vegetative axis is initiated with a prophyll (pp) followed by a scale leaf (s), various transitional leaves (ts), and then normal foliage leaves. At flowering, bracts are produced, and again a transition (tb) is seen from normal leaf to broad, short (sometimes coloured) bracts (b). The old inflorescence scar is usually prominent on the stem. Branching points often bear inflorescences. The first branch point does not carry an inflorescence in some species, but does in others. Once the tree has become well branched, the reduction of axes further is not feasible, and the stems become purely sympodial, with a single new shoot replacing the last when it becomes a terminal inflorescence. In some species the delay in the development of the inflorescence gives the impression of lateral flowering.

The leaves are produced in three series, and these arise in a spiral, giving the plants their common name of 'screw-pines'. The leaves are thick and leathery, with parallel venation, they have a midrib which is usually folded sharply downwards, and two lateral pleats which fold in the opposite direction making an M-shaped section. Along their margins and below the midrib (mb) they are beset with numerous curved thorns all of which point towards the leaf apex, except those near the base of the midrib which usually curve towards the base (rp). In some species the lateral pleats may also be thorned near the leaf apex (avp), a feature of considerable taxonomic significance.

The base usually clasps the stem (D), and the apex varies from finely tapering (C) to blunt, or has a long acuminate or caudate apex (B). The broader-leaved species tend to have bent leaves, the lower part arising above the horizontal, while the apex hangs downwards (*P. danckelmannianus*, *P. rex*). The more narrow-leaved species often have gracefully curved leaves (*P. exiguus*, *P. krauelianus*, *P. tectorius*), whilst others may have erect, straight leaves (*P. brcosimos*).



In structure the leaves show considerable variation during the growth of a plant. The juvenile leaves are usually longer with a more acuminate apex, as the tree becomes taller there is often a corresponding reduction in the length of the leaves. Leaf size follows Corner's rules of axial conformity (Corner 1949), in that leaf length is directly proportional to axis size, and thus with greater branching and corresponding reduction in the axis diameter in large trees, the leaves become progressively smaller (Ash 1987). The leaves are resilient to decay, and in some species form a marcescent skirt.

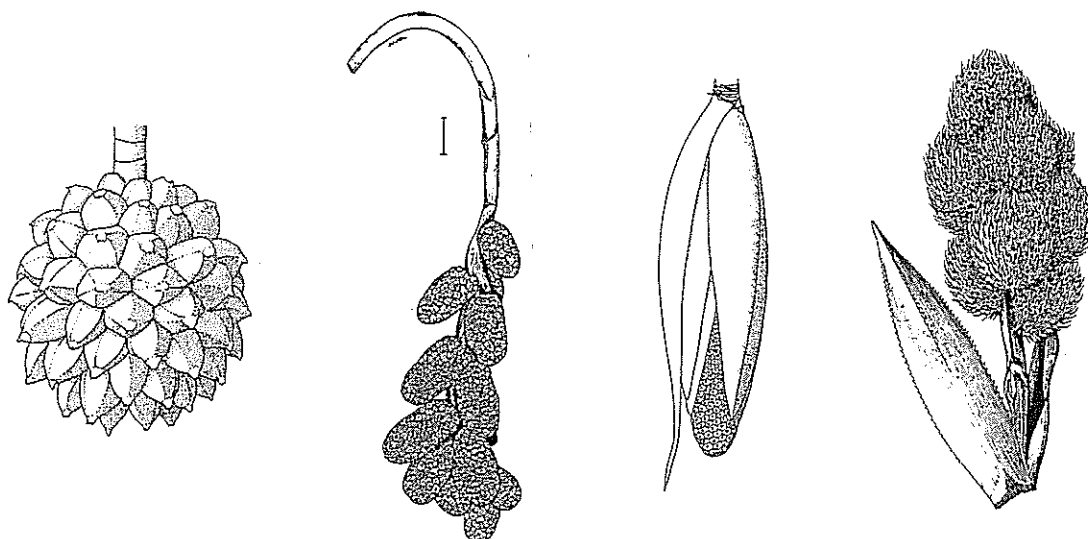
THE FEMALE INFLORESCENCE

Pandanus are dioecious - that is the trees are either male or female - furthermore the male plant of the majority of species is unknown. The male inflorescence is rarely encountered, being shorter lived than the slow developing infructescence. Thus at present most species are only known by the female plant. The single exception to this is *P. pendulinus* an enigmatic species known only from a single male collection. Presently it is assigned to sub-genus *Lophostigma*, but its sectional place remains unknown (Stone & Huynh 1983).

The inflorescence is produced terminally on the stem, although development in some sections is considerably delayed, such that the fruit head appears laterally in the leaf crown, or even below it. The female inflorescence may be represented by a single cephalium (head), or by a spike of several cephalia. It may be bract covered, or these may fall, or rot, before the infructescence becomes fully ripe. In some species the peduncle may be thickly

clothed in short bract-like leaves (*P. danckelmannianus*, *P. lamprocephalus*). Bracts may be coloured yellow, pink or purple, rarely they may be bright red (*P. kosteri*). In general the bracts become smaller towards the cephalium, the ultimate bract (u) being no more than a narrow filiform organ. Juvenile trees produce not only larger leaves, but larger cephalia with larger numbers of phalanges or drupes (Ash 1987). Ash also found that *P. tectorius* females in Fiji fruited every 2 years, the cephalia taking up to 12 months to mature. Males by contrast, flowered annually.

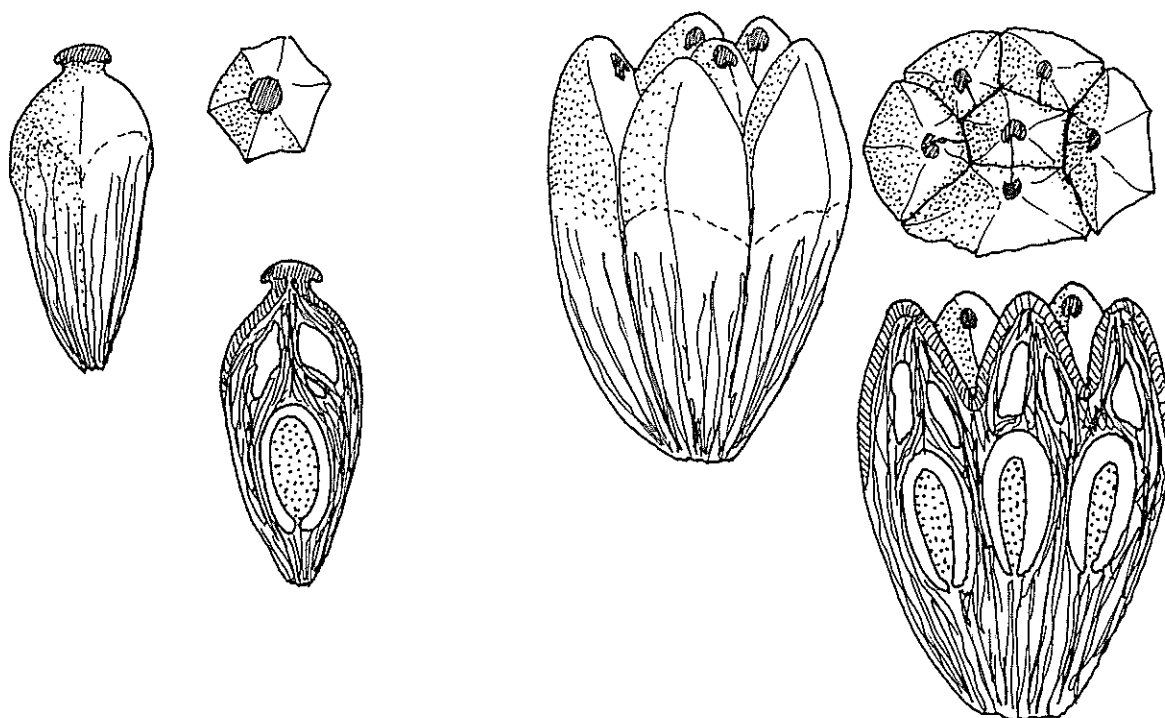
It seems that all phalanges or drupes in a cephalium will continue to develop even though all may not be fertilised (Kurz 1867). This may be of importance to the functioning of the entire fruit head. Ash (1987) found that the most apical phalanges of *P. tectorius* had the greatest number of embryos, reflecting the possibly greater chance of fertilisation of ovaries at the least bract-enclosed end of the inflorescence. Cox (1985) has shown that *P. tectorius* is facultatively apomictic, setting viable seed even when not fertilised.



Although the production of fruit heads appears to be seasonal in some species, in others it appears to be far less exact. Some of the lowland species around Madang appear to fruit continuously (*P. krauelianus*, *P. papuanus* and *P. dubius*). Male inflorescences, however, are only produced seasonally. Debbie Wright and Andy Mack have also recorded this phenology difference at Crater Mountain, where fruits of particular species are present in Cassowary droppings for upwards of 9 months of the year, but male inflorescences appear but briefly. It is possible that some New Guinea *Pandanus* species have developed a reproductive strategy of apomixis combined with periodic sexual reproduction. Thus through most of the year the carpels are parental clones, while during the male flowering season sexual recombinants can be produced.

The manner in which the drupes or phalanges dry can considerably alter their aspect (see page 100). In life they range in colour from yellow, pink, orange, red to purple-black, and many have a combination of colours which can give them a startling aspect as the cephalium begins to break up, with a rosette of colours, as seen from the ground, such as a yellow centre, bright red mesocarp and dark purple pileus. The cephalium of many species has a dark or green appearance when entire, but the falling drupes are often brightly coloured on their lower surfaces, becoming conspicuous only after falling from the cephalium. *P. papuanus*, *P. penicillus* and *P. limbatus* feature prominently in the diet of Cassowaries in Eastern Highlands Province (Andy Mack & Debbie Wright, pers. comm.).

The drupes (one seeded) or phalanges (2 or more seeded) are paramount in *Pandanus* taxonomy, the sections being largely based upon the arrangement, shape and size of the stigmas - the direction in which the stigma faces is important to the taxonomy, although its significance biologically is unknown. Stigmas are usually small dark areas, often cordate in shape. In some species the stigmas are well separated on individual conical projections, while in others they may be tightly grouped at the apex of the phalange.

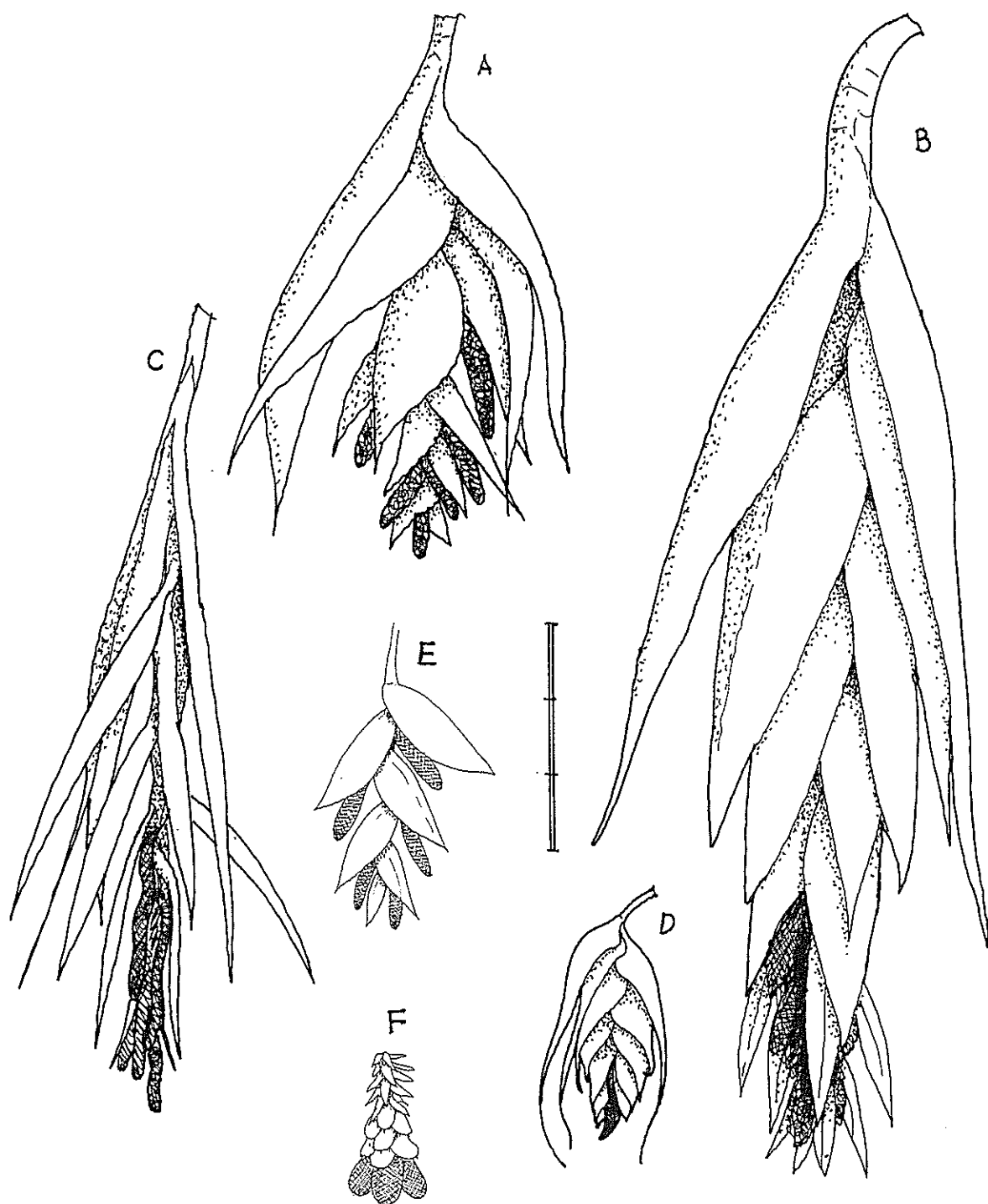


A SINGLE-SEEDED DRUPE

A MANY-SEEDED PHALANGE

THE MALE INFLORESCENCE

The male inflorescence remains unknown for the majority of *Pandanus* species. In Papuasia only 27, of the 74 species recognised in this guide, have known males collections. Where possible I have included details of these on the species plates. The male flowers are short-lived compared to the female infructescence, and no doubt this is a major cause of their rarity amongst collections. The majority of male inflorescences consist of racemes of spikes, except in §§*Involuta*, §§*Kurzia* and §§*Cauliflora*, where the spike is solitary. The anthers are either arranged singly or in small clusters on the surface of the spike, or the filaments may be fused into a simple or branched cone.



MALE INFLORESCENCE AND ANTHERS OF VARIOUS *PANDANUS* SPP.

A: *P. antaresensis*

B: *P. croceus*

C: *P. leiophyllus*

D: *P. lamprocephalus*

E: *P. danchelmannianus*

F: *P. subumbellatus*

Scale bars for Inflorescence = 30 cm; for Anthers = 1 cm.

TAXONOMY OF PANDANUS

Nine sub-genera of *Pandanus* are currently recognised. Micromorphological studies by Huynh (1974, 1975 & 1976) complement the gross-morphological and anatomical criteria employed by Stone (1974). The four sub-genera not represented in the New Guinea and Solomon Island region are §*Coronata* (Philippines & Fiji), §*Eydouxia* (Mauritius), §*Martellidendron* (Madagascar & Seychelles) and §*Vinsonia* (Africa, Madagascar & Seychelles).

It is not possible to provide a succinct synopsis of these sub-genera, nor to characterise them on just a few characters. Keys need to be lengthy and filled with exceptions. Familiarity with the individual species leads to a comprehension of the sections and finally to an understanding of the sub-genera. There is no satisfactory short-cut to this process. The Key on page 20 leads to some sections, but in other cases to a range of sections in several sub-genera. Nearly all the species are illustrated in this handbook, and comparison of material to these illustrations is far more satisfactory than preparing a laboured and complex key to the species.

Although the sub-genera §*Acrostigma* §*Pandanus* and §*Rykia* appear quite natural, others, particularly §*Kurzia* and §*Lophostigma* are less satisfactory, and these sub-genera are in need of phylogenetic analysis to solve these problems (Ben Stone, pers. comm.).

THE GENUS *SARARANGA*

Of the remaining genera of Pandanaceae in New Guinea and the Solomons it is possible to mistake *Sararanga sinuosa* for a *Pandanus*. This species is therefore included in this guide also. There are just two species in the genus, one in the Philippines, and the above mentioned in New Guinea and the Solomon Islands (Stone 1961). Although similar to *Pandanus* it differs in its palm-like roots, apparently 4-rowed phyllotaxis (in fact 2-rowed) on axes produced after the first inflorescence (Cox 1990), and its massive, two metre long branching, panicle inflorescence, which has a peduncle square in section, and which bears numerous, many-seeded, fleshy berries.

PANDANALES RELATIVES

The order Pandanales is presently grouped with three other major orders; the Arecales (Palms), Cyclanthales and Arales (Cronquist, 1981). Each of these orders has a single family with the exception of Arales, which comprises both Araceae and Lemnaceae. The fact that these orders are each all but unifamilial underlines their marked isolation from one another, and although several phylogenies have been proposed (Chase 1993), none are as yet satisfactory. It seems most unlikely that Aroids have anything to do with these woody groups, and their origin through the transference of floral function to a massive organ primordia provides a more elegant hypothesis (Hay & Mabberley 1991).

Palms are three to four times as speciose as the order Pandanales (3,000 vs. 800 species). Both orders share an evergreen habit, which restricts them to the tropics. Palms have (rarely otherwise) unbranched trunks in which establishment growth occurs at or below ground level, pinnate leaves with a closed basal sheath which encloses the subsequent leaf, axillary inflorescences, and are for the most part monoecious. In contrast, *Pandanus* have a protracted establishment growth above ground level, large prop roots, branching trunks, simple leaves with an open basal sheath and are strictly dioecious (with the exception of certain mutant forms).

HOW TO COLLECT PANDANUS

Stone (1983) has published a guide to collecting *Pandanus* which I briefly summarise here, with an illustration from the original publication.

* The minimum composition of a collection would consist of:

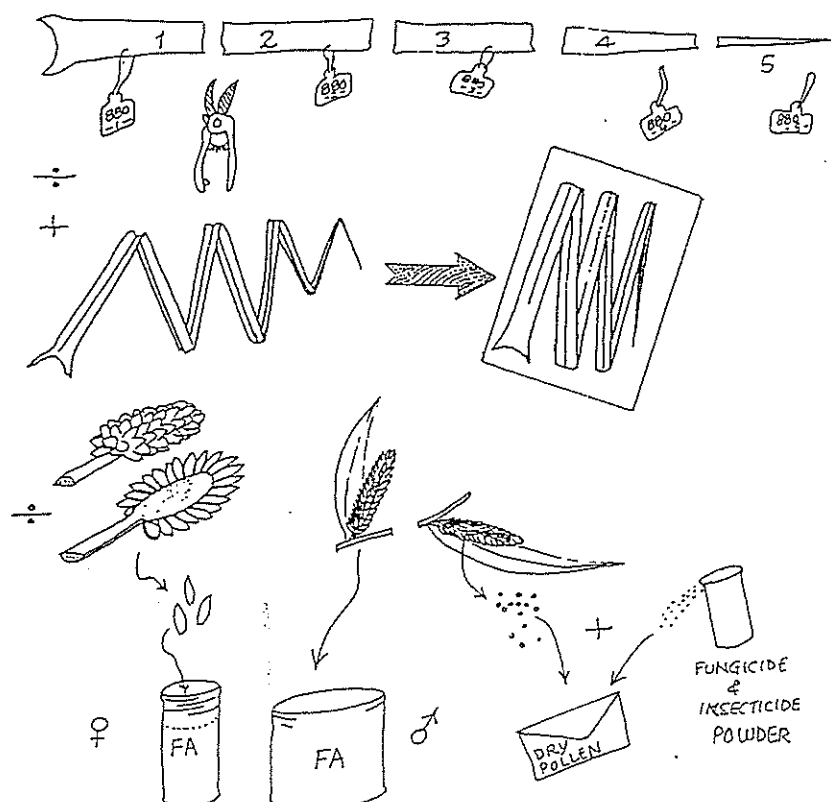
1. Good notes on the size of the plant, the size and spread of the proproots, degree of branching are essential. A sketch or photograph of the whole plant.
2. A whole leaf, either folded or cut.
3. A sample of 3-4 drupes or phalanges, or in the case of a fruit head less than 10 cm in diameter the entire cephalium. A photograph of the cephalium and individual drupes or phalanges.

** A good collection would comprise at least 3 duplicates of the above, plus:

4. Whole examples of prophylls, adult leaves, sucker shoot leaves and seedling leaves.
5. Entire or half cephalium, with 3-4 drupes or phalanges placed in preservative.
6. A sample of prop roots and wood/bark sample.

*** An excellent collection would comprise at least 3 duplicates of several individuals within a population and preferably male and female individuals, with the materials listed for a 'good' collection plus:

7. A male spike in preservative, and a sample of pollen removed and placed in a small packet with a fungicide/insecticide mixture.
8. Living seedlings which can be established at a nearby botanic garden and which are cross referenced to the collection number.



INFRAGENERIC CLASSIFICATION OF PANDANUS IN THE REGION

The known New Guinea and Solomon Island *Pandanus* spp. probably number at least 74 species, and are classified into 5 sub-genera and 29 sections or sub-sections (Stone 1974a, Huynh 1976; Stone 1978, 1987). The table below shows the number of validly published species described for each of the sections, followed by the number recognised in this guide. Excluded from this table are 15 varieties, 22 *nomina nuda* and 95 *in scheda* names (almost all coined by St. John). Some of these latter names have appeared in the literature, accounting for the large number of *nomina nuda*. In Appendix 2 all these additional names are listed. It is most unfortunate that these *in scheda* names are clearly annotated on 'holotype specimens', and have been filed accordingly in many herbaria. It is important to view any annotation of a St. John name with extreme caution, and these *in scheda* names should all now be regarded as invalid and unusable names for the genus.

SUB-GENUS	SECTION/SUB-SECTION	SPECIES	
		Names	Recognised
ACROSTIGMA	ACROSTIGMA / ACROSTIGMA	8	5
	ACROSTIGMA / DIMISSISTYLI	12	1
	ACROSTIGMA / LAUTERBACHIANI	1	1
	ACROSTIGMA / ROSTELLATI	9	2
	PSEUDACROSTIGMA	1	1
KURZIA	CURVIFOLIA	5	4
	INVOLUTA	2	1
	JEANNERETIA	5	1
	KURZIA	7	4 **
	LEPTOCARPA	1	1
	MARGINATA	2	1
	MICROSTIGMA	9	3
	PARALOPHOSTIGMA	4	4
	UNNAMED	1	2 *
	CAULIFLORA	1	1
LOPHOSTIGMA	KARUKA	3	3
	LINIOBTUTUS	6	3 *
	MAGNICAVERNOSA	1	1
	MAYSOPS	34	10
	MEGASTIGMA	2	2
	METAMAYSOPS	2	2
	PERRYA	5	5 **
	STONEDENDRON	3	4 *
	?UNCERTAIN	1	1
	ATHROSTIGMA	2	1
PANDANUS	AUSTROKEURA	2	1
	EXCAVATA	3	1
	FAGERLINDIA	4	3 *
	INTRAObTUTUS	8	2
	PANDANUS	27	1
	UNNAMED	1	1
	HOMBRONIA	2	1
		174	74

* NOTE: Eight undescribed taxa are listed in the 'Recognised' column, which are absent from the previously published 'Names' column.

HOW TO IDENTIFY A PANDANUS SPECIMEN

The single most important feature in identifying a *Pandanus* specimen is the structure of the drupe or phalange, sometimes it can be diagnostic. Other features of importance are the shape of the entire cephalium, the leaf apex, and presence of spines on the lateral pleats, and the size and appearance of the proproots. It has also become clear in preparing this handbook that the overall appearance of a tree will become a diagnostic feature in the future, but as yet this information is lacking for many species.

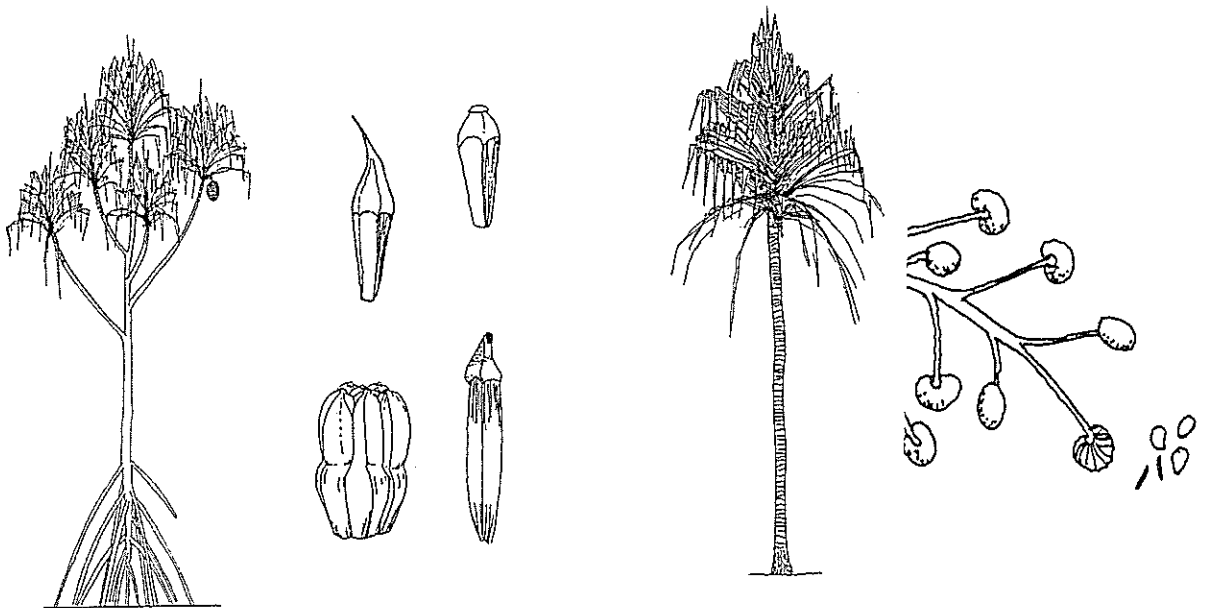
KEY TO PANDANACEAE IN NEW GUINEA AND THE SOLOMONS

Plant a climber, or erect shrub. Leaves usually small to medium-sized (15 cm to 60cm, rarely to 1m). Infructescence usually in threes:



.....FREYCINETIA

Plant a tree or shrub. Leaves generally large (1 to 3 metres). Infructescence borne terminally, solitary or in spike, or in a huge panicle:



.....PANDANUS

.....SARARANGA

One species in New Guinea, and the Solomon Islands: *S.sinuosa*.

Scale bar = 1 cm

KEY TO PANDANUS IN NEW GUINEA AND THE SOLOMON ISLANDS

The following brief key leads to the five sub-generic (§) keys which are found at the beginning of each sub-genus (That for §*Acrostigma* faces this page). The page numbers are listed at the base of this page. In some cases the key leads to a short list of possible sections (§§). In conjunction with the sub-generic summary pages, it should be possible to identify a species from a single drupe or phalange, although for confirmation, further vegetative features should be compared to the pertinent species description and illustration. N.B.: Several ornamental, cultivated Pandans, which generally do not flower, are discussed in Appendix 1, on page 127. Many of these are strikingly variegated, or have aromatic leaves.

- 1. Drupes all, or some, 1-loculed
 - 2. Style a tapering thorn, the stigma a black line along the side
 - 3. Cephalium solitary §*ACROSTIGMA*: §§*DIMISSISTYLI*,
 §§*ROSTELLATI* and §§*PSEUDACROSTIGMA*
 - 3a. Cephalia many, arranged in a spike §*ACROSTIGMA*: §§*ACROSTIGMA*
 and §§*LAUTERBACHIANI*
 - 2a. Style blunt, the stigma more than just a narrow line
 - 4. Cephalium solitary all §*KURZIA* and all §*LOPHOSTIGMA*
 - 4a. Cephalia multiple, arranged in a spike §*KURZIA*: §§*CURVIFOLIA*,
 P. leptocaulis and *P. polycephalus*
- 1a. Drupes all, or some, two to many-loculed
 - 5. Cephalia multiple, arranged in a spike §*PANDANUS*: §§*FAGERLINDIA*
 - 5a. Cephalium solitary
 - 6. Stigmas ±separated, phalange apex irregular, stigmas on separate pilei
 - 7. Carpels arranged concentrically §*PANDANUS*
 - 7a. Carpels arranged in a row §*LOPHOSTIGMA*: §§*MAGNICAVERNOSA*
 §*KURZIA*: §§*PARALOPHOSTIGMA*
 and *P. species 3*
 - 6a. Stigmas clustered, phalange apex +united
 - 8. Phalange tip a slight hollow §*PANDANUS*: §§*EXCAVATA*
 - 8a. Phalange tip flat or pointed, but not hollowed
 - 9. Stigmas erect, pointed §*RYKIA*: *Pandanus dubius*
 - 9a. Stigmas flat or flush with phalange tip §*PANDANUS*: §§*ATHROSTIGMA*
 §*LOPHOSTIGMA*: §§*LINIOBTUTUS* and §§*METAMAYSOPS*

§ <i>ACROSTIGMA</i> Key	...	...	(10 species)	...	...	...	Opposite
§ <i>KURZIA</i> Key	...	...	(21 species)	...	...	...	Page 31
§ <i>LOPHOSTIGMA</i> Key	...	...	(32 species)	...	...	...	Page 53
§ <i>PANDANUS</i> Key	...	...	(10 species)	...	...	...	Page 85
§ <i>RYKIA</i>	...	...	(1 species)	...	...	...	Page 96
<i>SARARANGA</i>	...	...	(1 species)	...	...	...	Page 97

SUBGENUS ACROSTIGMA

The sub-genus *Acrostigma* is characterised by the cephalia always having simple, free drupes, a spine-like style, the stigma a groove on the abaxial surface and the lateral pleats of the leaves toothed near the apex. They are stemless shrubs to small-sized trees, most species lack proproots, in others they are short and reduced, with the exception of *P. poronaliva* and *P. setistylus*.

Section *Acrostigma* comprises 4 sub-sections in the region:

Sub-Section *Acrostigma* has narrow leaves a compound inflorescence of 3 to 11 (rarely just 1) cephalia, and obovate drupes.



Sub-Section *Dimissistyli* has broad leaves, a single large cephalia, and the drupes are slender with a very long pileus which abscises from the basal pyrene. This section appears to comprise a single, variable species.



Sub-Section *Lauterbachiani* has a single species of medium-sized tree, with a compound inflorescence of up to 12 oblong cephalia, with short, abruptly pointed drupes.

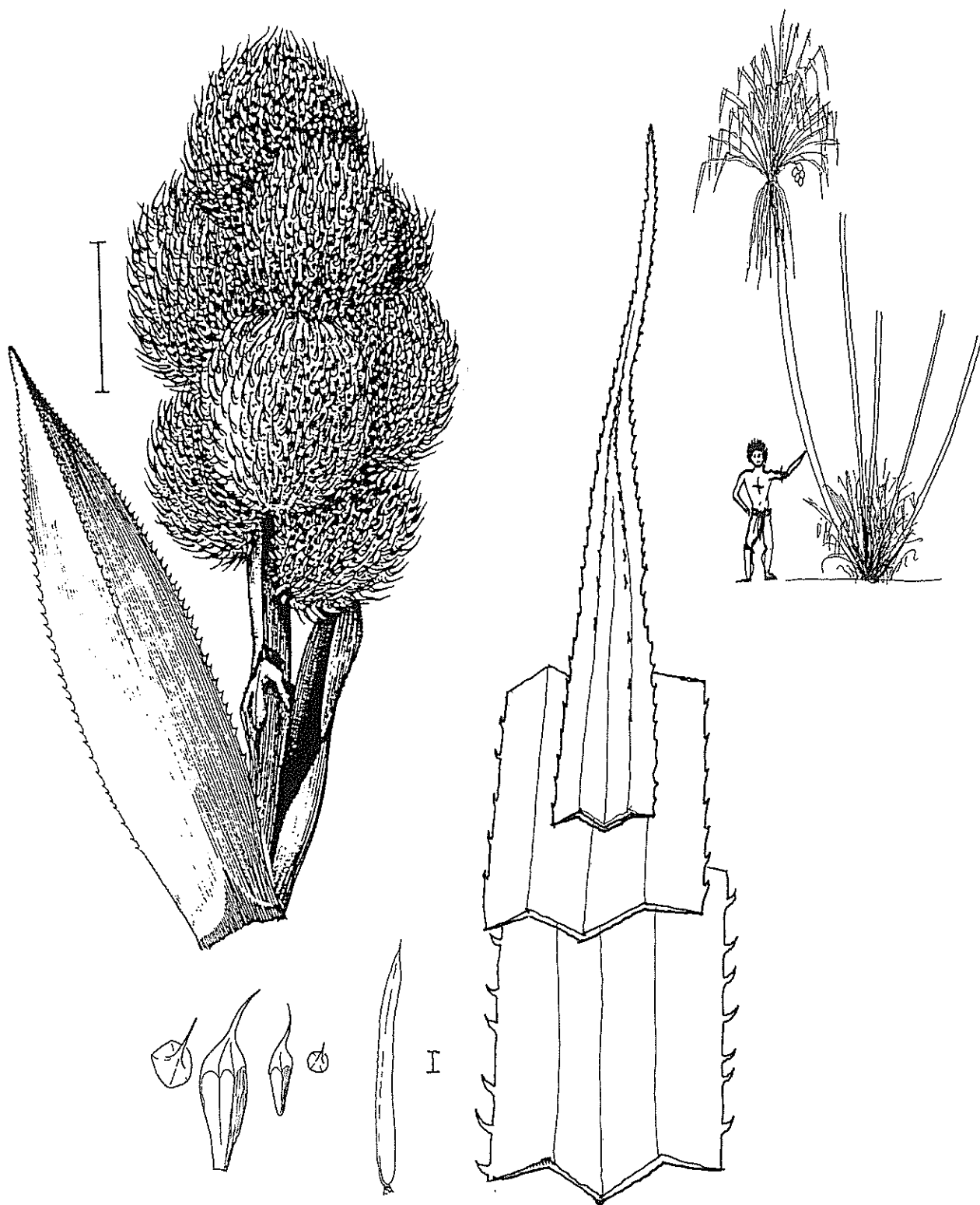


Sub-Section *Rostellati* are small caespitose or short-trunked shrubs, they have slender leaves, a solitary cephalium, and the drupes have a straight or curved style.



Section *Pseudacrostigma* with just one species in the region is also a short-trunked shrub, with very slender leaves, a solitary cephalium, and drupes with a rounded apex with a bulbous-based style.





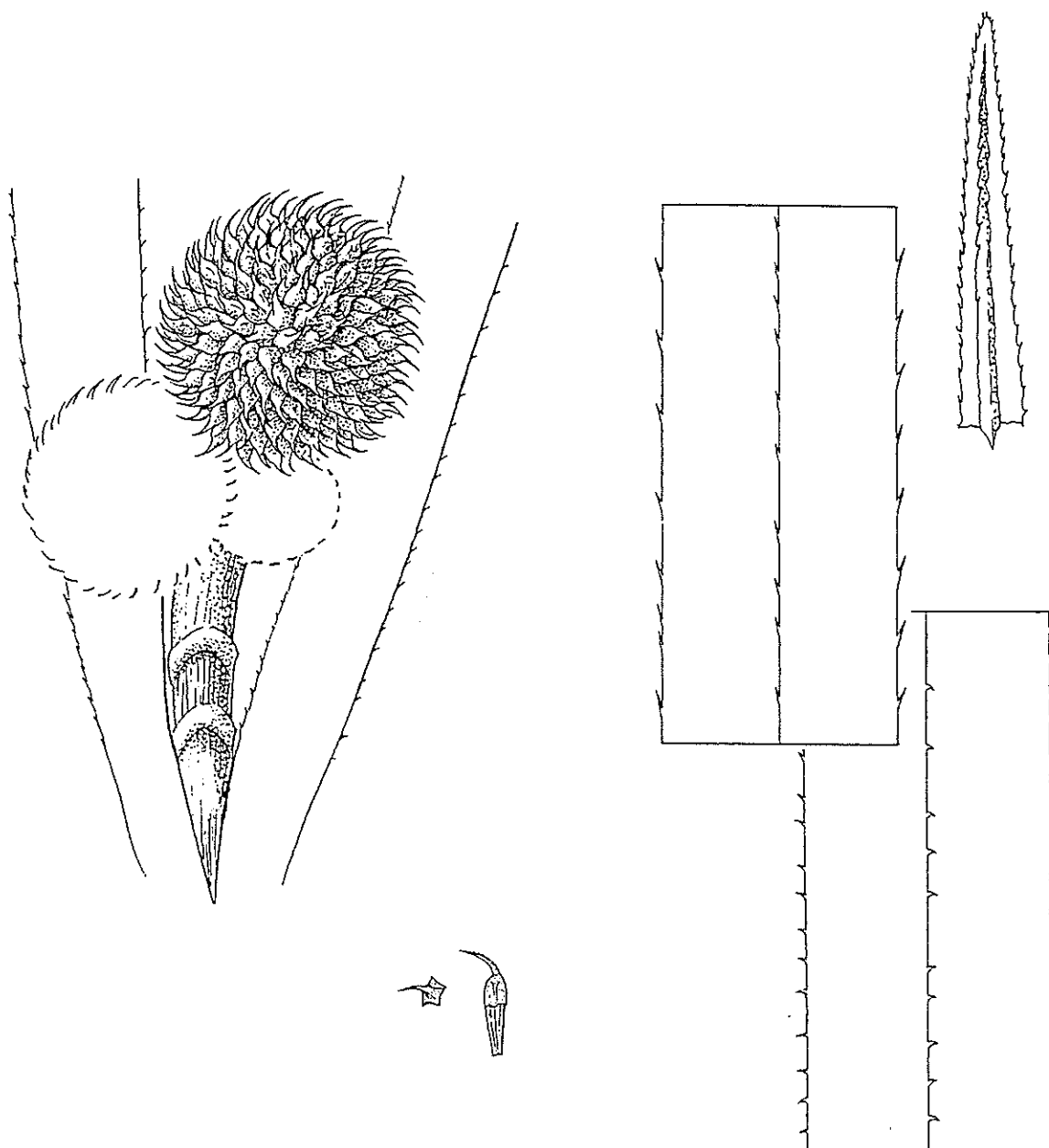
Sub-Section: **ACROSTIGMA**

Pandanus adinobotrys Merr. & L. M. Perry

Clump-forming or solitary, unbranched tree, to 12 m; proproots lacking or few; leaves 260-600 x 7-12 cm, lateral pleats thorned near apex; inflorescence appearing laterally, a raceme of 5-9 cephalia, these oblate, 4 to 8 cm across; drupes to 30 x 8 mm, yellow, then bright red when ripe; male spikes brown, enclosed by large pale bracts, filaments free.

Forest; (400-) 1,400 to 2,250 m.



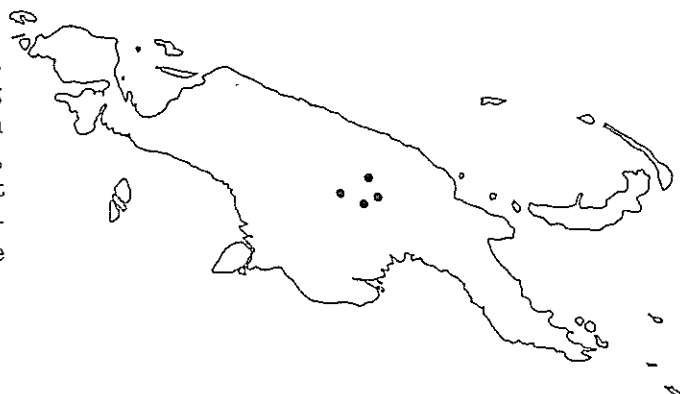


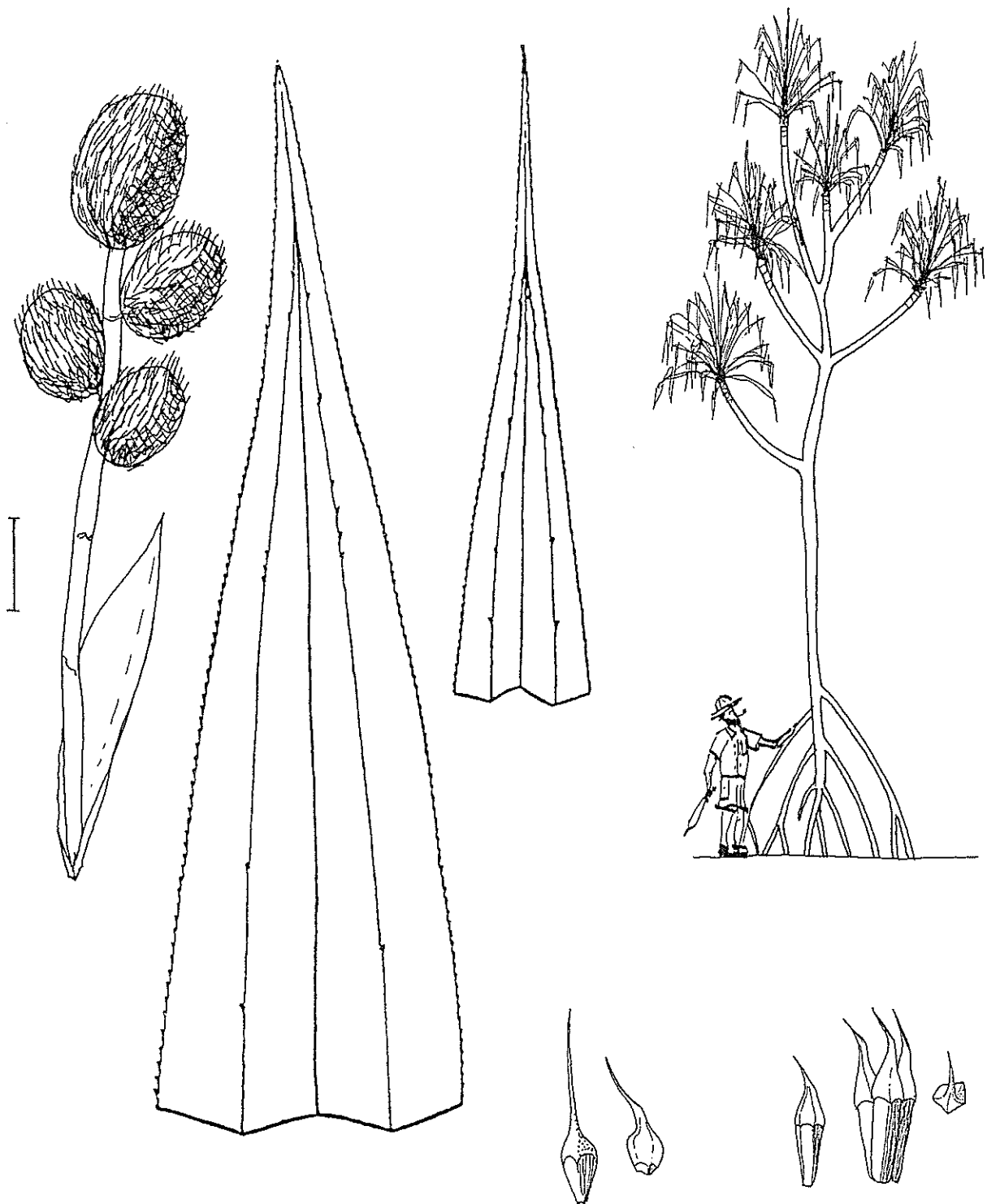
Sub-Section: ACROSTIGMA

Pandanus congregatus St. John

Erect, freely-branched tree to 4 m, with short, flowering side-branches; proproots few, short; leaves 115 x 3.5 cm, grey-green; inflorescence a solitary cephalium, or raceme of 3 to 5 unequal, \pm rounded cephalia, 3.5-4.5 cm across, the most apical largest, peduncle to 50 cm or more, sub-erect; drupes 16 x 4 mm, orange-red; male inflorescence similar to previous species.

Forest; 1,300 to 1,700 m.



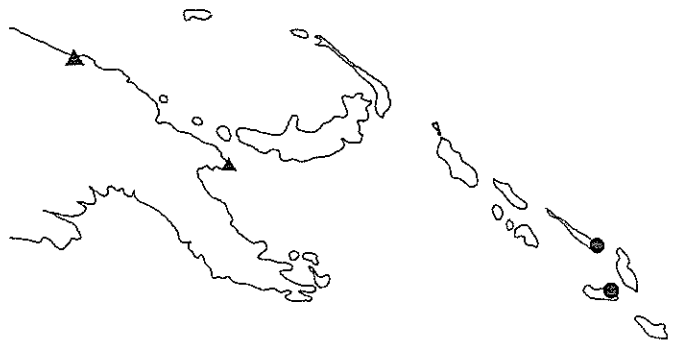


Sub-Section: ACROSTIGMA

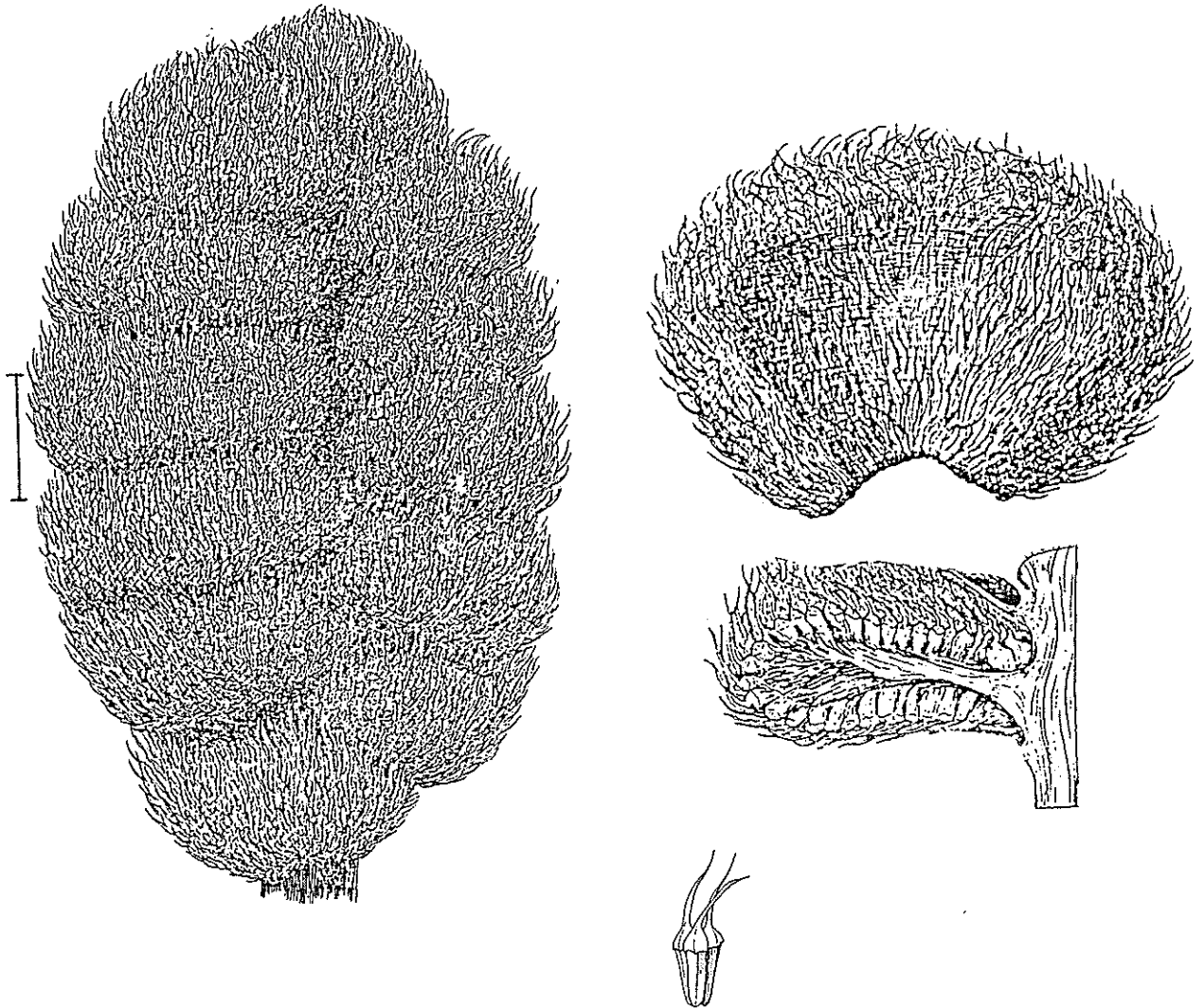
***Pandanus poronaliva* Stone** ●

Branched tree to 15 m; proproots present; leaves 150-280 x 5-8.5 cm, lateral pleats thorned near apex; inflorescence a raceme of 4 to 11 globose to ellipsoid cephalia, each to 10 x 6 cm, the most apical usually largest; drupes 8-20 x 4-5 mm, style arising abruptly, long and slender, 15 mm, yellow to orange-brown in colour; male unknown.

Dry forest, edge of Mangrove swamp; sea level to 900 m; Solomons.



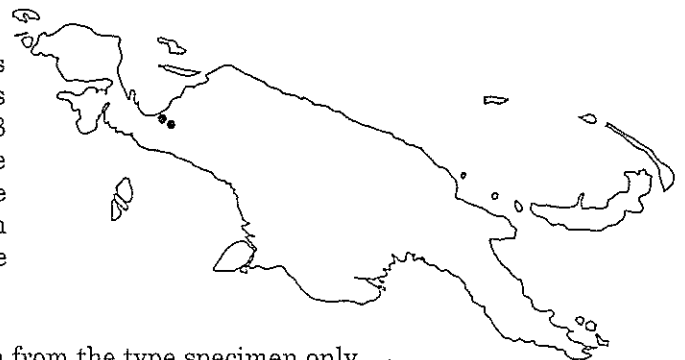
Pandanus setistylus Warb.: very similar, on mainland New Guinea only, styles far longer ▲



Sub-Section: ACROSTIGMA

***Pandanus pseudosyncarpus* Kanehira**

Tree, branching?, 1 to 5 m tall; proproots unknown; leaves 150 x 7.5 cm, lateral pleats thorned near apex; inflorescence a raceme of c.18 cephalia, these tightly appressed, giving the impression of a single cephalium 35 x 16 cm, the individual cephalia reniform, 10 cm broad, 7 cm long, 3.5-5 cm thick; drupes to 10 mm, style slender to 12 mm, bright red; male unknown.



Thickets at foot of mountain; 200 to 400 m. Known from the type specimen only.

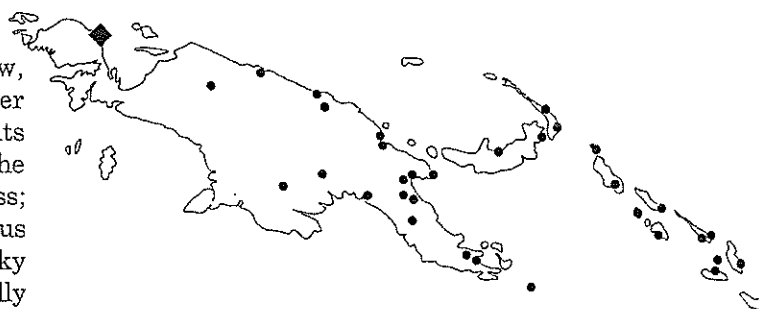


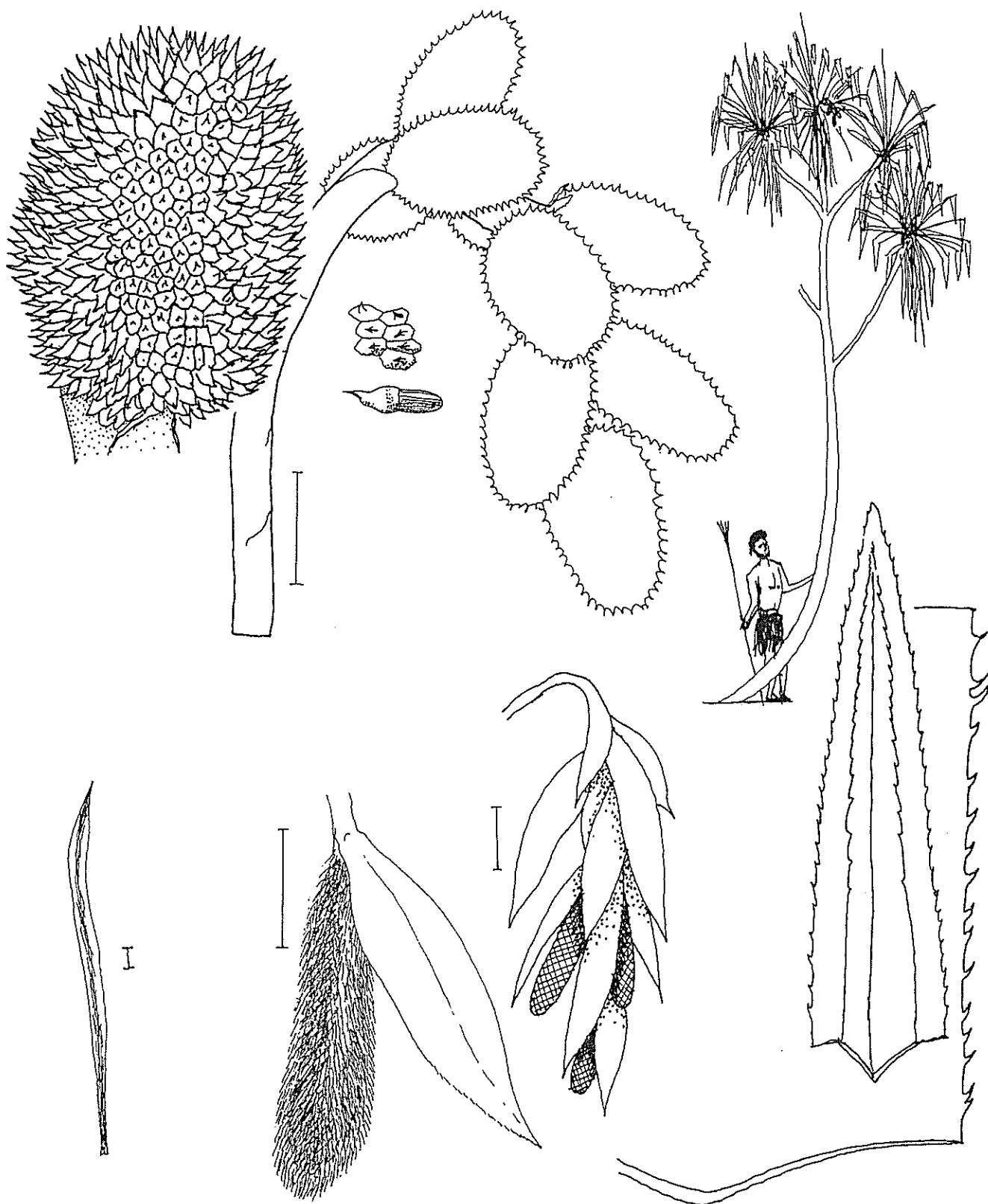
Sub-Section: **DIMISSISTYLI**

***Pandanus danckelmannianus* K. Schum.**

Unbranched tree to 10 m; propoots lacking or few, slender, to 20 cm, crowded; often with sucker shoots; leaves to 400 x 11 cm, lateral pleats thorned near apex; cephalium appearing below the leaves, on a short peduncle, 10-20 cm across; drupes 3-6 cm long, characterised by a red pileus which abscises, leaving the bright yellow, sticky pyrene attached to the cephalium, style gradually tapered, or rounded and abruptly acuminate; male raceme with 4-5 spikes each 8 x 2.5 cm, anthers to 10 mm.

Forest; sea level to 1,800 m.

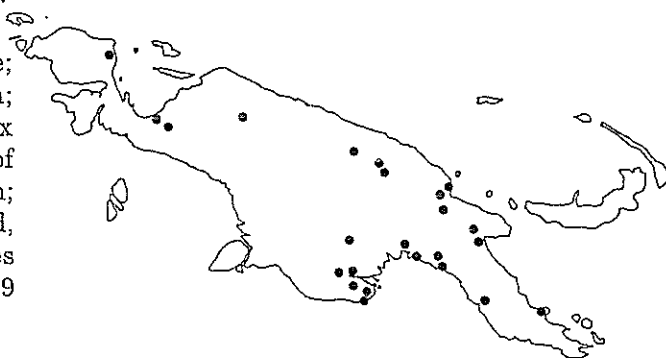




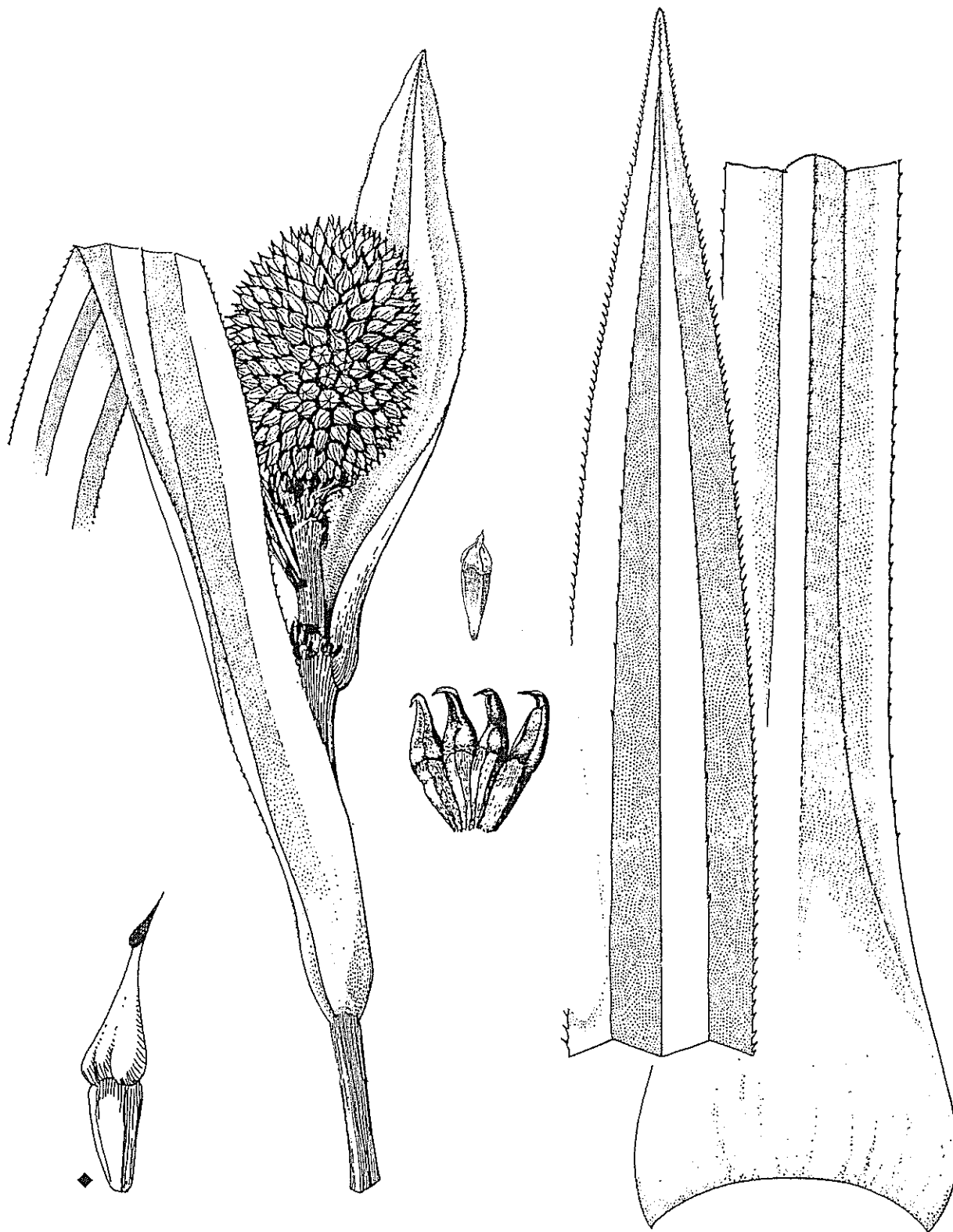
Sub-Section: LAUTERBACHIANI

Pandanus lauterbachii K. Schum. & Warb.

Branched tree to 10 m, often decumbent at base; bark with rounded, spine-like roots to 0.5 cm; proproots very short, slender; leaves 150 (-600) x 5.5 cm; inflorescence terminal, curved, a raceme of up to 12 oblong cephalia, these to 8.5 x 5 cm; drupes \pm laterally flattened, orange to bright red, yellow below; male with a raceme of stout spikes to 19 x 3.5 cm, bracts creamy-white, anthers to 19 mm, with a short apiculus.



Swamp forest, along river banks; sea level to 100 m.



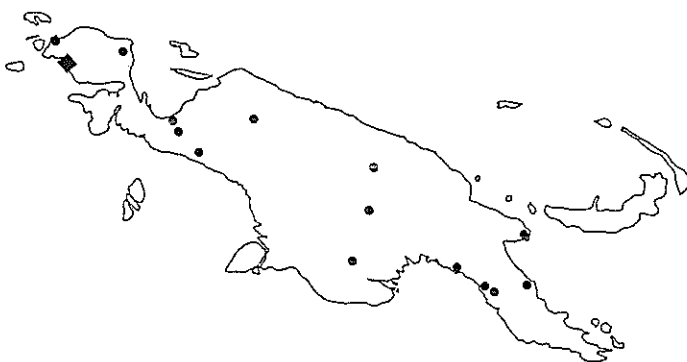
Sub-Section: **ROSTELLATI**

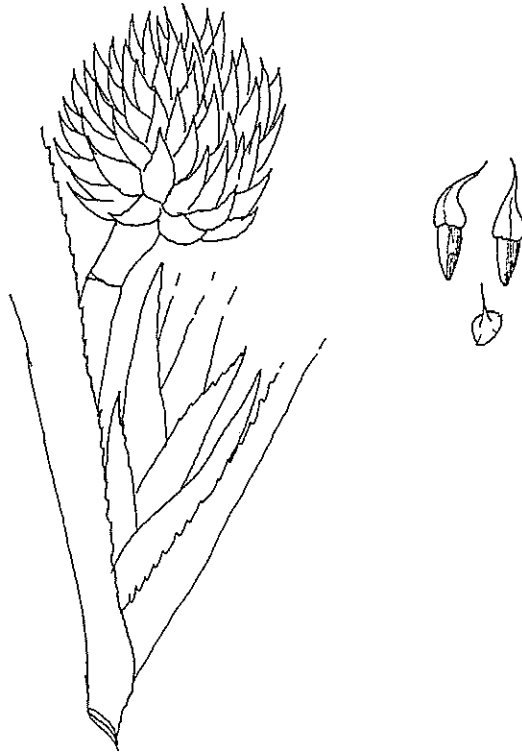
***Pandanus odoardi* Martelli**

Stemless or short-stemmed shrub; leaves 125-250 x 2-6 cm, dark above, glaucous below; cephalium solitary, erect, 6 to 12 cm across, peduncle to 60 cm, rarely with minute cephalia in bract axils; drupes 25-45 x 3-6 mm, pileus ± 5 angled, style variable, either short and acute or more slender and recurved, but not prolonged as in §§*Acrostigma*, scarlet; male unknown.

Forest; 100 to 2,000 m.

A complex, possibly of several species.



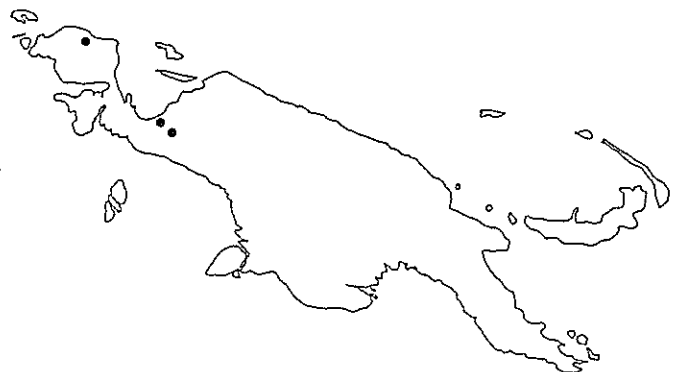


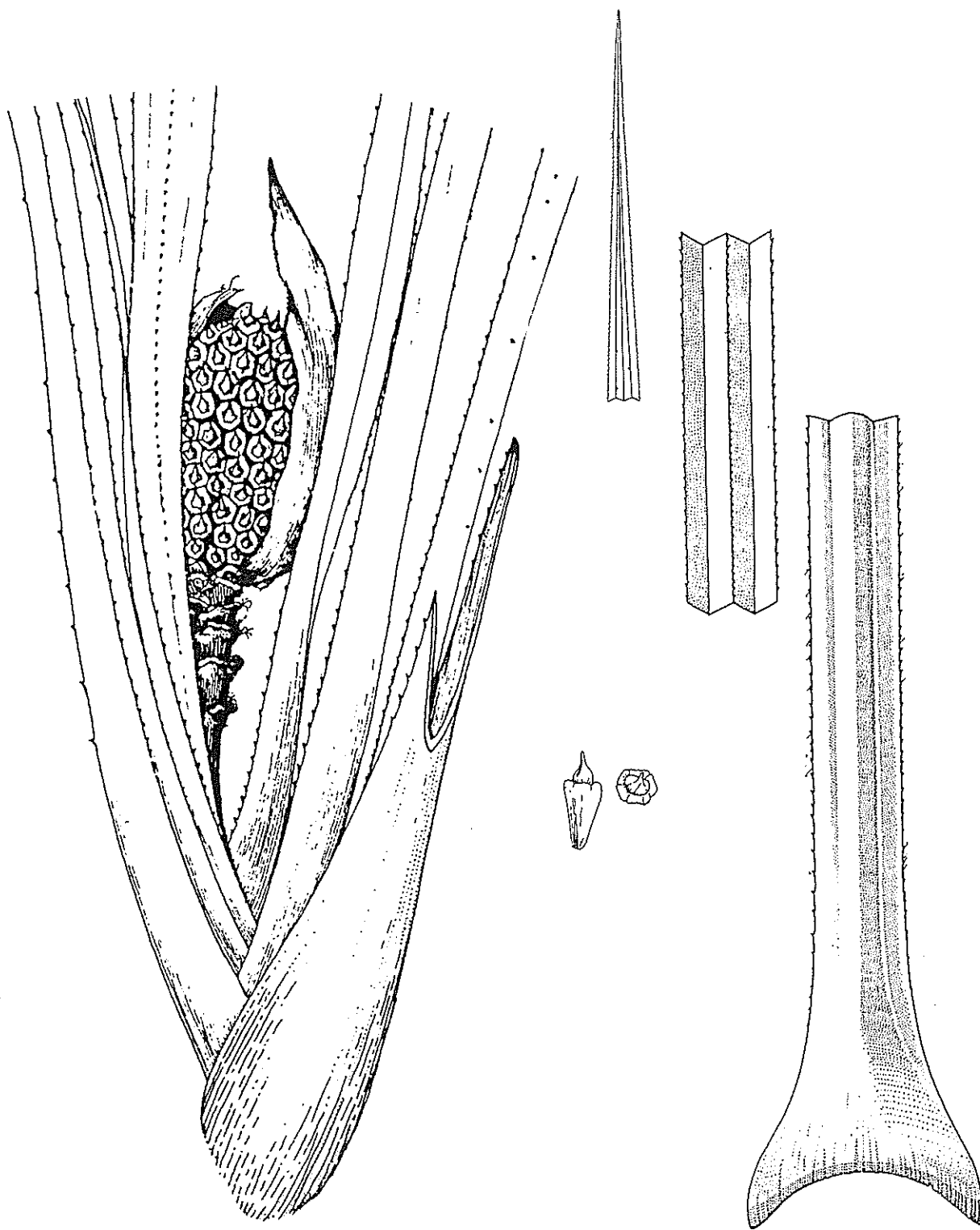
Sub-Section: **ROSTELLATI**

Pandanus permicron Kanehira

Short-stemmed shrub to 60 cm tall; leaves 40-50 x 1.2-2 cm; cephalium solitary, erect, globose, 3.2 cm in diameter; drupes to 12 x 5 mm, style 5 mm, bright red; male unknown. Smaller in all dimensions than *P. odoardi*.

Forest; 100 to 1,000 m.





Section: **PSEUDACROSTIGMA**

***Pandanus ornithocephalus* St. John ex Stone**

Shrub to 60 cm high; leaves very slender, 90-110 x 1.6-1.7 cm, with a broad base; cephalium solitary, terminal, elliptic, to 5 x 4.5 cm; drupes 15 x 5 mm, pileus rounded and sunken towards centre when dry, with a swollen-based style, brownish-green (? possibly unripe); male unknown.

Forest on limestone; at 100 m.

Known from the type specimens only.



The sub-genus *Kurzia* comprises small to medium-sized trees, with solitary or racemose female inflorescences. The male inflorescence is racemose with the exception of §§*Kurzia* and §§*Involuta* in which it is solitary. The drupes are blunt-ended with a cordate to rounded, apical stigma, which is usually central, and unlike the stigmas of §*Lophostigma* is horizontal, and not overtopped by the style, except in §§*Paralophostigma*. The shape and position of the stigma is important in sectional differentiation.

Section *Curvifolia* is distinctive, with its soft-textured, elliptic leaves. The four endemic species have either solitary or racemose cephalia, and the drupes have a flattened stigma.

Section *Involuta* with a single endemic species, has a table-like stigma with a narrow neck-like style.

Section *Jeanneretia* has a single, widespread, coastal species with a raceme of soft red cephalia.

Section *Kurzia* has drupes with a flattened, horizontal apical stigma, and an oil-rich pericarp.

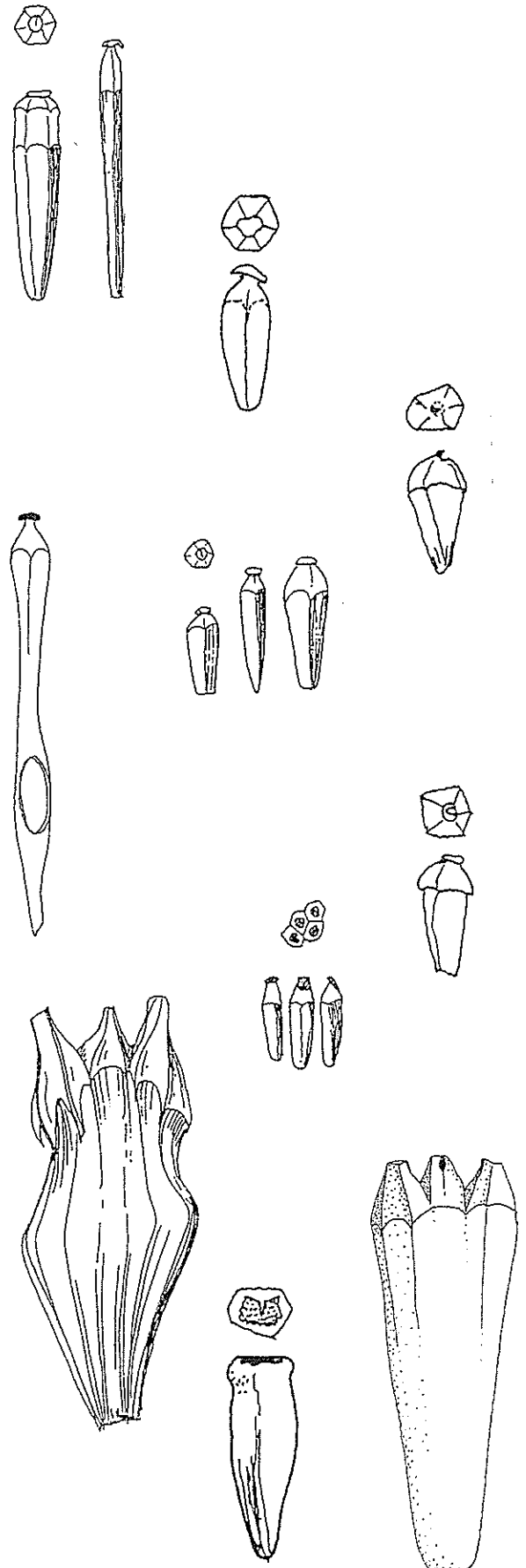
Section *Leptocarpa* has long, matchstick-like drupes in a large ovoid cephalium.

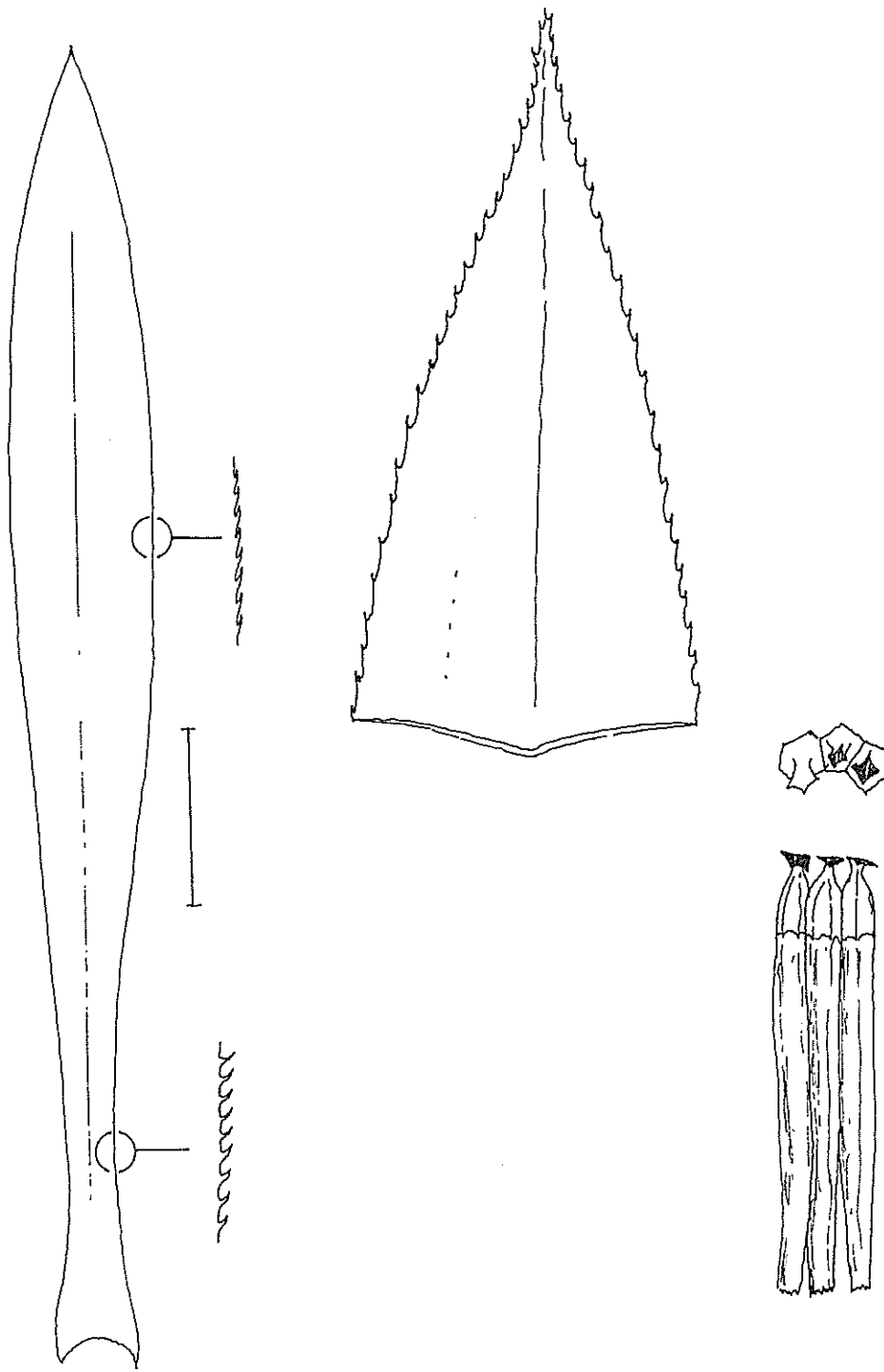
Section *Marginata* has a single endemic species with a characteristic horseshoe-shaped stigma.

Section *Microstigma* has an oblique stigma on the adaxial side of the style. The cephalia may be solitary or racemose, and the drupes have an oil-rich pericarp.

Section *Paralophostigma* has connate drupes with a basal pyrene. Leaf apex bluntly acute and assymetric.

Two unnamed sections each with a single species; one from New Ireland with large cordate stigmas, one from Papua New Guinea with connate drupes like §§*Paralophostigma*.



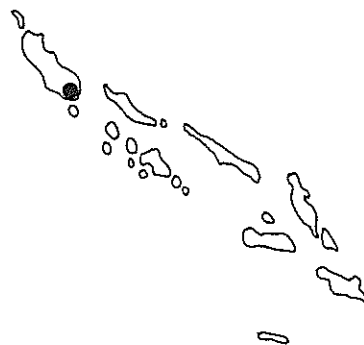


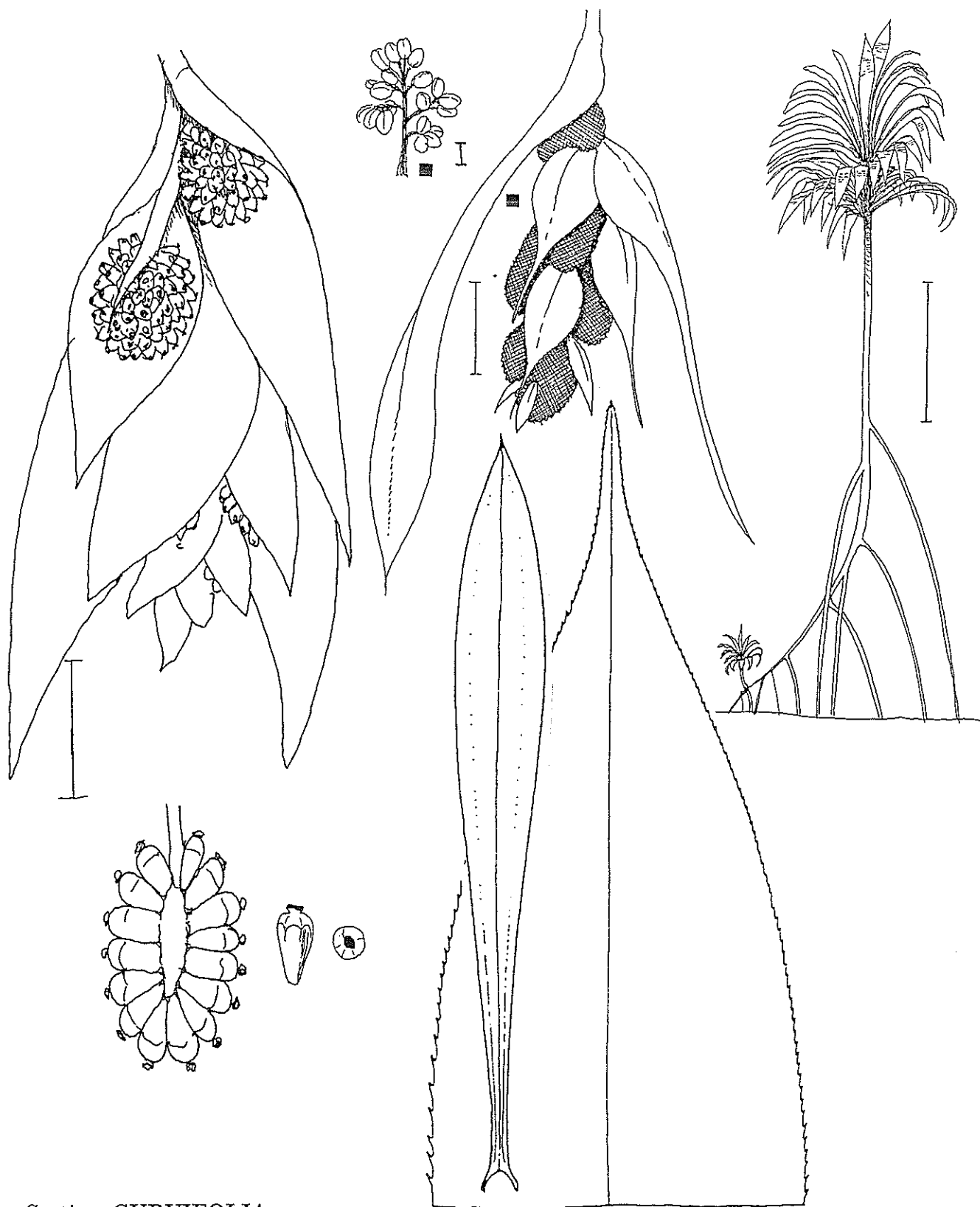
Section: **CURVIFOLIA**

Pandanus buinensis Merr. & L. M. Perry

Tree to 7 m; propoots to 2 m; leaves to 100 x 6.5 cm; cephalium solitary, \pm spherical, to 16 x 14 cm; drupes 40 x 3 mm, cream, style narrow, stigma 2-3 mm across, an irregular cushion with acute, \pm stellate, sharp edges, dark brown; male unknown.

Forest; sea level to 100 m.





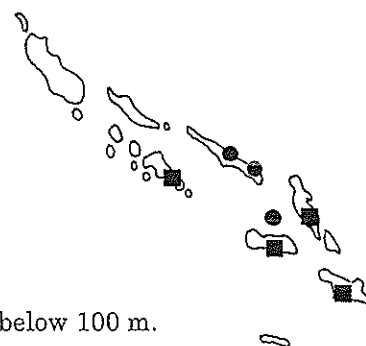
Section: **CURVIFOLIA**

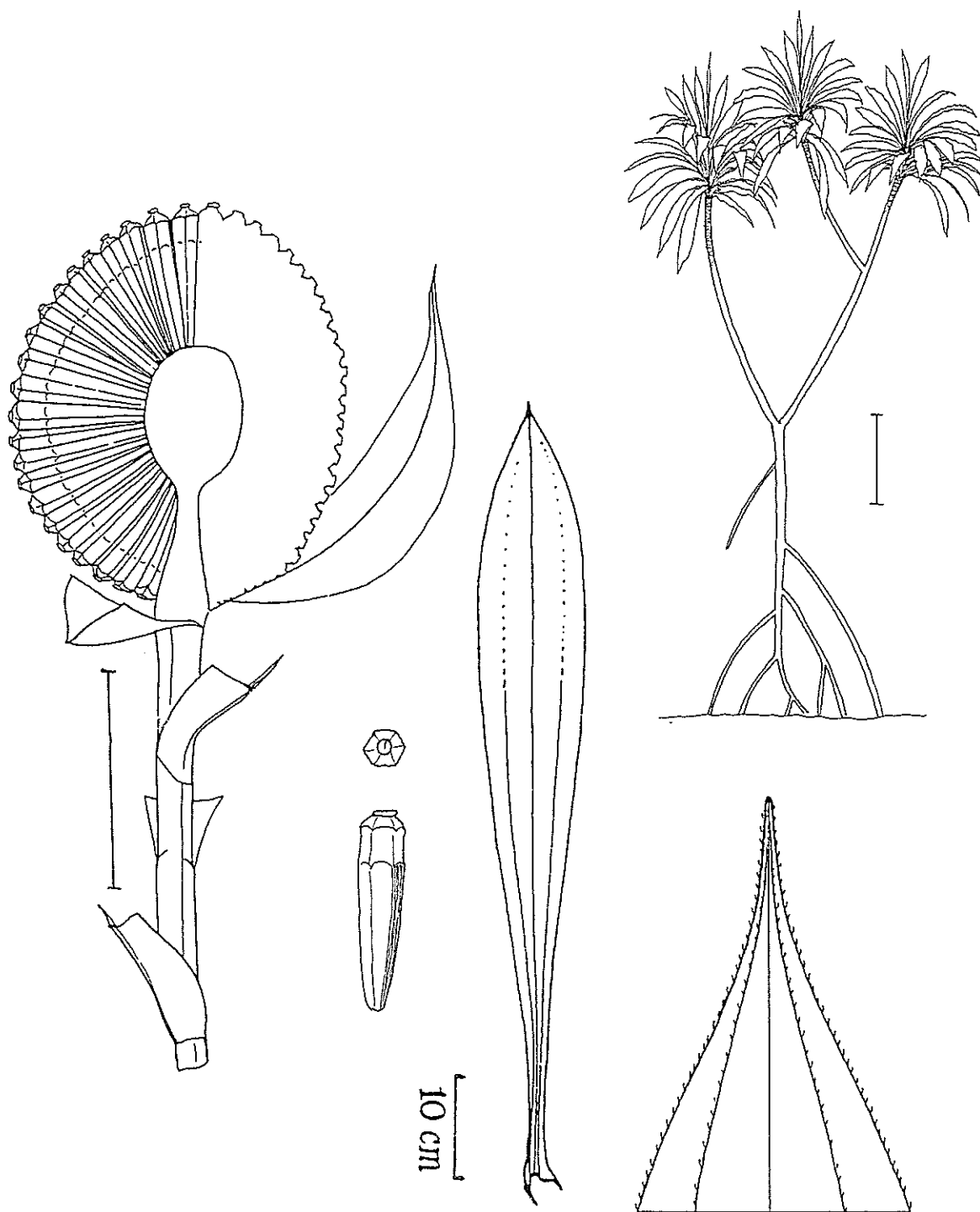
Pandanus nemoralis Merr. & L. M. Perry

Slender tree, rarely branched, to 7 m; proproots long, curved; leaves to 70 x 7.5 cm, narrow-elliptic, thin textured, flat, margin armed at apex and base only; inflorescence terminal, a raceme of c.14, ovoid, flattened cephalia to 6 x 5 cm, apically much smaller, bracts green; drupes white, to 10 x 5 mm; male inflorescence structurally identical.

Swampy forest, often on small raised mounds above water level; below 100 m.

Pandanus decus-montium Stone, is similar, differing in its red drupes ■



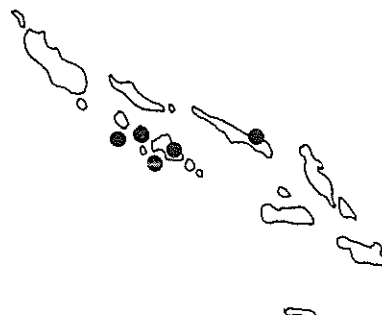


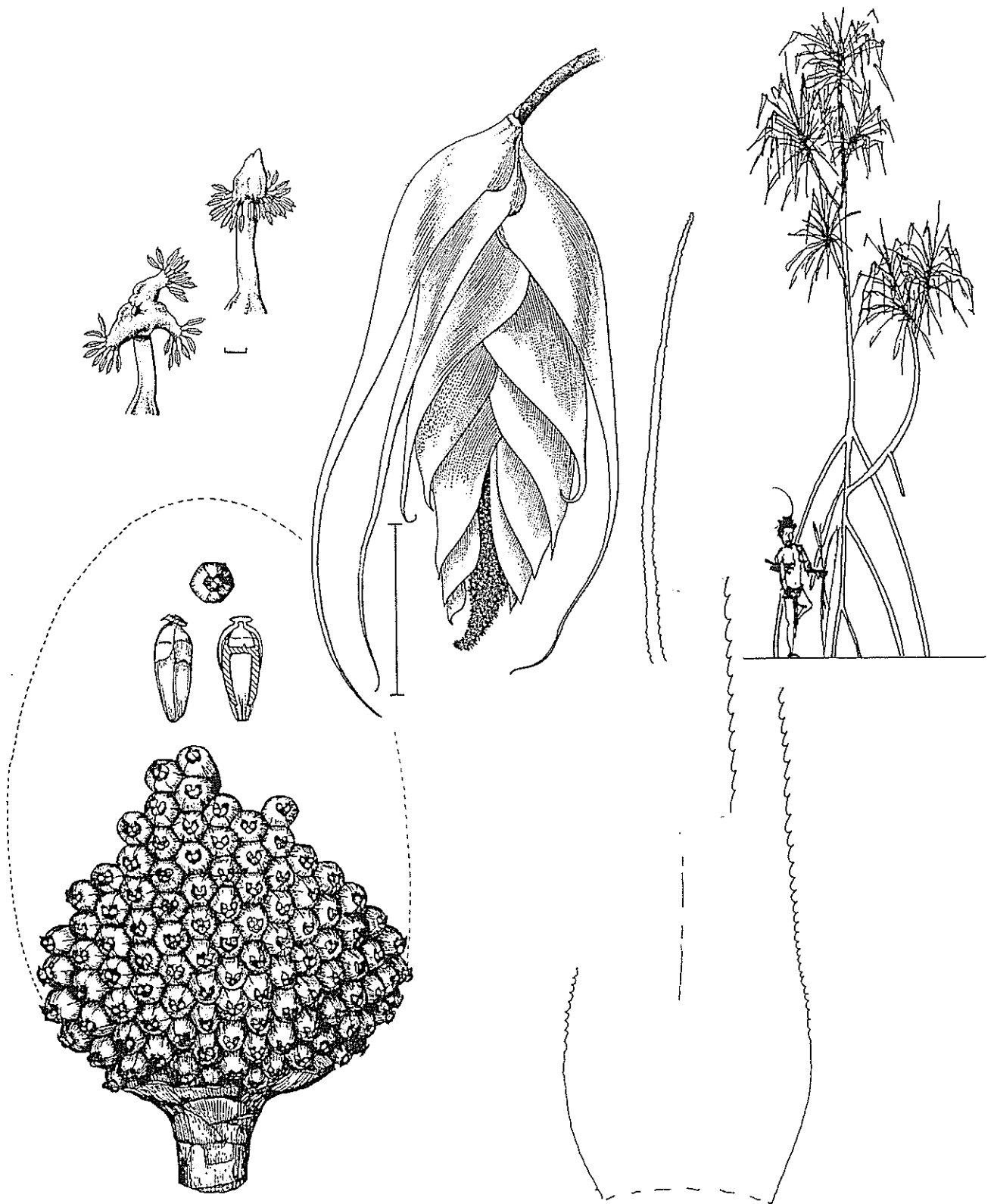
Section: **CURVIFOLIA**

Pandanus paludosus Merr. & L. M. Perry

Slender, branched tree, to 7 m; prop roots to 3 m; leaves narrow-elliptic, to 85 x 8 cm, margin armed throughout, lateral pleats \pm thorned; cephalium solitary, \pm spherical, to 10 x 8 cm; drupes 30 x 7 mm, white, pileus flat, stigma broad, brown, male unknown.

Forest, swampy to well-drained slopes; below 100 m.





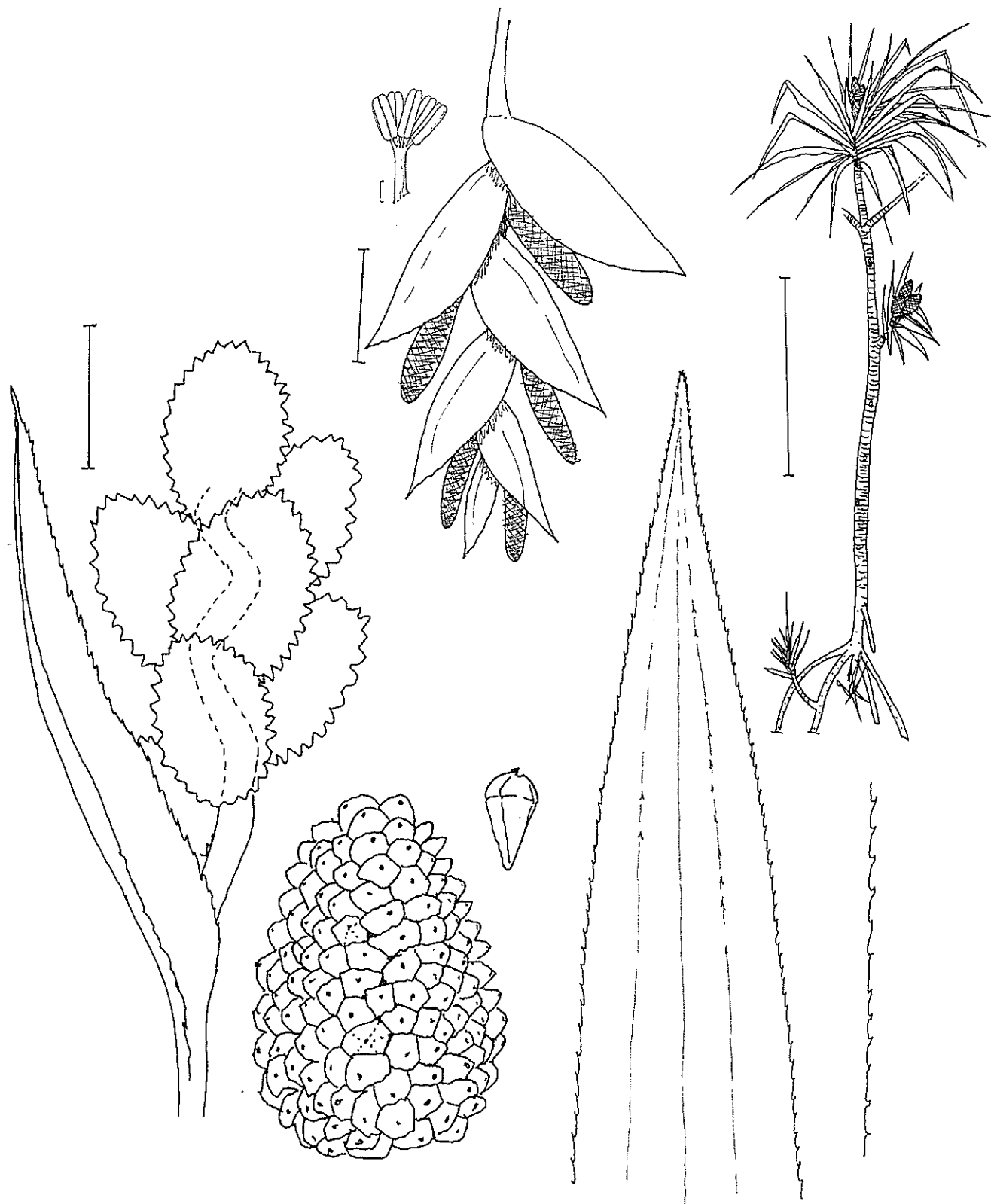
Section: INVOLUTA

Pandanus leiophyllus Martelli

Slender tree to 12 m; branches short, scattered up main trunk; proproots wide-spreading, few, long; leaves 120 x 3 cm, apex caudate; cephalium semi-erect, to 12.5 cm, with crowded deciduous bracts to 40 x 4 cm, which rupture at middle when ripe; drupes soft, red, with a hard yellow apex; male inflorescence a single conical spike c.15 cm long with numerous branched phalanges of up to 30 anthers, closely enveloped by white bracts.

Riverbanks, wet areas in forest; sea level to 100 m.



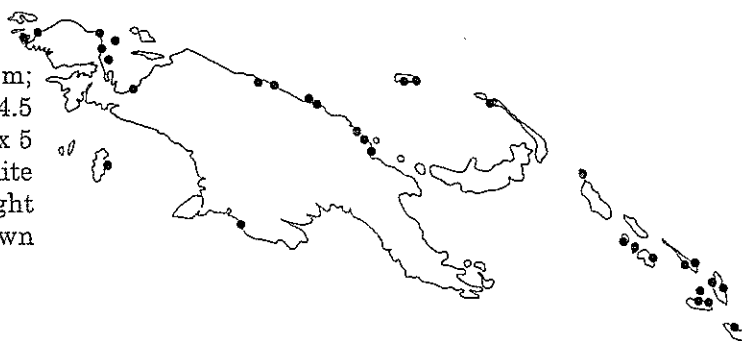


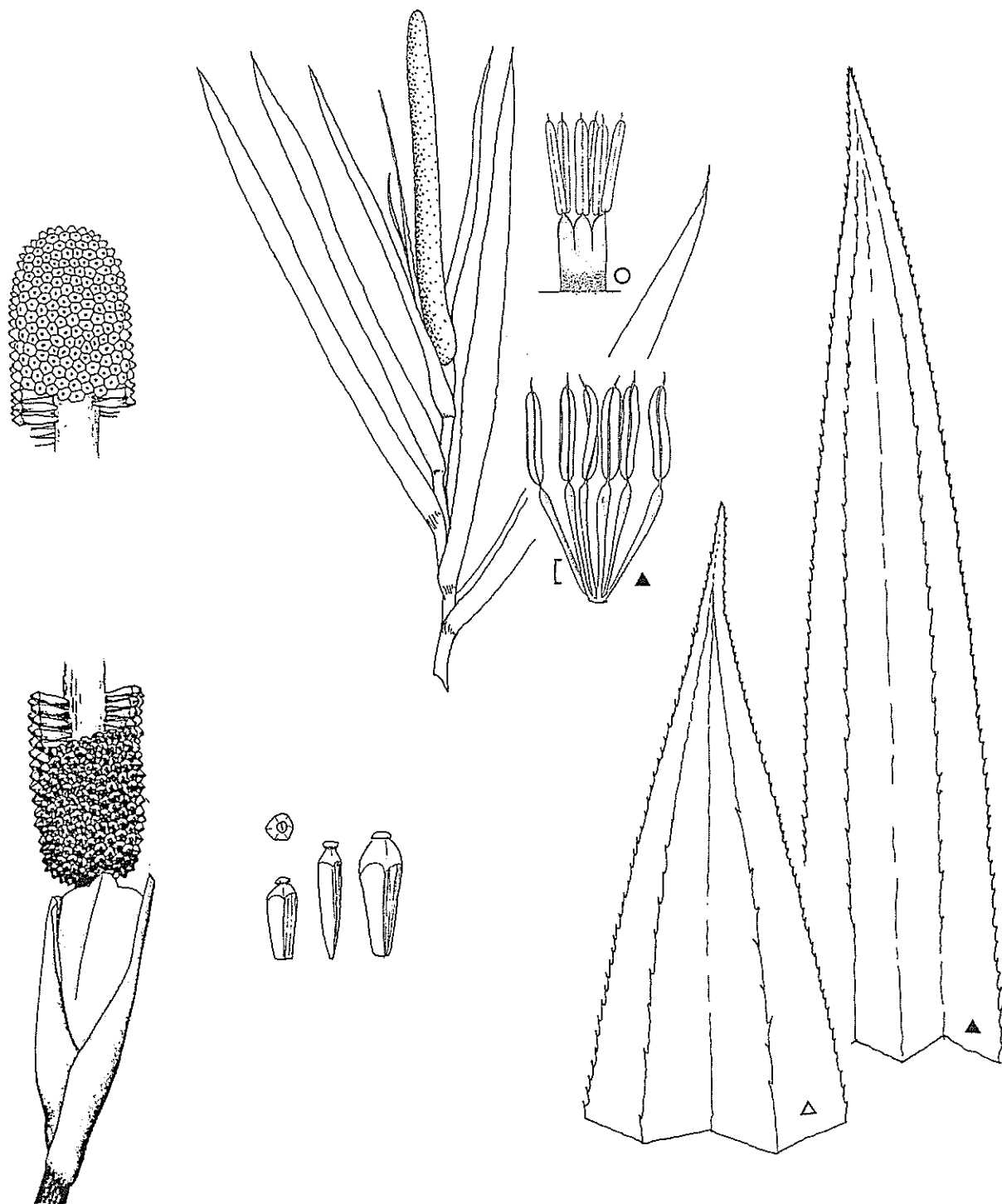
Section: JEANNERETIA

***Pandanus polycephalus* Lamarck 1785**

Short, clump-forming, branched shrub to 4 m; proproots to 40 cm, spreading; leaves to 90 x 4.5 cm; cephalia in a raceme of 5-8, tetragonal, to 7 x 5 cm, mostly borne on short side shoots, bracts white to yellow, falling early; drupes soft, fleshy, bright red; male inflorescence a raceme of short brown spikes to 6 x 1 cm, anthers to 1.5 mm.

Coastal; mangrove swamps and sandy beaches.

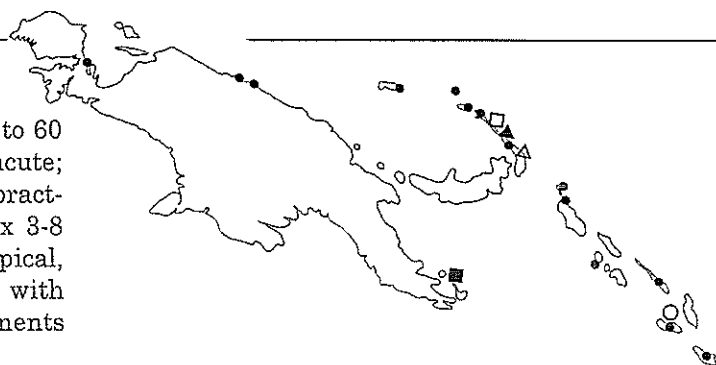




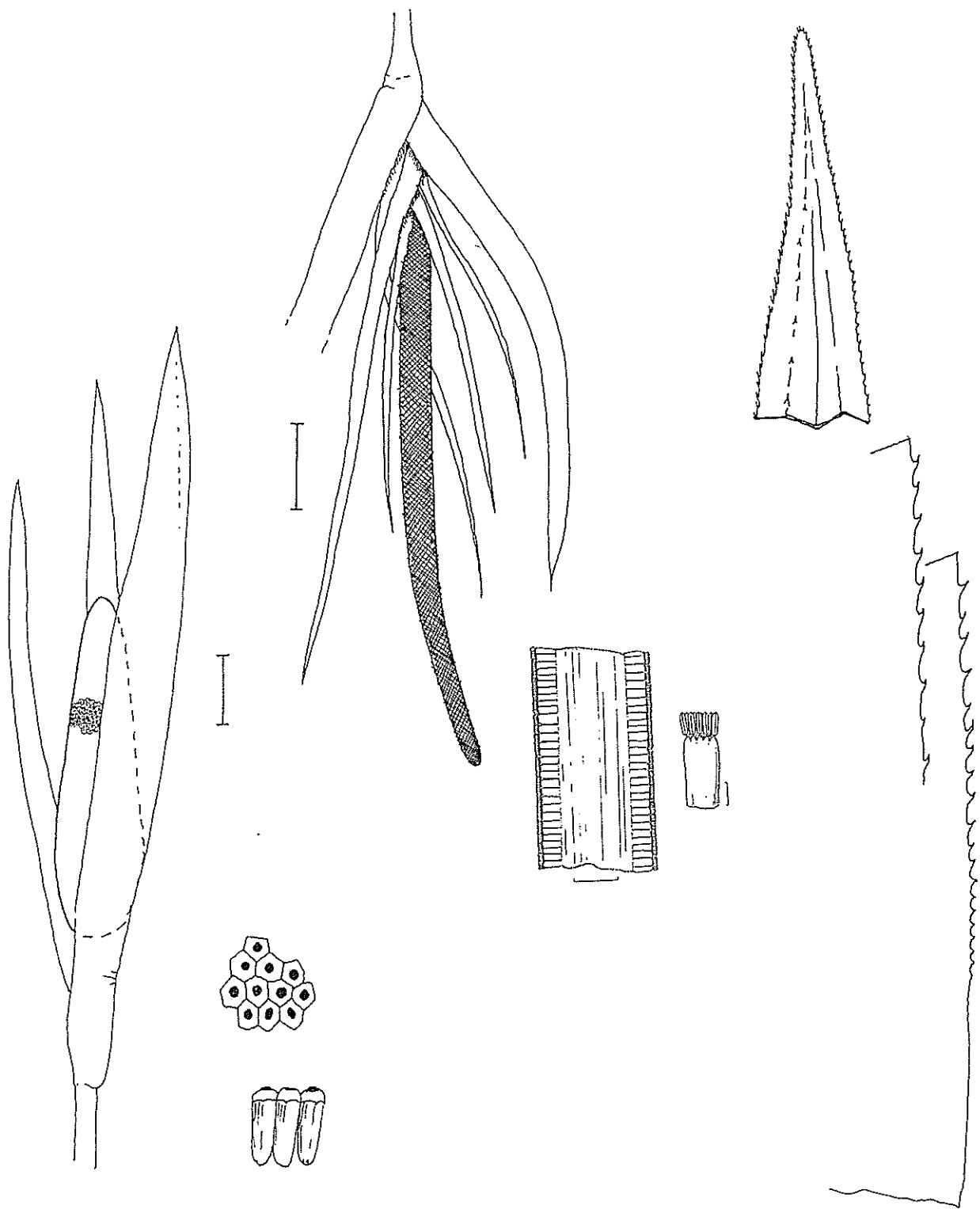
Section: KURZIA

Pandanus macgregorii Solms-Laub.

Sparsely-branched tree to 7 m tall; proproots to 60 cm; leaves to 250 x 12 cm, apex tapering to acute; cephalium 20-35(-60) x 5-14 cm, partially bract-covered, these whitish-yellow; drupes 12-22 x 3-8 mm, red, pileus rounded to acute, stigma apical, horizontal, brown; male spike solitary, with yellow-white bracts, anthers 3 mm long, filaments 3 mm and connate in lower half.



One of the edible *maritas*; cultivated, and wild; sea level to 600 m. The type localities of the several related species are marked: *P. cominsii* ○ ; *P. englerianus* △ ; *P. latericius* ▲ ; *P. macgregorii* ■ ; *P. minusculus* □ .



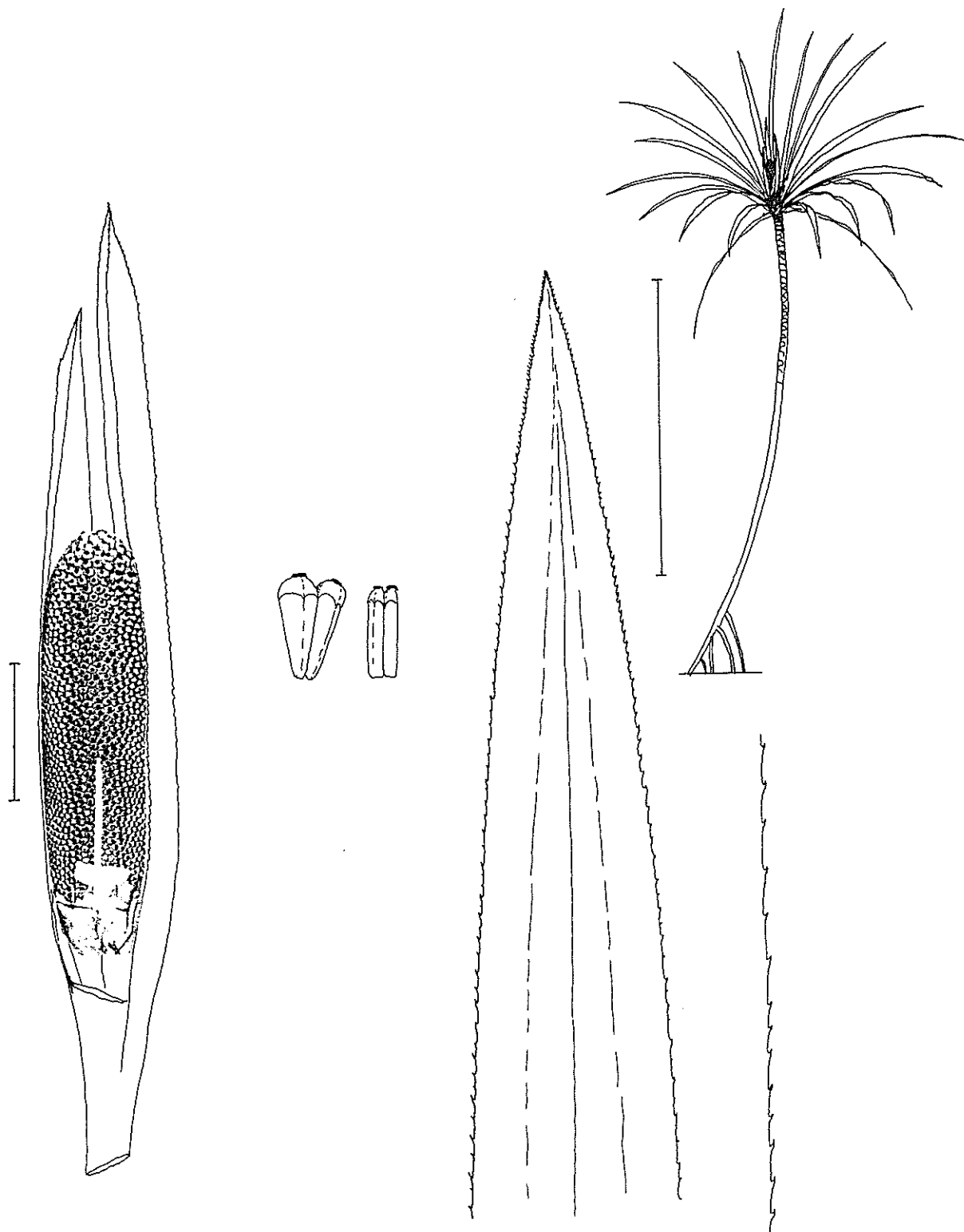
Section: **KURZIA**

***Pandanus subumbellatus* Beccari**

Branched tree to 12 m; proproots thick, with 1 cm spines; leaves 240 x 5 cm, glaucous below; cephalium cylindrical, semi-erect, to 24 x 7 cm, bracts yellow; drupes to 15 x 5 mm, red, pileus rounded, stigma black, sessile and \pm flush; male inflorescence a solitary spike to 50 x 2.5 cm, yellow to reddish brown, surrounded by yellow bracts.

Swamp forest; sea level to 100 m.





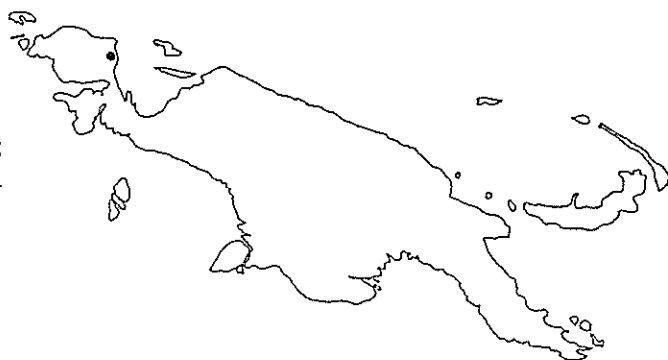
Section: **KURZIA**

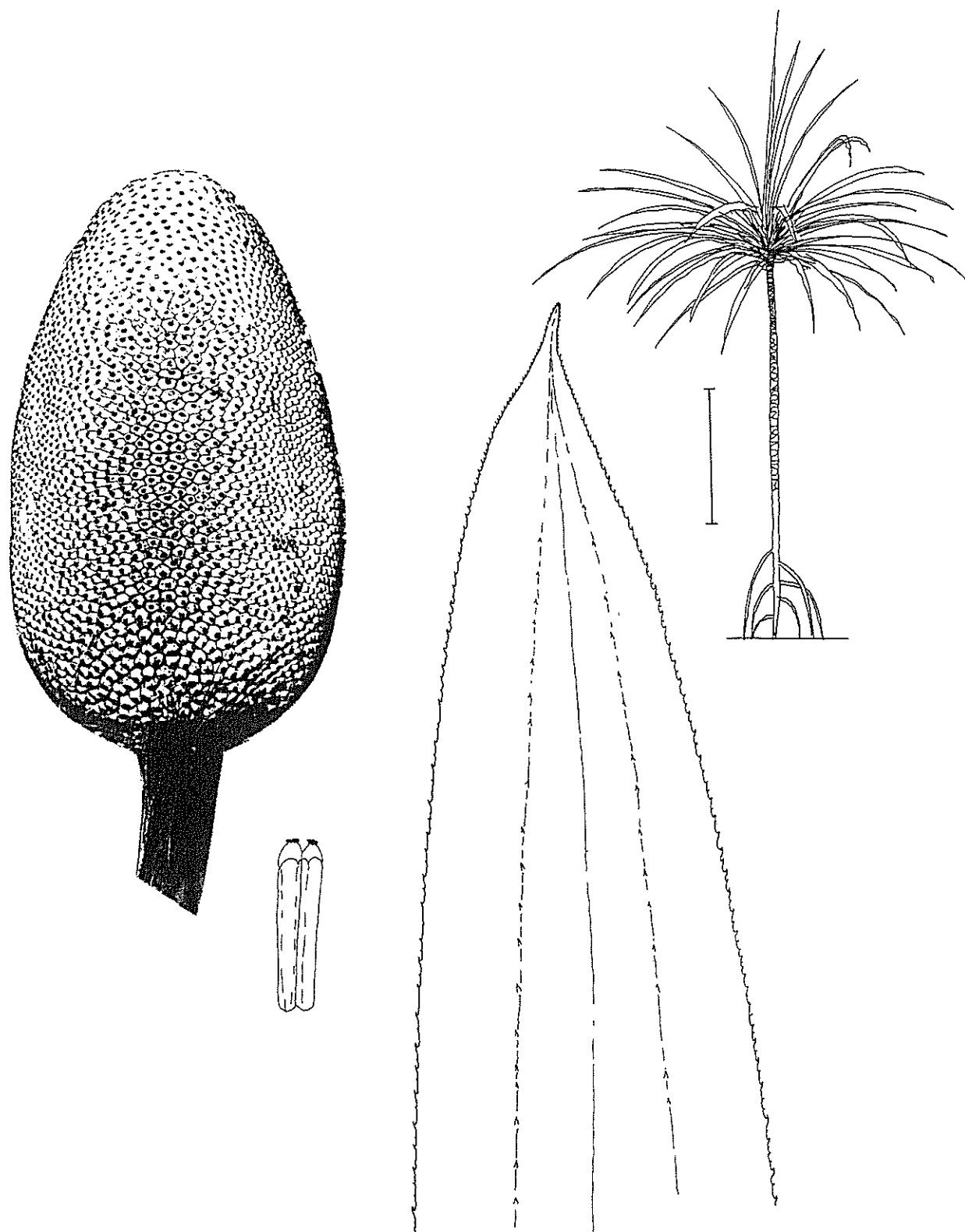
Pandanus species 1

Unbranched(?), decumbent to upright tree to 1.5 m; proproots short, to 20 cm; leaves 150 x 3.5 cm, dark glossy green; cephalium cylindrical, erect, \pm triangular in section, 14.5 x 4.5 cm, bracts yellow; drupes 13 x 2-5 mm, red, pileus rounded, stigma black, raised, to 1.5 mm across; male unknown.

Forest on limestone at 400 m.

Known from a single collection.





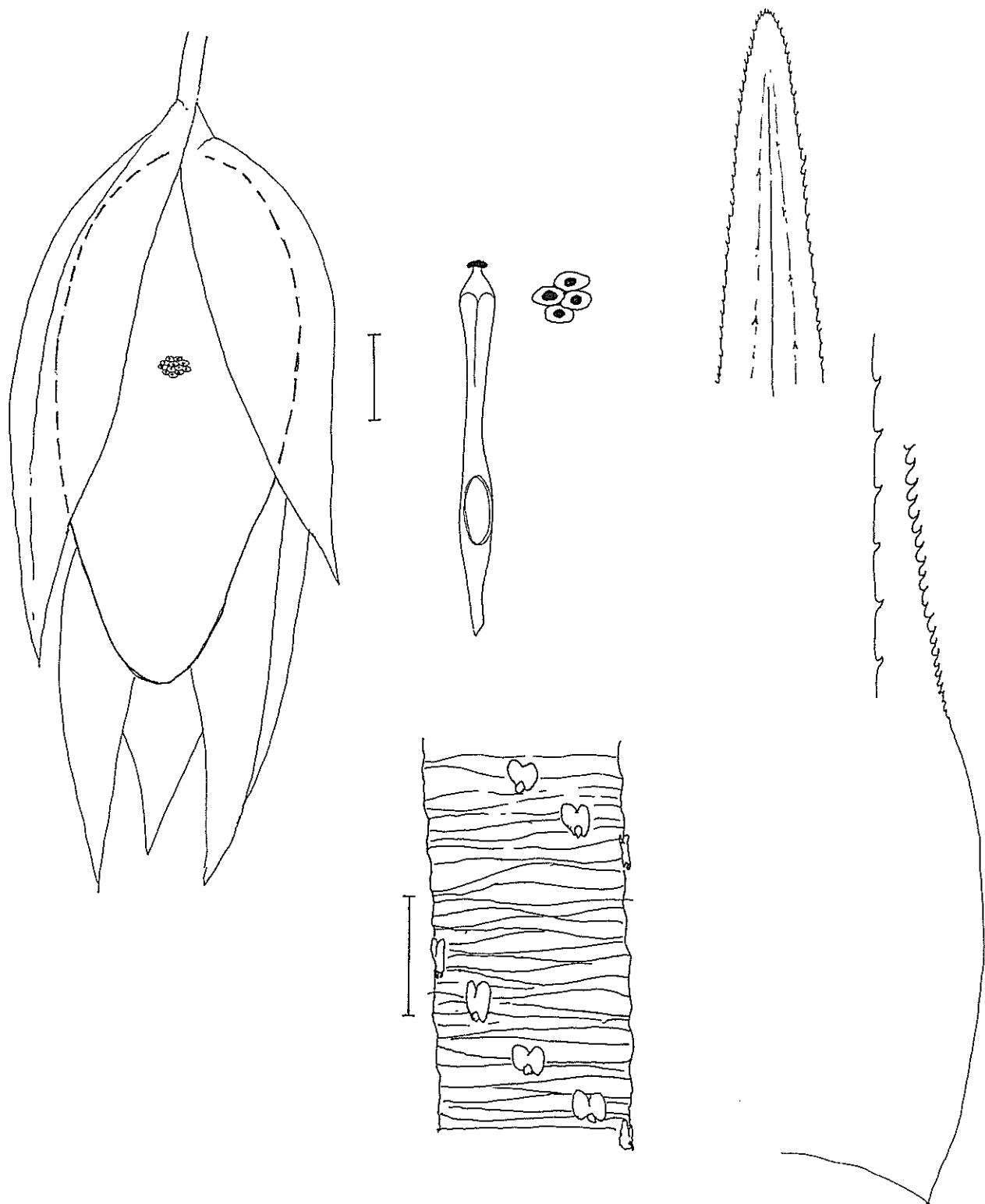
Section: KURZIA

Pandanus species 2

Sparsely-branched, upright tree to 3 m; proproots to 1.5 m above ground level, arising perpendicular to the trunk, widespreading; leaves 250 x 7 cm, dark glossy green, curved; cephalium pendent, ovoid, 19 x 11 cm, markedly triangular in section, bracts withering when ripe; drupes 23 x 2.5-4.5 mm, red, pileus rounded, stigma black, raised, to 1.5 mm across; male unknown.



Forest on limestone at 300 m. Known from a single collection.



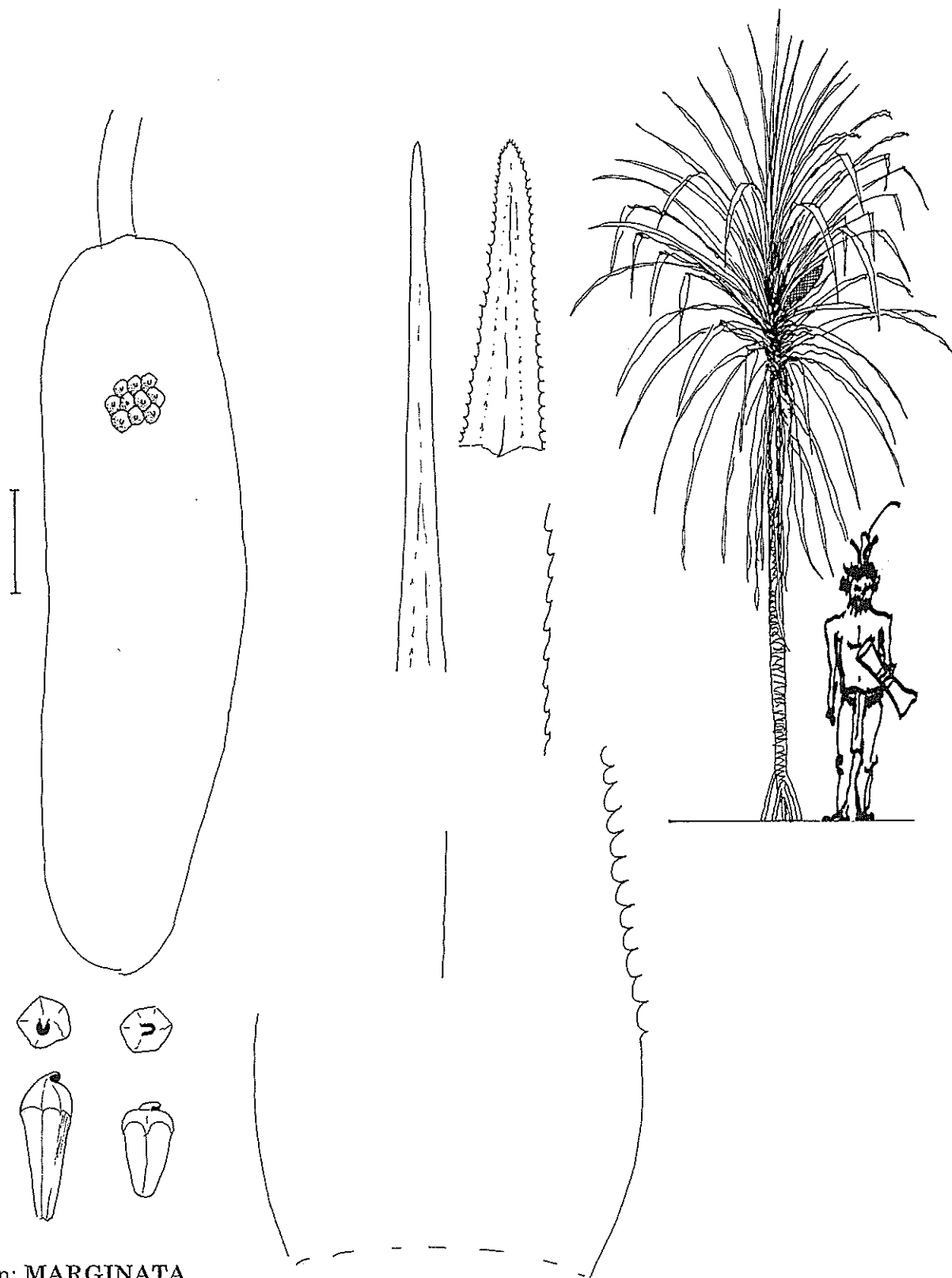
Section: **LEPTOCARPA**

Pandanus leptocarpus Martelli

Much-branched, decumbent to prostrate stem, with numerous sucker shoots, to 15 m long, with a 'spiral' of cordate-buds; leaves to 240 x 10 cm, lateral pleats ±thorned, glaucous below, but differing on main and sucker shoots; cephalium ovoid, bract-covered, to 35 x 19 cm, disintegrating when ripe, peduncle to 60 cm; drupes to 60 x 6 mm, pileus green, red-orange or scarlet below; male unknown.



Forming pure stands on inner curve of rivers; sea level to 50 m.

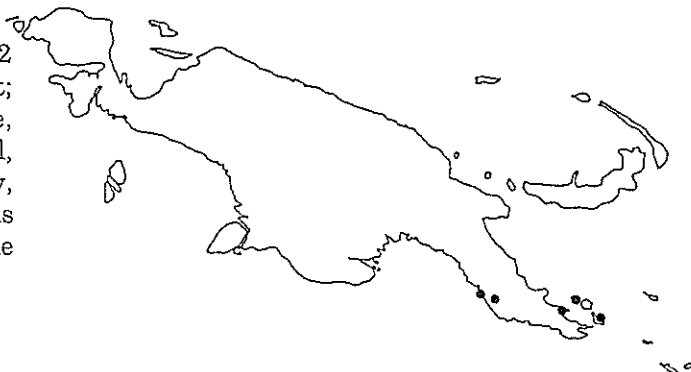


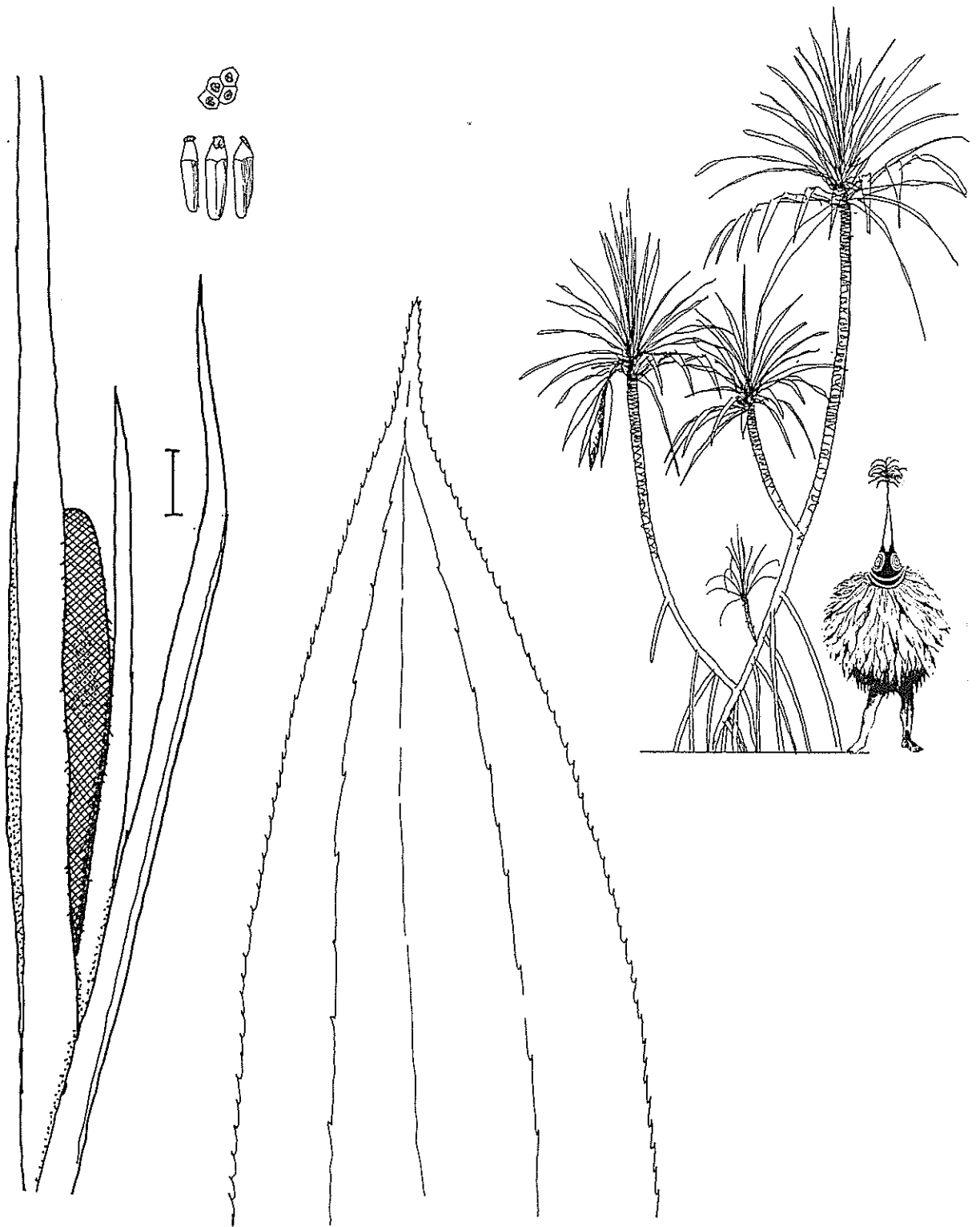
Section: **MARGINATA**

Pandanus meniscostigma Merr. & L. M. Perry

Erect, sparsely-branched tree to 7 m; bark with 2 cm spines; propoots upright to 1 m, or absent; leaves to 250 x 4.5 cm, apex acuminate to caudate, occasionally unarmed; cephalium cylindrical, bract-covered, to 35 x 8 cm, hanging below canopy, peduncle to 30 cm; drupes orange-red, pileus ridged on angles, stigma horseshoe-shaped; male unknown.

Forest; sea level to 450 m.





Section: MICROSTIGMA

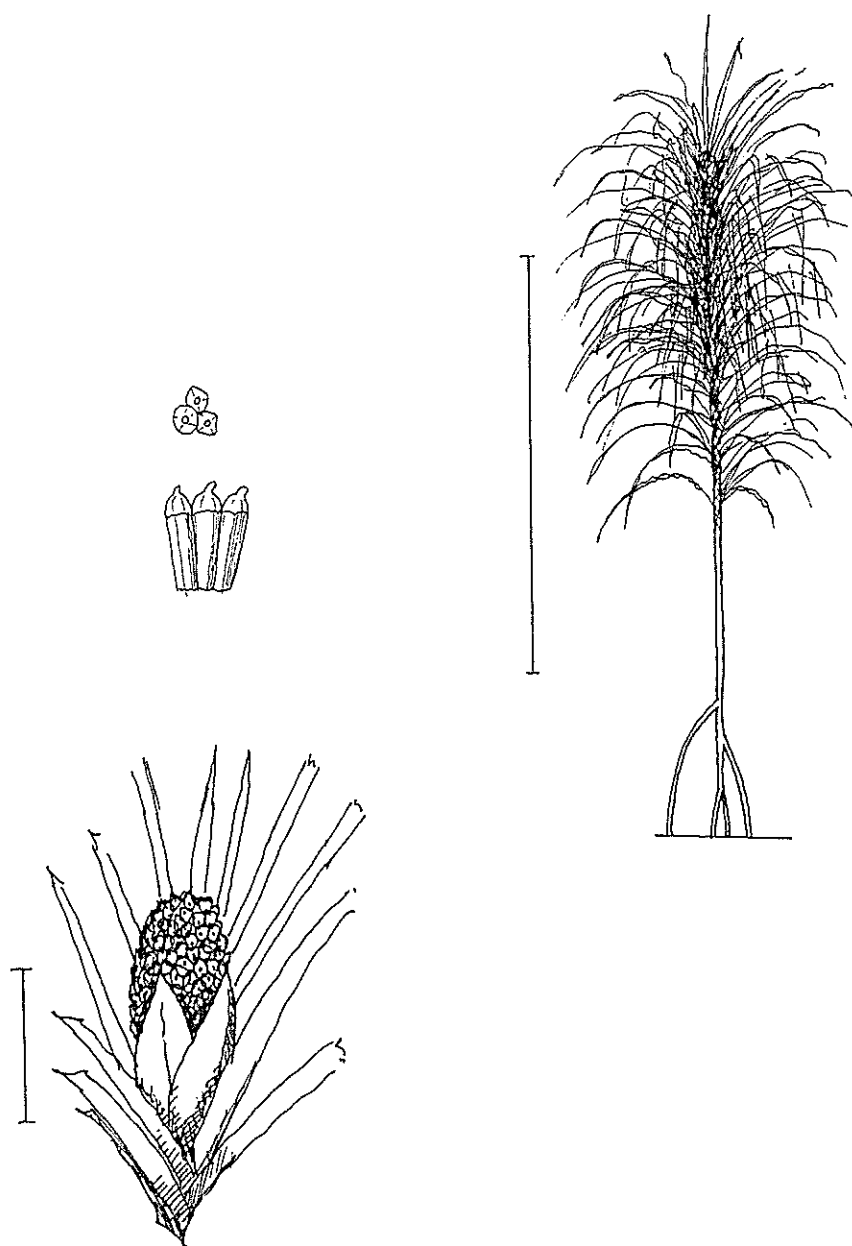
Pandanus conoideus Lamarck

Clump-forming, branched tree, to 7 m; proproots few, short; leaves 200 x 12 cm, apex abruptly acute to acuminate; cephalium pendent, to 42 x 11 cm, \pm triangular in section, partially bract covered, these green; drupes 14-25 x 4-6 mm, red or yellow, with an oblique, lateral stigma; male unknown.

One of the edible maritas; with numerous cultivars.

Cultivated from sea level to 2,000 m; propagated from cuttings; apparently not known from the wild, but persistent in regrowth for up to 20 years.





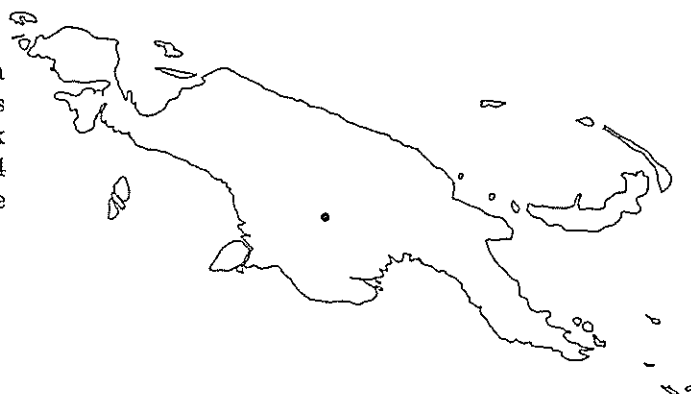
Section: MICROSTIGMA

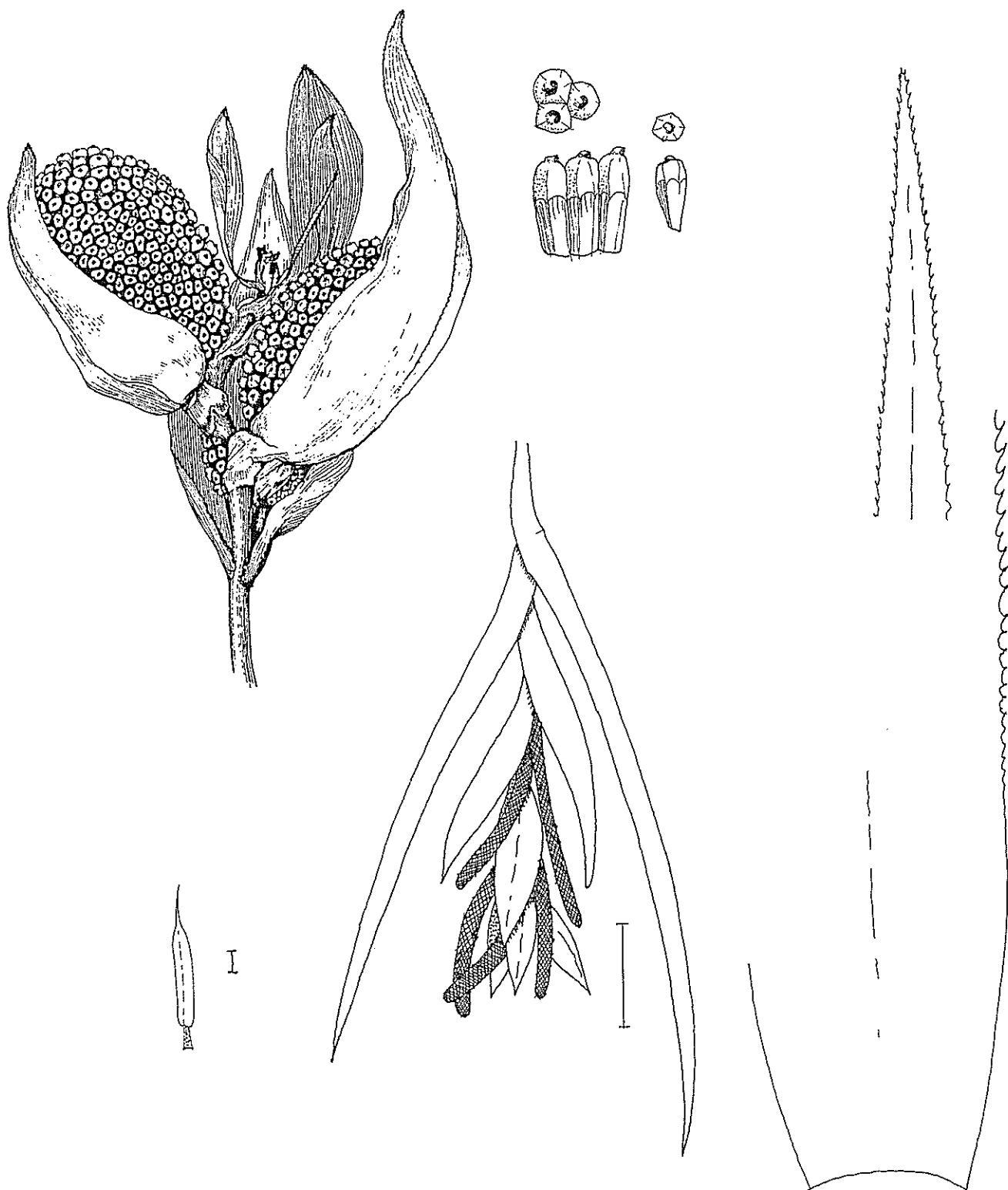
Pandanus exiguus Merr. & L. M. Perry

Small, unbranched tree to 2 m, the upper half with leaves; trunk raised on proproots to 30 cm; leaves 80 x 1.5 cm, curving; cephalium solitary, erect, 7 x 3.5 cm, surrounded by short bracts; drupes 13 x 4 mm, red, stigma lateral to horseshoe shaped; male unknown.

Forest in swampy depressions; 100 m.

Known from the type specimen only.



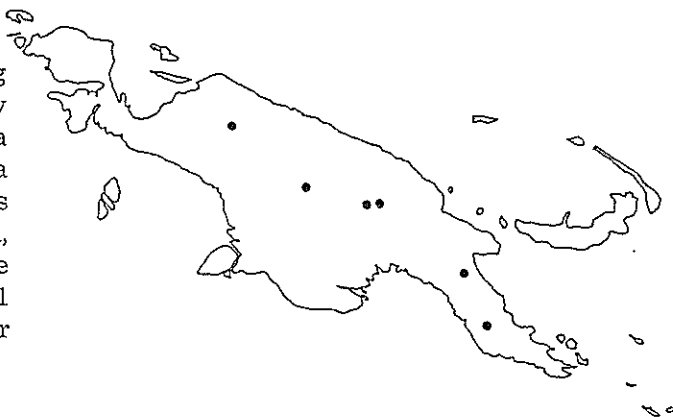


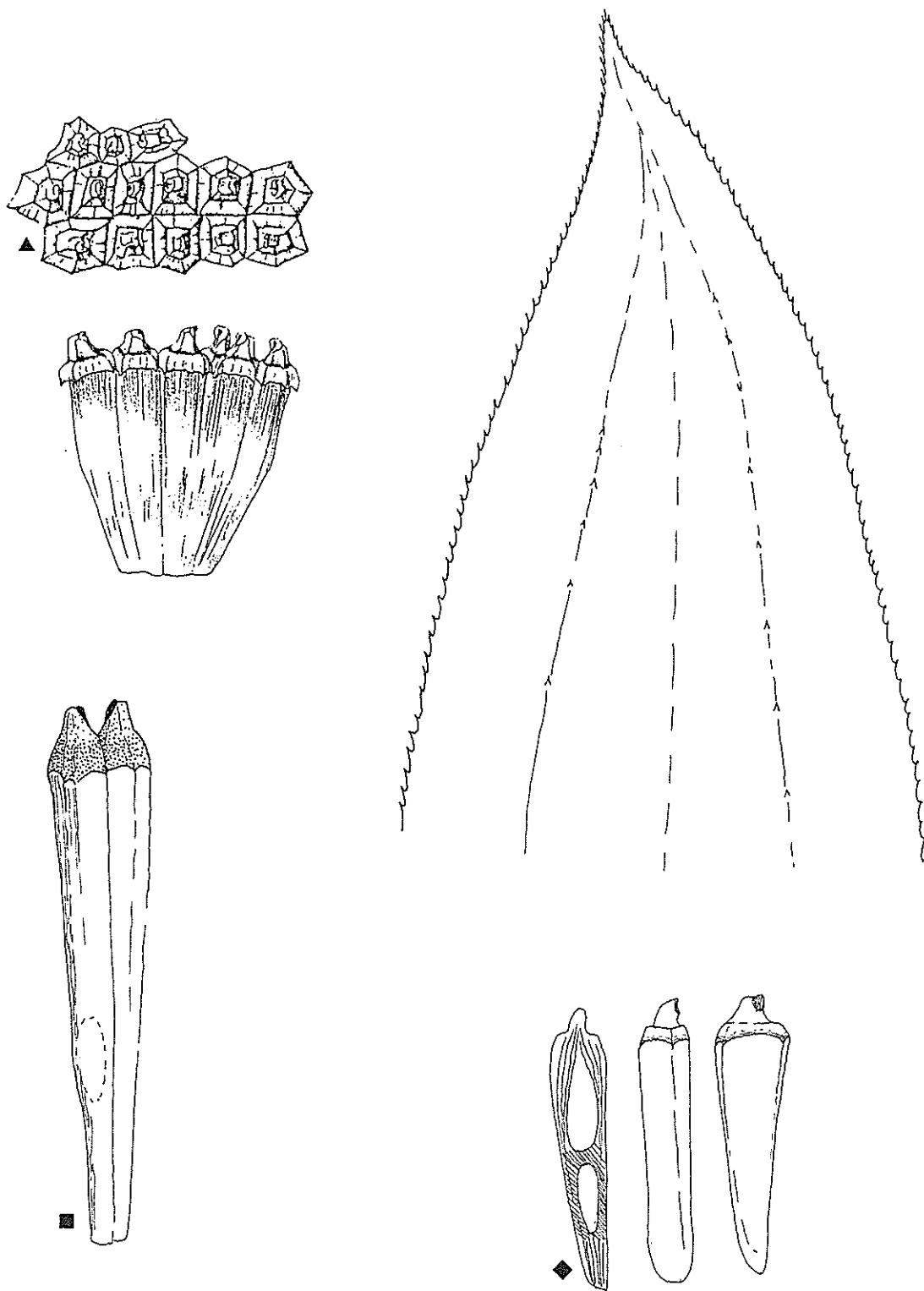
Section: MICROSTIGMA

Pandanus leptocaulis Merr. & L. M. Perry

Slender, unbranched tree to 3 m; lacking propoots; leaves 180 x 2(-3.5) cm, apex gradually and long attenuate; cephalium solitary or a raceme of 2-3(-5), terminal, erect, each with a single bract, to 10 x 4 cm, smallest at apex; drupes to 15 x 4 mm, yellow to orange, stigma lateral, cordate, cushion-like; male inflorescence pendulous, bracts white, foetid, spikes to 10 x 1 cm, anthers 4-5 mm overall, with long, slender filament and apiculus.

Mossy forest; 900-2,000 m.



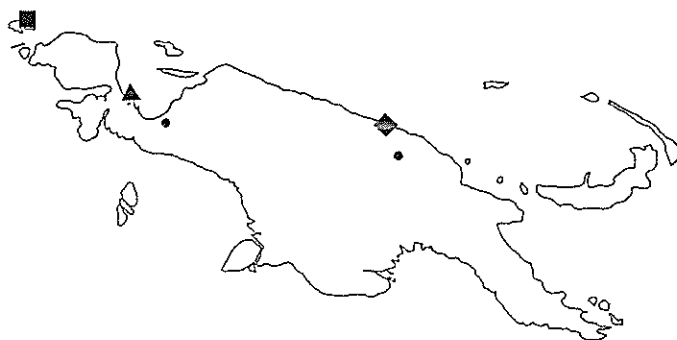


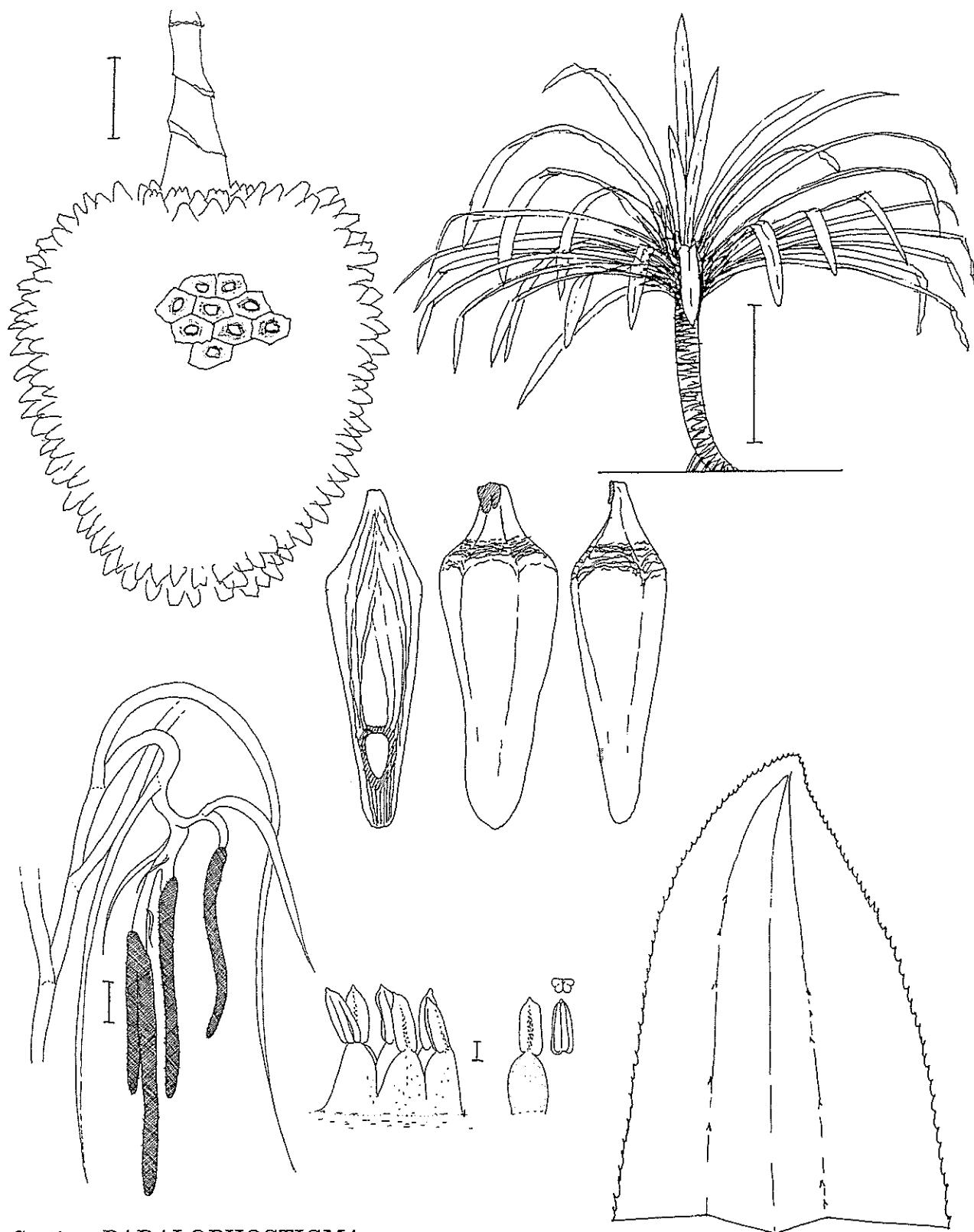
Section: PARALOPHOSTIGMA

Pandanus balenii Martelli

Unbranched tree to 4 m or more, proproots few, short, thin; crown broad and flattened; leaves to 300 x 12 cm; cephalium cylindrical to ovoid, to 28 x 13 to 33 x 26 cm; drupes 45 x 11 to 70 x 8 mm, pileus abruptly narrowing, mostly solitary, but near base fused into transverse rows of 3-5, pileus brown to green, basally orange-red; male unknown.

Forest; sea level to 100 m.





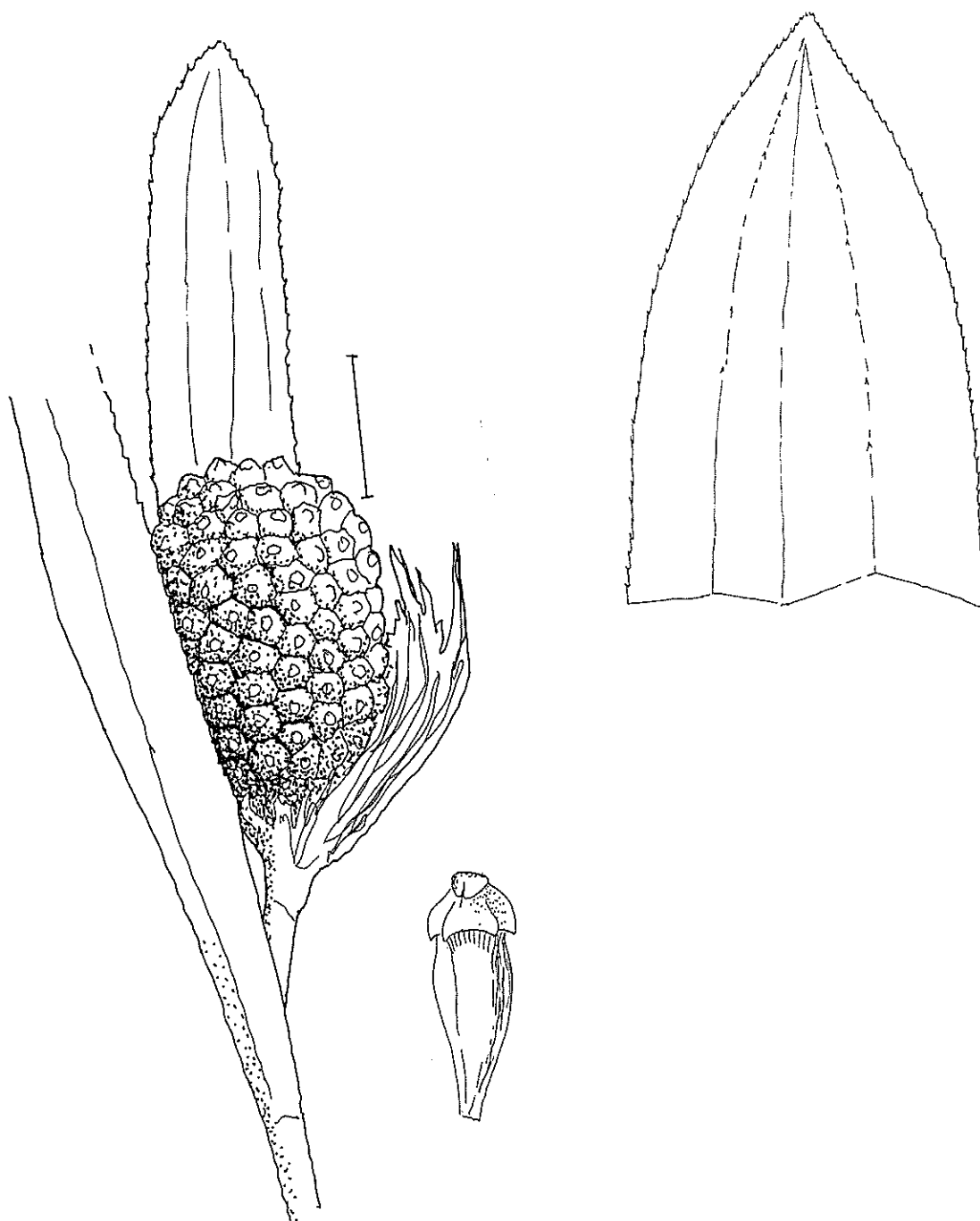
Section: PARALOPHOSTIGMA

Pandanus clarkei Stone

Unbranched tree to 3 m; propoots short, slender; leaves 200 x 9 cm, abruptly rounded and concave at apex, \pm assymetric, lateral pleats thorned near apex; cephalium solitary, pendent, ovoid to \pm cylindric, 28 x 16 cm, angular in section; drupes 55 x 20 mm, mostly solitary, but some fused into rows of 2-3 (4) carpels, apex brown-green, bright orange below; male a loose raceme of 3-4 male spikes, to 33 x 2 cm, bracts yellow, anthers 3 x 1 mm, on thickened filaments to 3 x 2 mm.



Forest, river banks; sea level to 500 m.



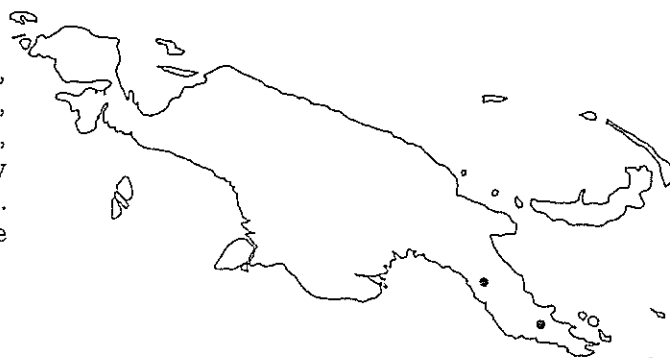
Section: **PARALOPHOSTIGMA**

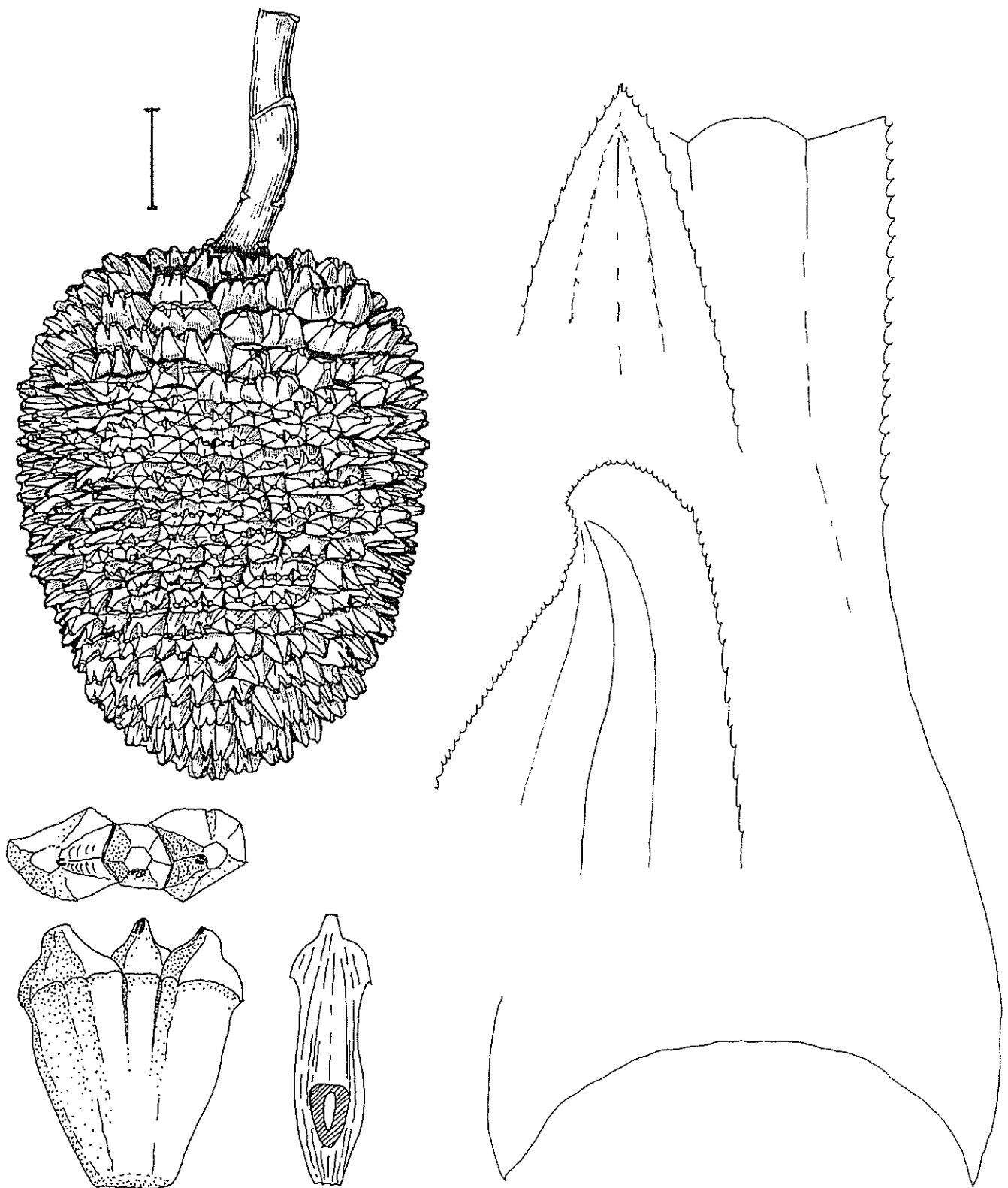
***Pandanus daymanensis* H.St.John**

Stemless ?; propoots ?; leaves 230 x 6.2 cm, lateral pleats thorned near apex, apex broad, concave, keeled; cephalium solitary, pendent, ellipsoid, 13 x 9.5 cm; drupes 37 x 12 mm, nearly all solitary, brown with a green apex (? immature, possibly larger cephalium and drupes); male unknown.

Forest; 700 m.

Known from the type specimen only.





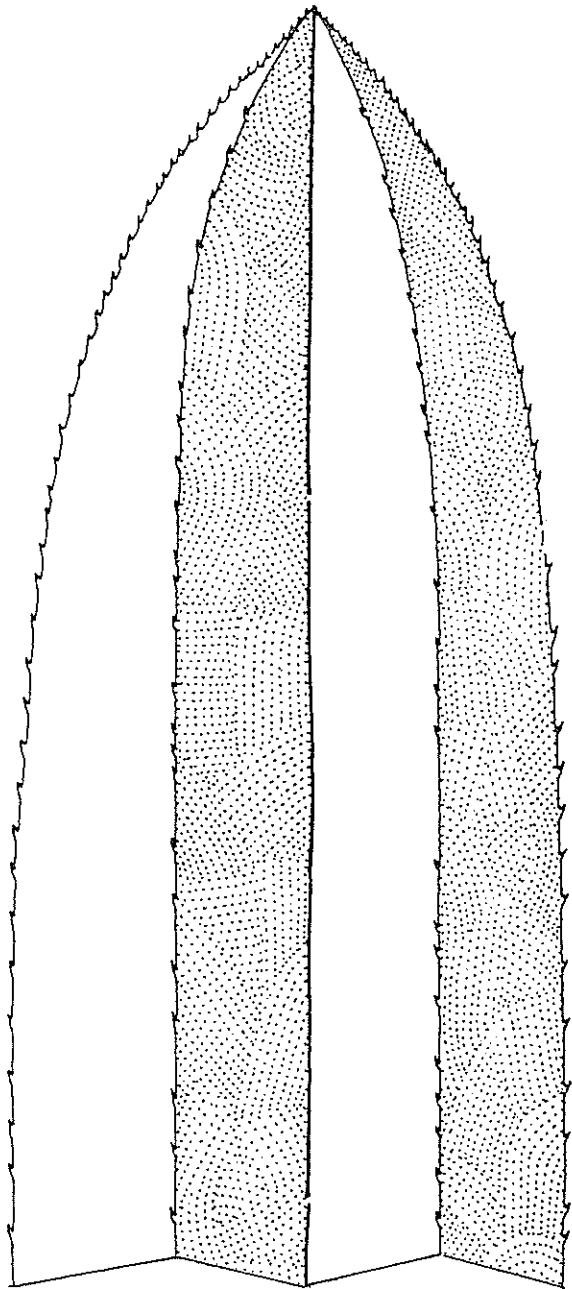
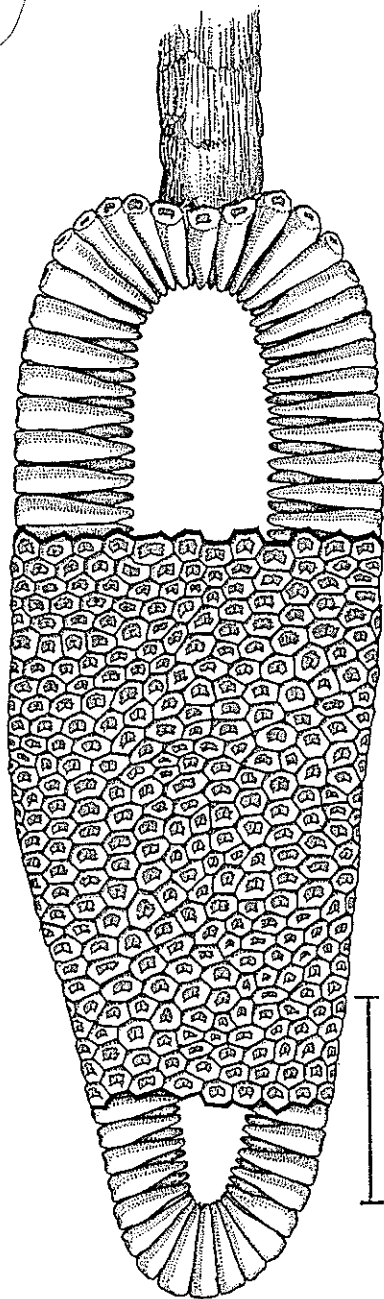
Section: **PARALOPHOSTIGMA**

***Pandanus limbatus* Merr. & L. M. Perry**

Unbranched tree to 5 m; proproots absent; leaves 225 x 9.5 cm, abruptly rounded and concave at apex, occasionally tip ±asymmetric, dark shiny green above, paler below, reddish-yellow at base, lateral pleats thorned near apex; cephalium ovoid, to 40 x 25 cm; drupes fused into transverse rows of 2-4 carpels, apices purple-green, basal parts scarlet red; male unknown.

Forest, stream banks; sea level to 1,300 m.



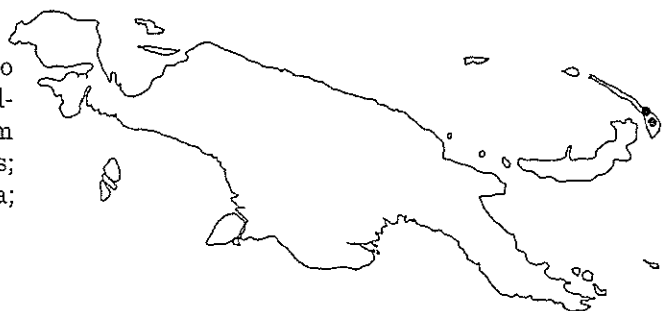


Section: UNNAMED

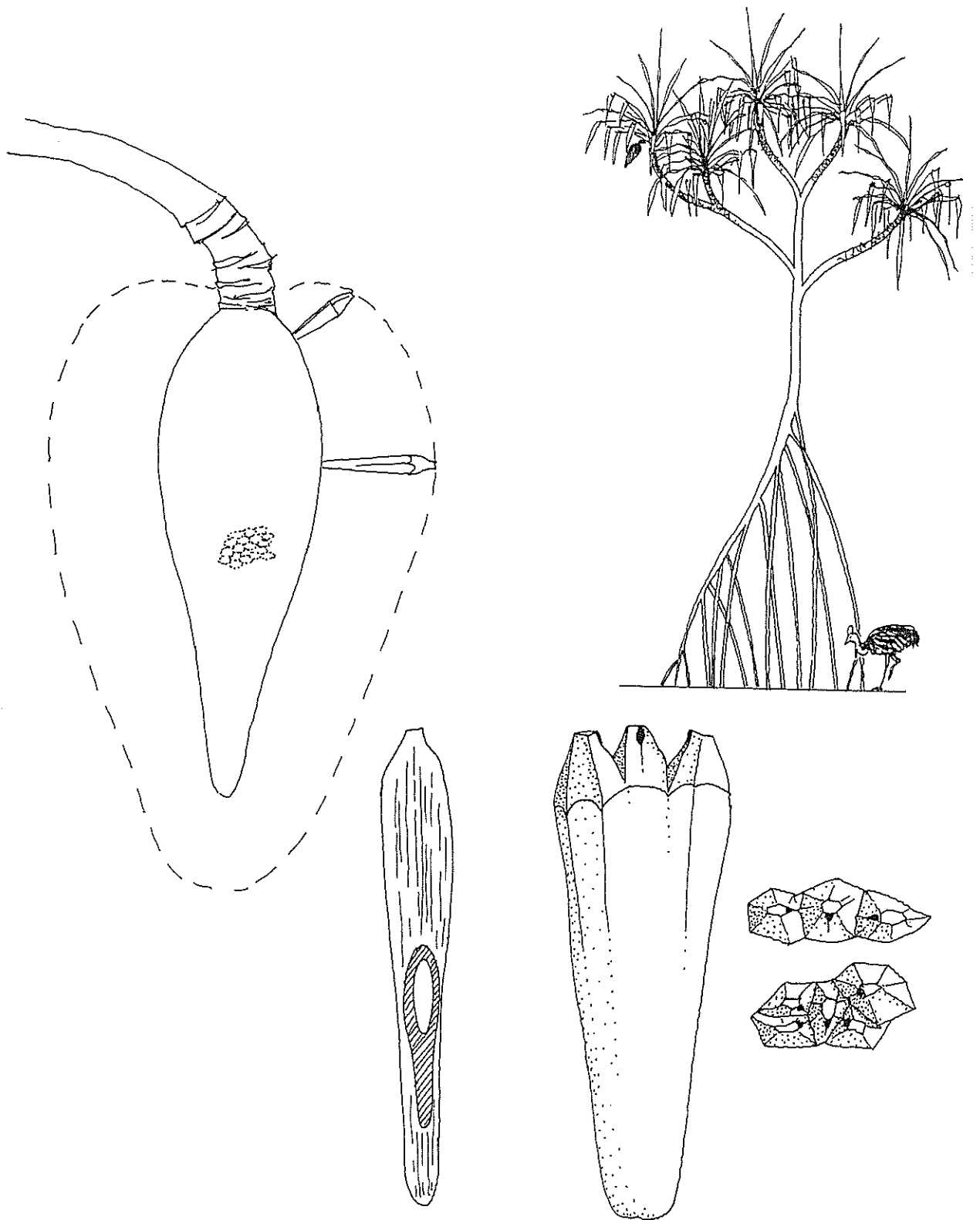
Pandanus navicularis Stone

Short erect tree to 6 m (branching?); proproots to 1.5 m; leaves 150 x 11 cm, apex abruptly round-acute, lateral pleats thorned near apex; cephalium terminal, erect, to 25 x 9 cm, bracts deciduous; drupes red, with a large, cordate, brown stigma; male unknown.

Forest on limestone; 250 m.



The stigma of this species is unique amongst *Pandanus* in the region. The species is known by two collections.



Section: UNNAMED

Pandanus species 3

Large, branched tree to 25 m; proproots numerous, spreading, to 10 m; leaves 300 x 6 cm, apex tapering, mid-vein unarmed below; cephalium ovate, to 40 x 26 cm; drupes connate, mostly in rows of three's, but also in clusters of 4-5, to 85 x 34 mm, yellow; male unknown.

Forest; 1,000 m.

Known from a single collection.



SUBGENUS LOPHOSTIGMA

The sub-genus *Lophostigma* is the most speciose in the region. Many are medium-sized to large trees. The majority of sections are characterised by one-loculed drupes, others have poly-loculed drupes (polydrupes), which are unlike the true phalanges of sub-genus *Pandanus*. The stigmas are generally erect, face laterally and may be overtopped by the style.

Section **Cauliflora** has laterally borne inflorescences on short side branches covered by scale-leaves.

Section **Karuka** comprises the edible nut Pandans, endemic to the New Guinea highlands.

Section **Liniobtutus** is endemic to New Guinea, and has large poly-drupes with stigmas facing alternately up and down the cephalium axis.

Section **Magnicavernosa** has one to 3-loculed drupes in which the upper mesocarp is hollow.

Section **Maysops** has cylindrical cephalia enclosed in bracts and resembling an ear of maize. This is the most speciose section in the region, and is centred on New Guinea.

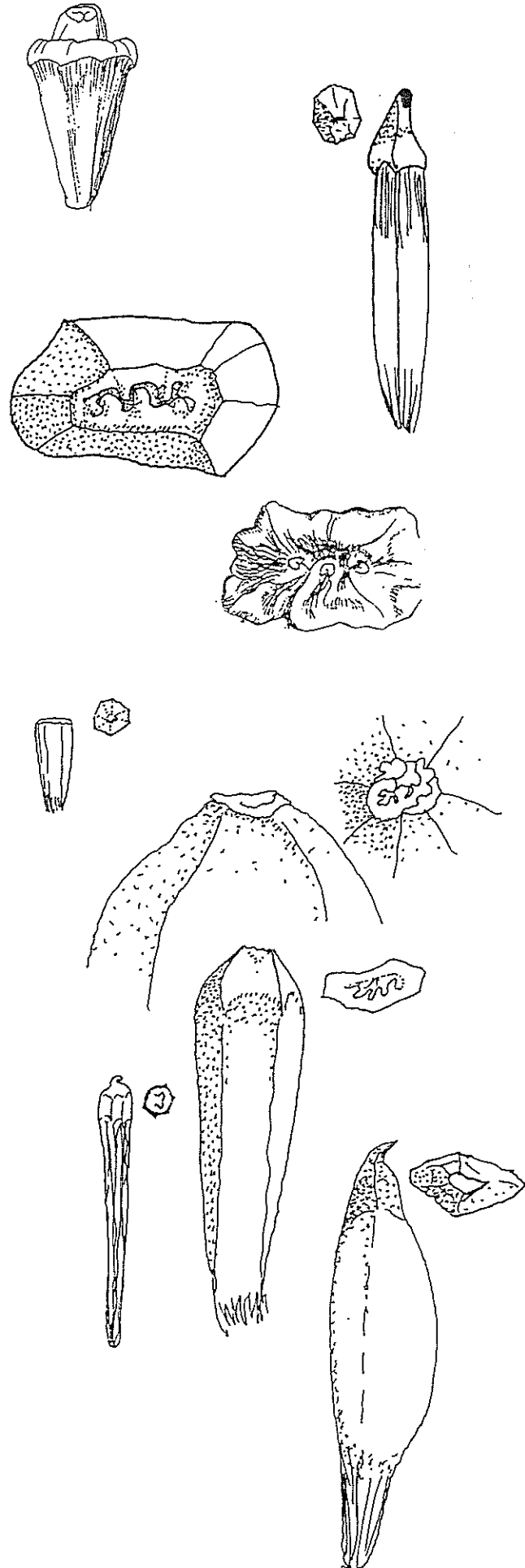
Section **Megastigma** comprises two species, each with very large drupes.

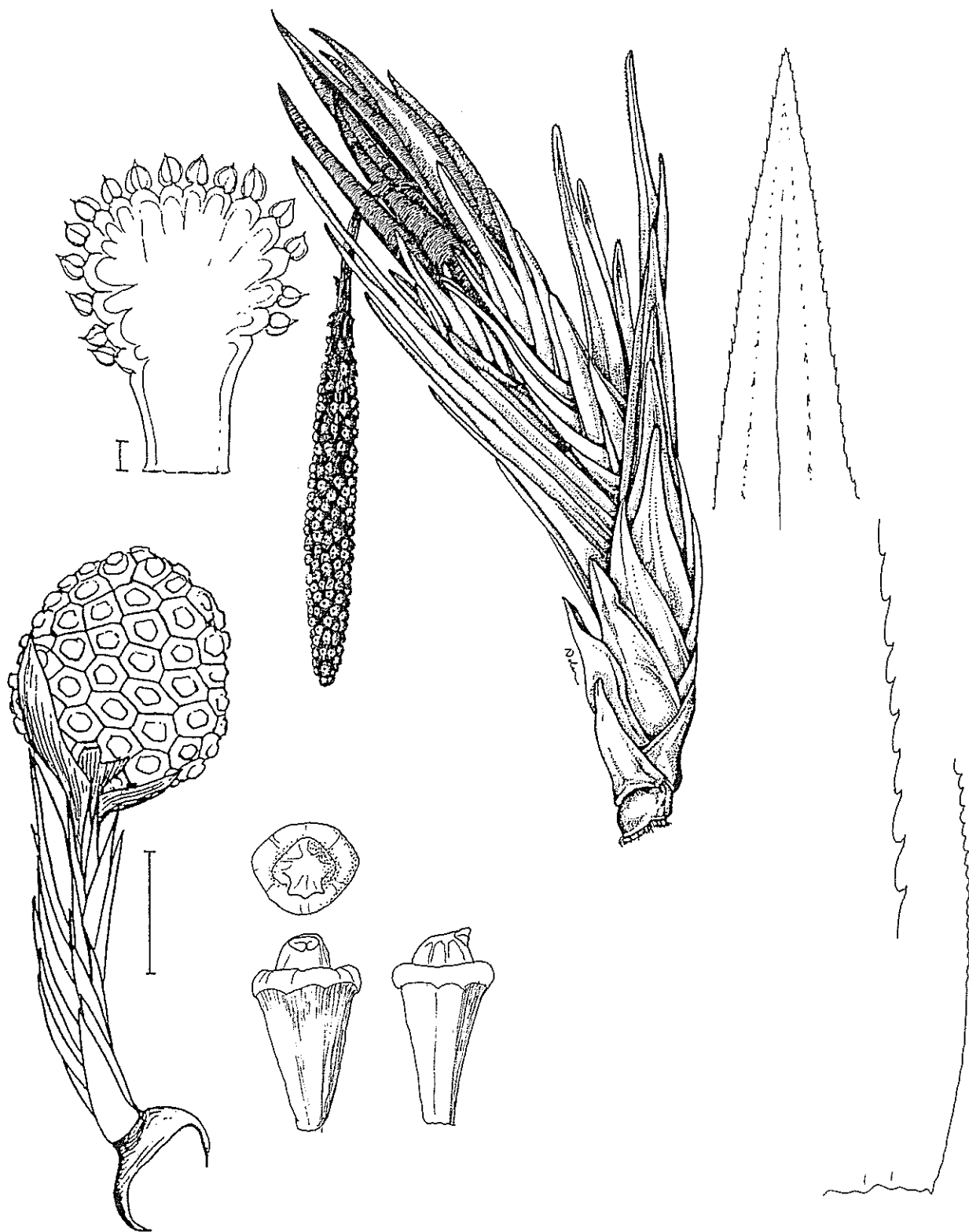
Section **Metamaysops** is endemic to New Guinea, with small poly-drupes.

Section **Perrya** is distinguished from §§*Maysops* by having much longer drupes with a basal pyrene. It is also endemic to New Guinea.

Section **Stonedendron** have ovoid cephalia with laterally-flattened drupes.

One species, only known by a single collection from a male tree, probably belongs to §§*Lophostigma*, but to an unknown section.

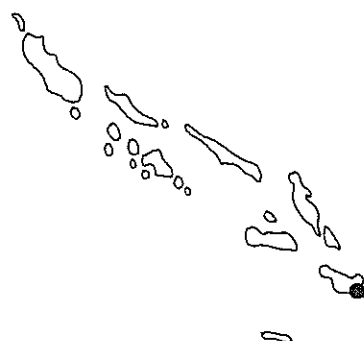




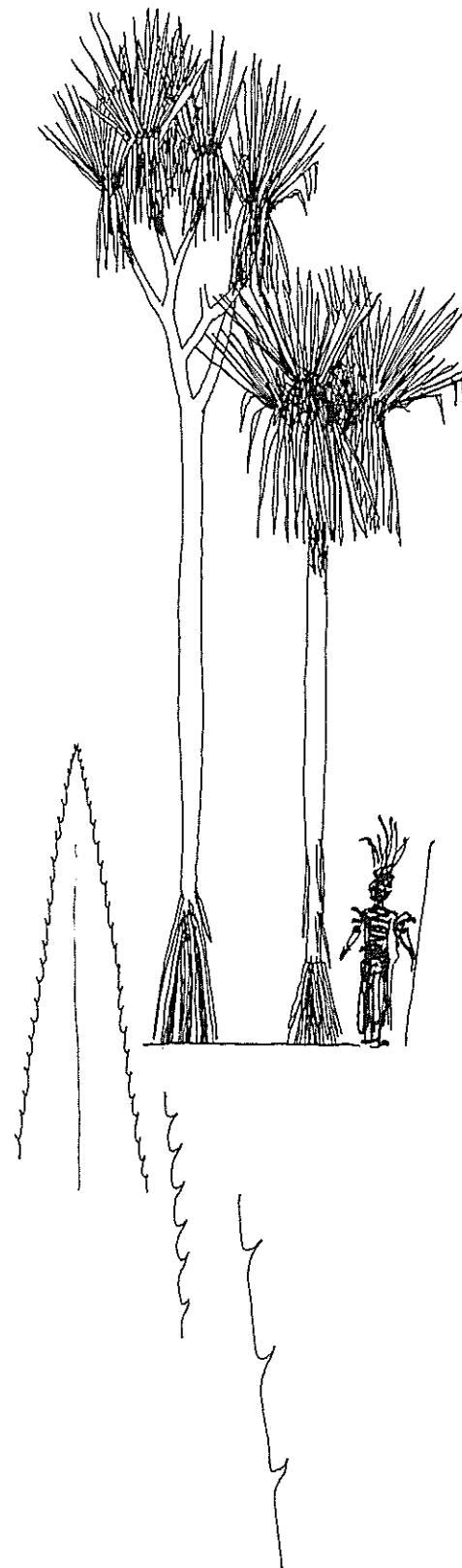
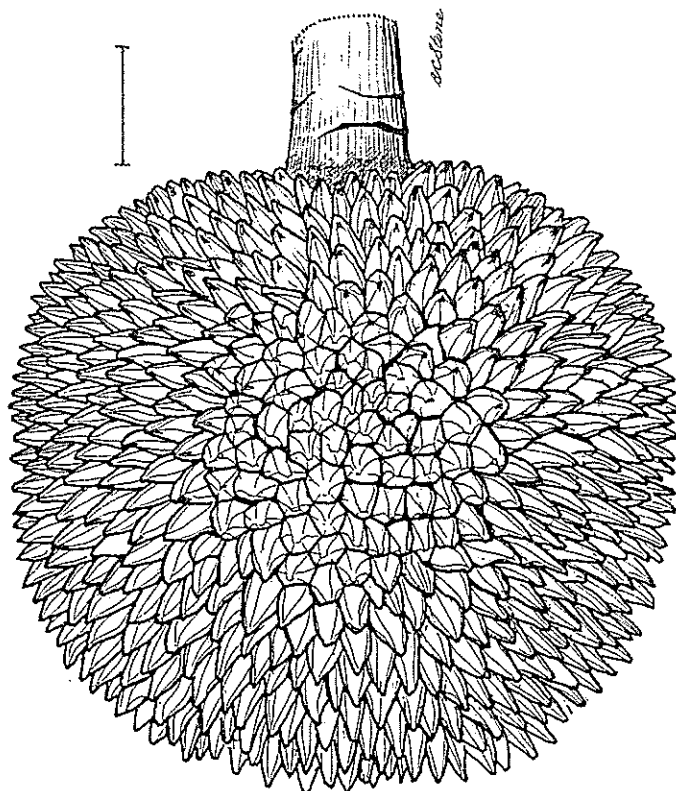
Section: CAULIFLORA

Pandanus lamprocephalus Merr. & L. M. Perry

Vegetatively unbranched tree to 5 m; proproots few, thick; leaves 240 x 8 cm, lateral pleats thorned; cephalium borne laterally on short side branches, 9 x 7.5 cm, inner bracts purple, outer bracts orange-yellow; drupes 30 x 15 mm, pileus pale purple-grey with a rounded margin and abrupt, thick style with lateral stigma; male inflorescence a solitary spike with swollen bodies to 5 mm across bearing numerous, sessile anthers to 1 mm.



Forest; 400 to 900 m.

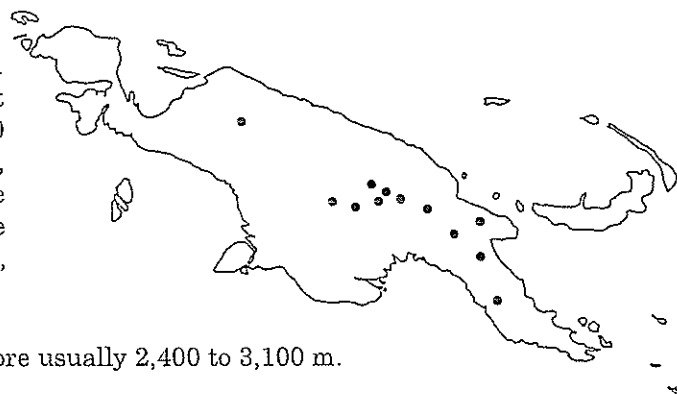


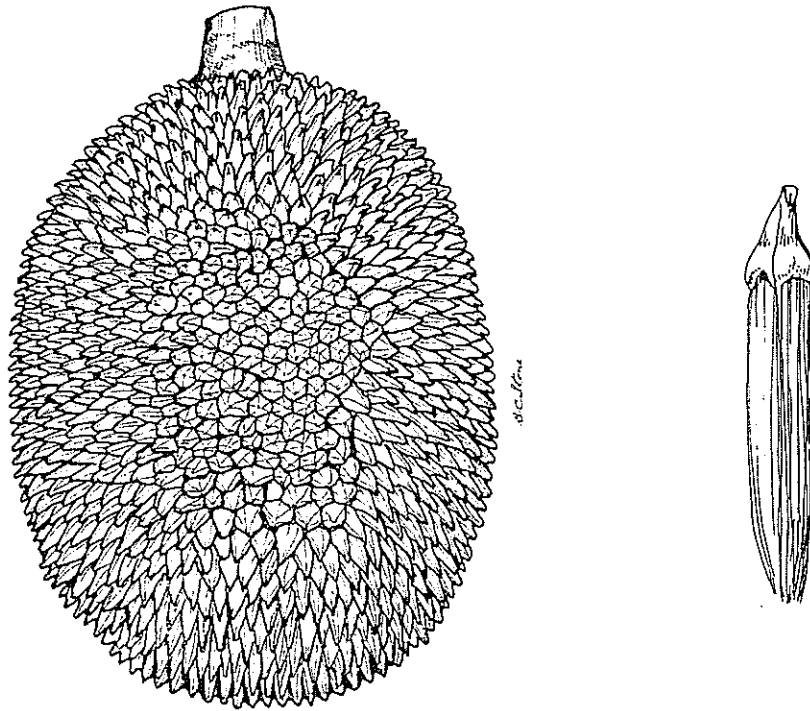
Section: KARUKA

Pandanus brosimos Merr. & L. M. Perry

Tree to 25 m tall, bole 8 m; proproots slender, to 1 m, not spreading; leaves to 350 x 18 cm, erect unbent; cephalium ellipsoid, to 30 cm; drupes to 80 x 17 mm, pileus acutely conical, glaucous green, exocarp woody, very hard, endocarp edible; male inflorescence a raceme to 50 cm with broad white bracts, spikes 7-11, to 24 x 3 cm, filaments fused, to 5 mm, anthers 5-7, 4.5 mm long.

Forest, semi-cultivated; from 1,800 to 3,300 m, more usually 2,400 to 3,100 m.





Section: **KARUKA**

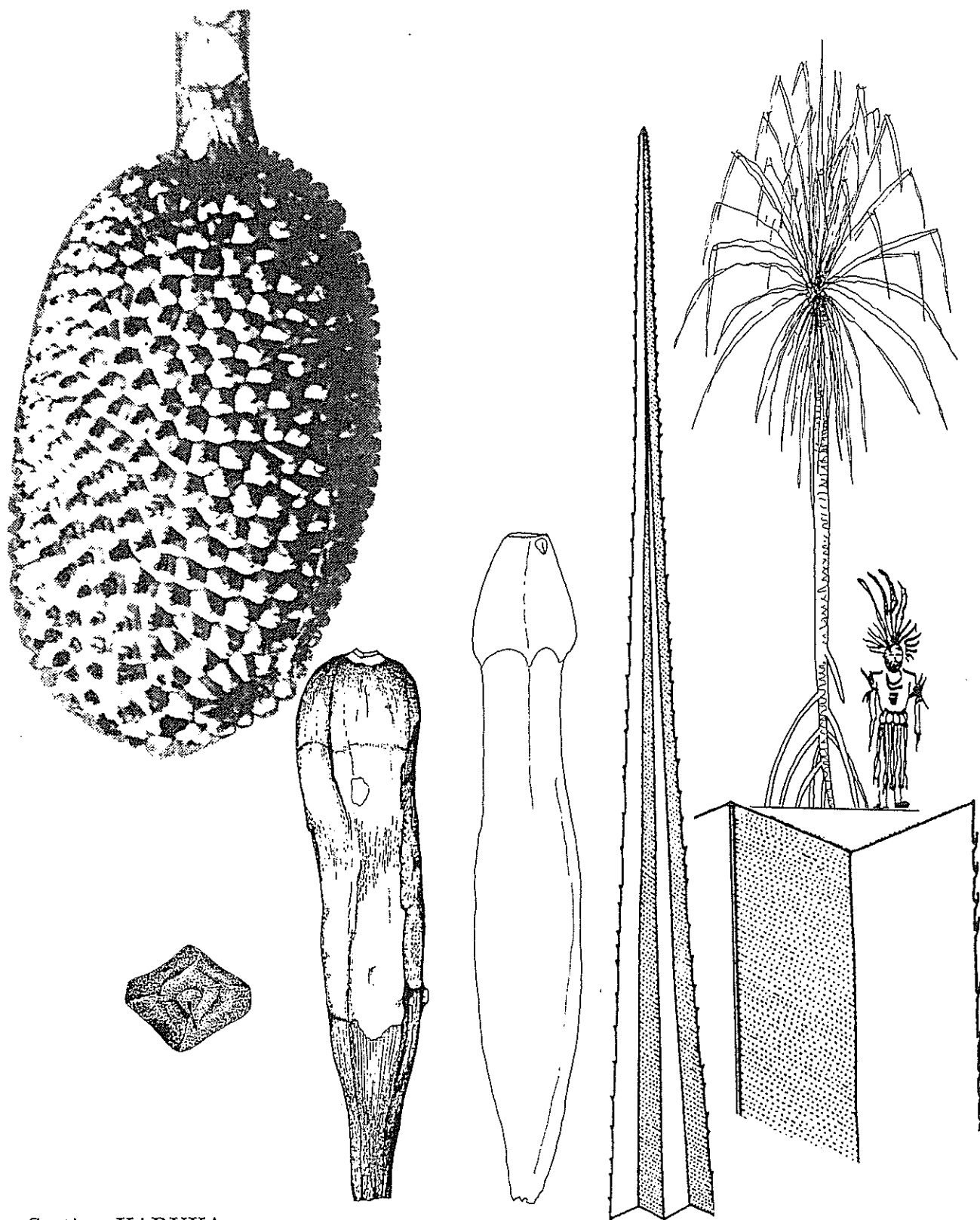
Pandanus iwen Stone

Tree to 15 m tall; bole to 8 m; propoots to 2 m or more, spreading; bark less spinous than *P. brosimos*; leaves to 155 x 12 cm; cephalium ellipsoid, to 23 cm; drupes to 55 x 10 mm, soft, can be broken with the teeth, endocarp edible; male unknown.

Forest, semi-cultivated; from 1,500 to 2,500 m.



Only known from the type specimen, this species may be a small form of *P. brosimos*.



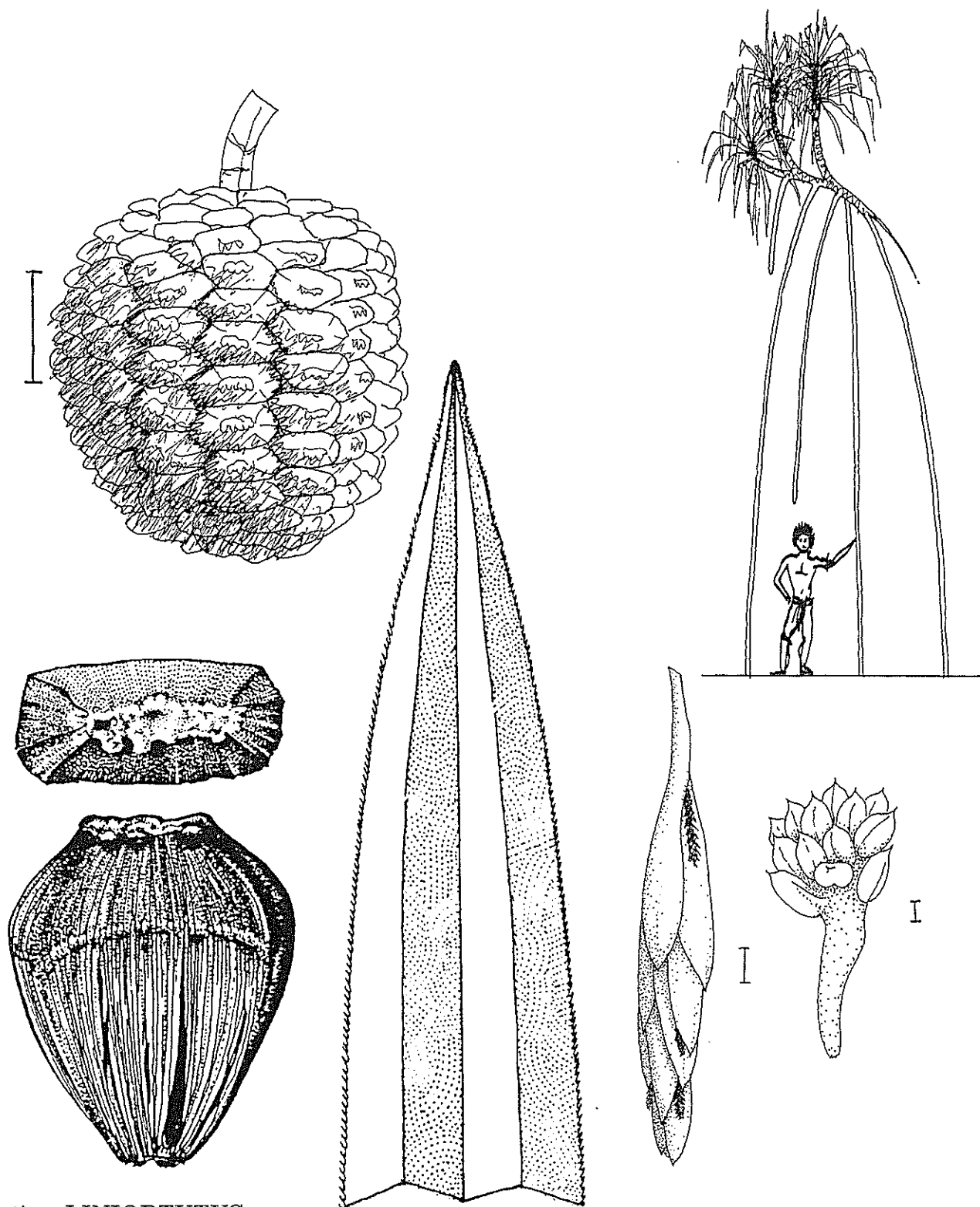
Section: KARUKA

Pandanus julianettii Martelli

Tree to 12 m tall, bole 4 m; prop-roots to 1 m, \pm spreading; leaves up to 350 x 18 cm, usually bent; cephalium to 20 cm long, averaging 5 kg; drupes to over 90 x 20 mm with a rounded pileus, the exocarp is soft, and can be broken with the teeth; male unknown.

Almost always in cultivated groves, propagated by cuttings; from 1,500 to 2,800 (most abundantly at 1,800-2,550) m.





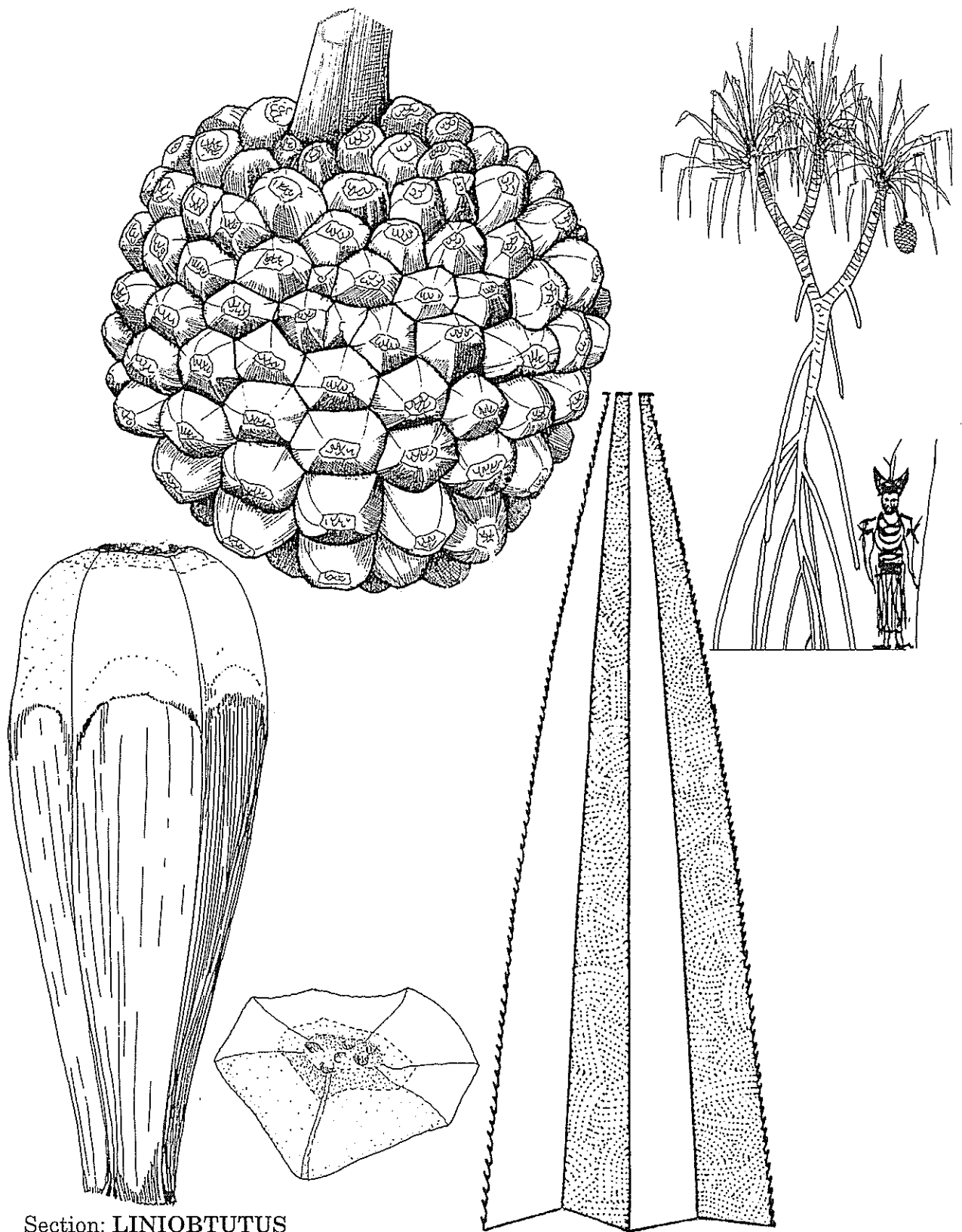
Section: LINIOBTUTUS

Pandanus hystrix Martelli

Tree to 16 m, proproots enormously developed, supporting the short branched stem in a reclining position 12-14 m above the ground; leaves to 140 x 6.5 cm; cephalium solitary, pendent, 26 x 21 cm, glaucous green at apex, pinkish within bracts; polydrupes arranged in vertical rows, 4-7 loculed; male inflorescence a raceme to 100 cm with large white bracts, spikes to 10 x 3 cm, anthers 2 mm, arising from fused filaments.



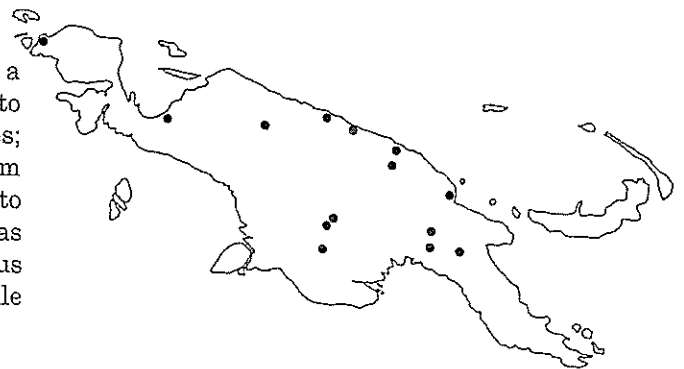
Riverbanks and damp hollows; sea level to 100 m.



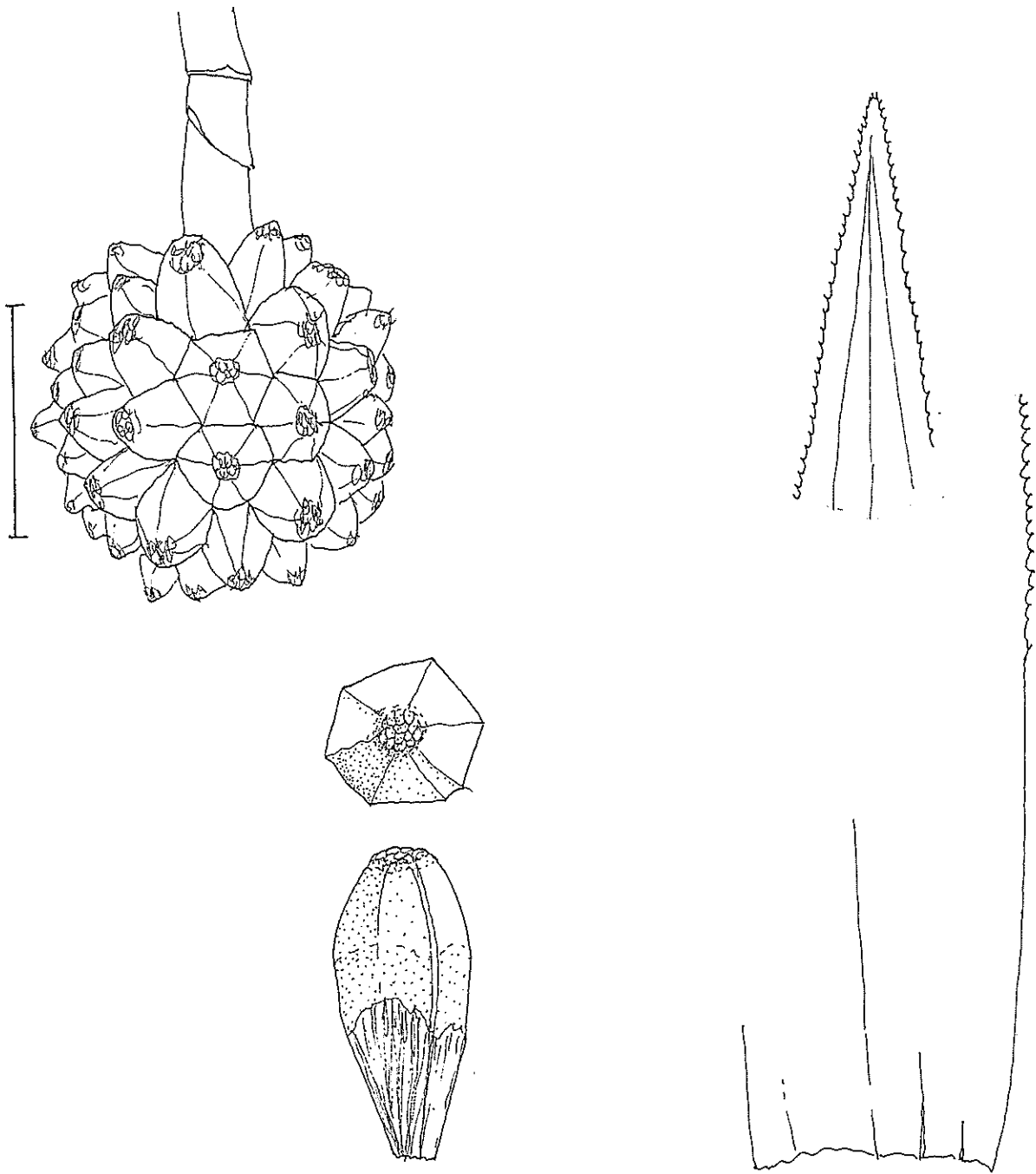
Section: LINIOBTUTUS

***Pandanus penicillus* Martelli**

Branched tree to 18 m, trunk becoming thick at a considerable height, usually not erect; propoots to 10 m long, spreading, from trunk and branches; leaves 260 x 11 cm; cephalium \pm spherical, to 30 cm across, terminal, on long peduncle; polydrupes to 120 x 45 mm, apex \pm sunken, the stigmas clustered, glaucous green above, pileus scabrous brown, orange-red below, 2-6 loculed; male unknown.



Forest, often in water-logged sites; sea level to 1,200 m.



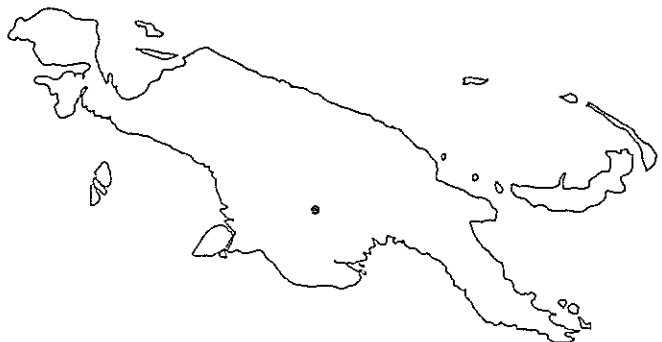
Section: **LINIOBTUTUS**

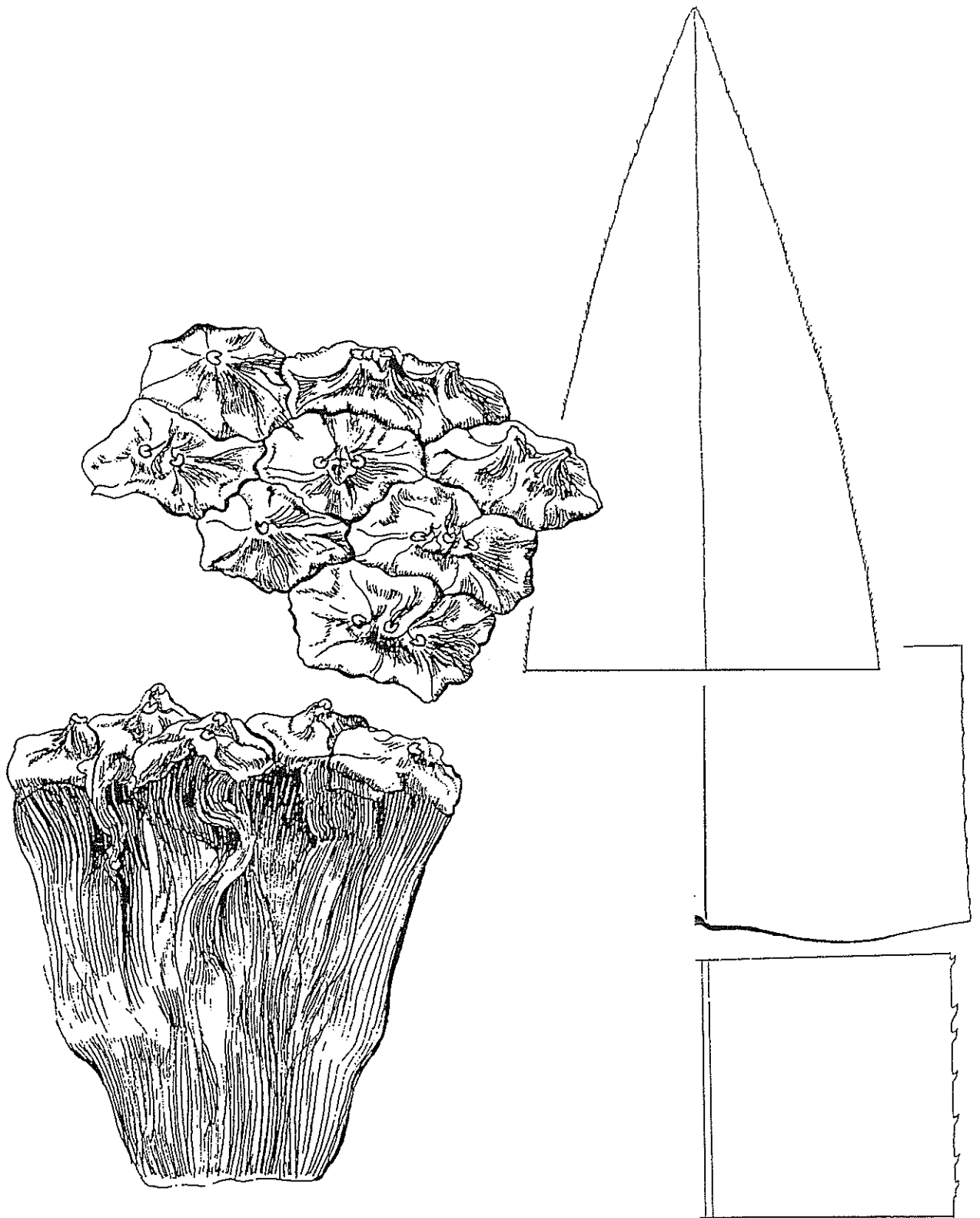
Pandanus species 4

Tree to 7 m; propoots to 2.5 m; leaves 130 x 9 cm, broadest near base, c.5 cm at midpoint, lateral pleats only apparent near apex; cephalium 9 x 9 cm; polydrupes 12+ loculed, 45 x 25 mm, stigmatic region <8 mm across; male unknown.

Forest at 50 m.

Known from a single collection.



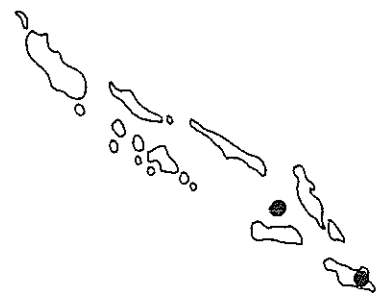


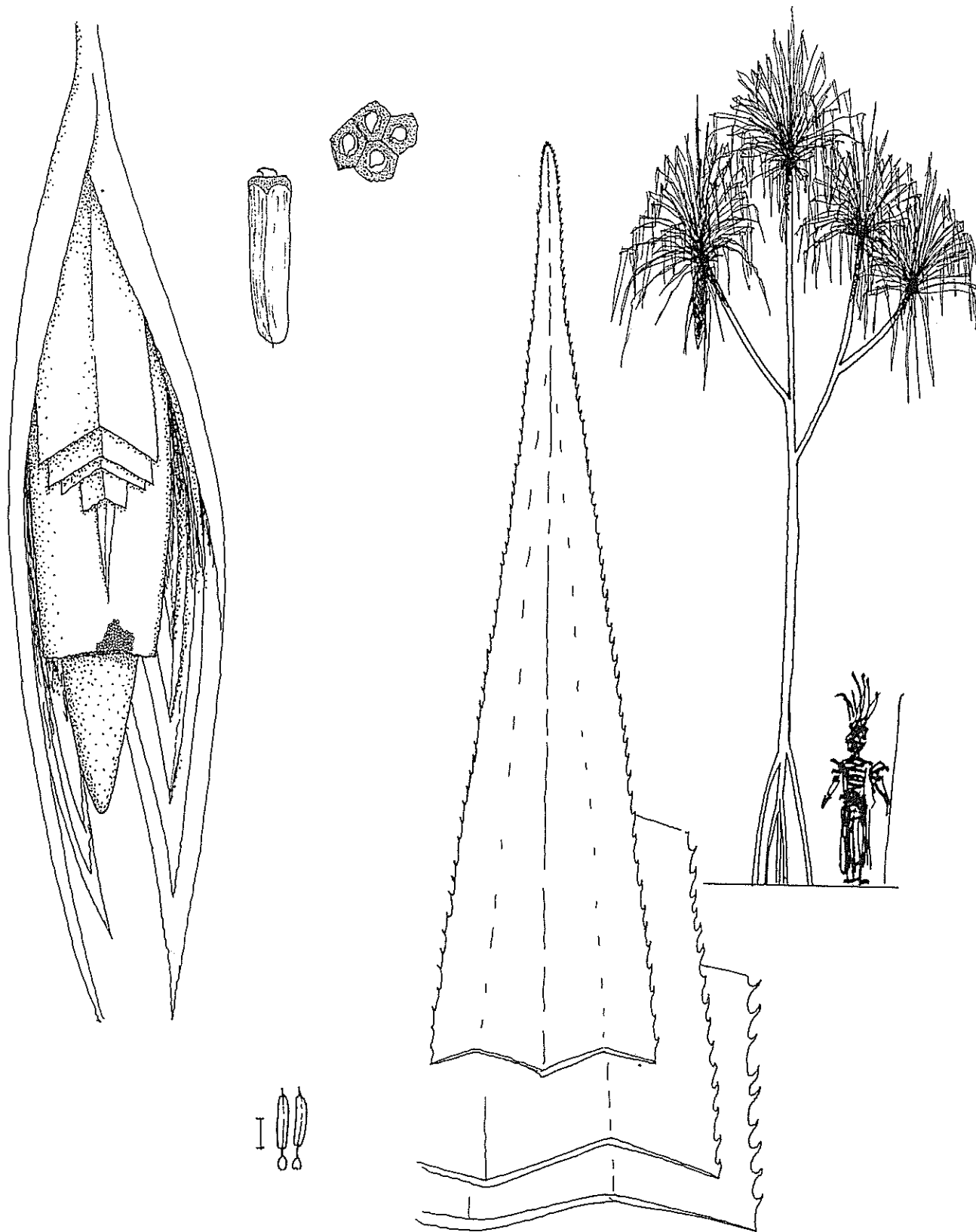
Section: **MAGNICAVERNOSA**

Pandanus magnicavernosus St.John

Branched tree, 3-8 m; propoots few; leaves 200-400 x 10-20 cm, apex broadly acute \pm flat; cephalium globose, 24 cm across; phalanges (1-)2-3 loculed, to 85 x 35 mm, upper mesocarp hollow.

Forest, to 100 m.





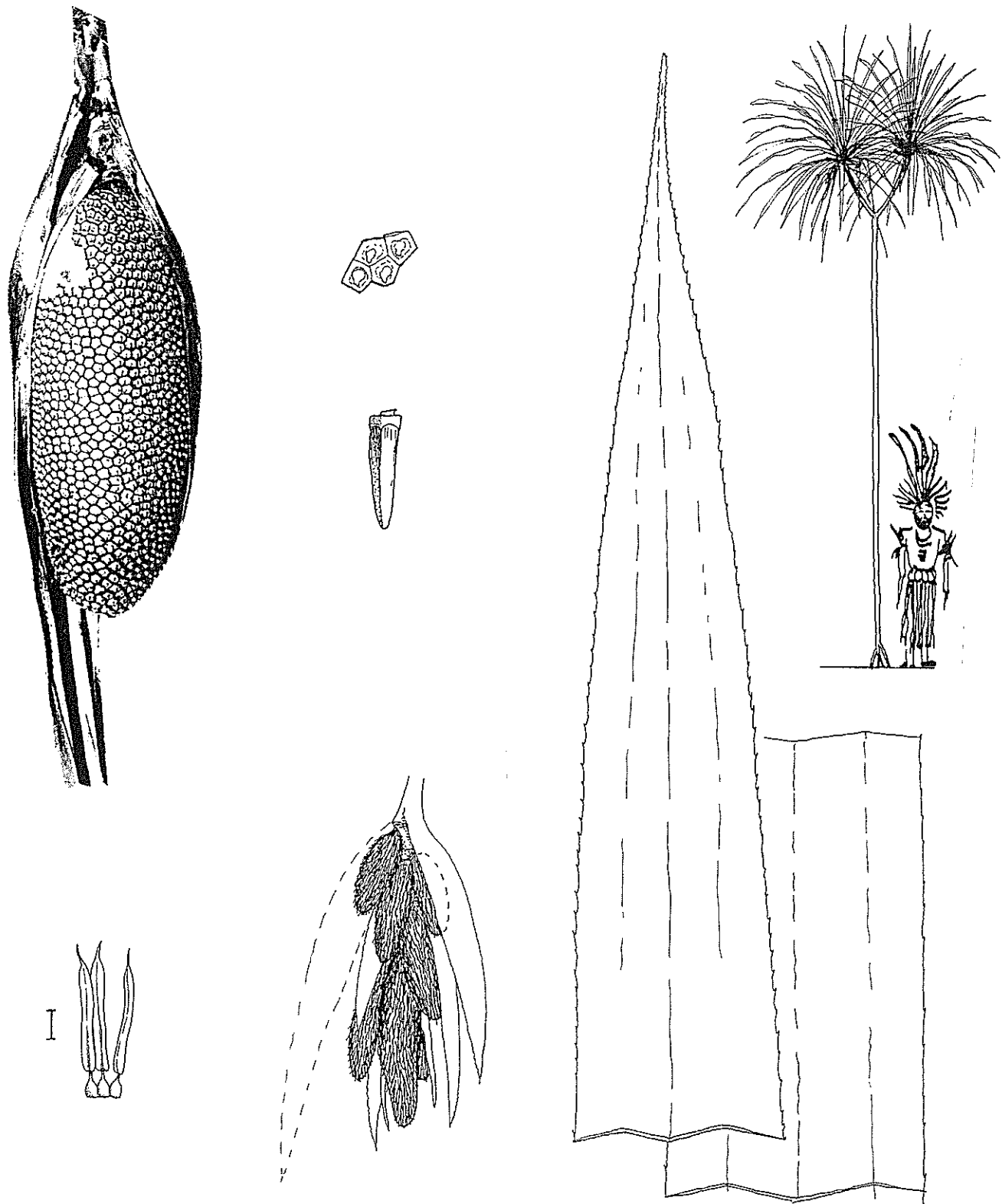
Section: MAYSOPS

Pandanus beccarii Solms-Laub.

Branched tree to 10 m; prop-roots upright, clustered, to 2 m, with upcurved, 1 cm spines; leaves 150-300 x 5-11 cm, apex acute, lateral pleats \pm thorned; cephalium to 45 x 14 cm; drupes 20-30 x 4-7 mm, apices sunken, dark brown-black, with a prominent, central, yellow-orange style, below deep red, fleshy; male inflorescence to 150 cm, spikes 7-9, to 20 x 2.5 cm, filaments very short, free, anthers 2 mm.

Forest; sea level to 1,600 m.

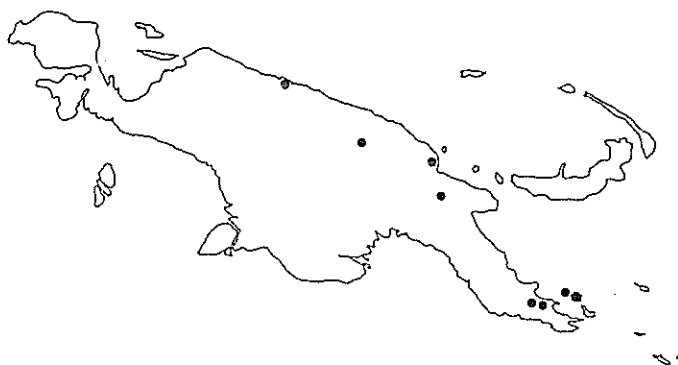




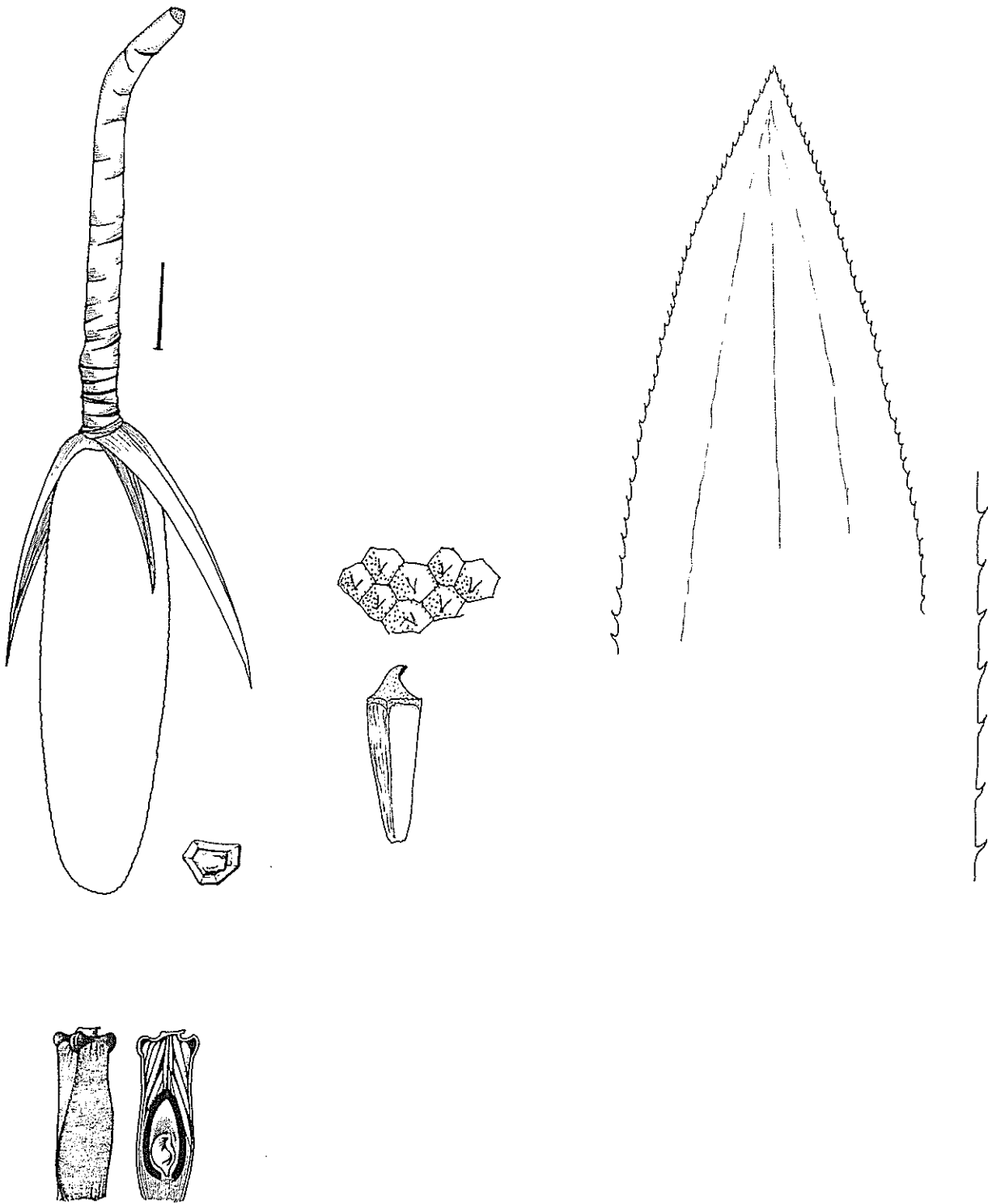
Section: MAYSOPS

***Pandanus castaneus* St.John & Stone**

Little-branched, slender tree to 9 m; proproots few, short, 20 to 30 cm; crown sparse, with c.50-80 leaves; leaves 210 x 6 cm, lateral pleats unarmed, green; cephalium cylindrical, apex rounded, 8-23 x 4.5-8 cm, bracts yellow, mostly shorter than cephalium; drupes 20-24 x 5-8 mm, apices sunken, style raised, salmon pink to orange-red; male inflorescence a raceme of up to 8 spikes, 4 x 1.5 to 8 x 2 cm, filaments c.1 mm, 6-9 connate, anthers to 4 mm, yellow.



Forest; sea level to 1,400 m.



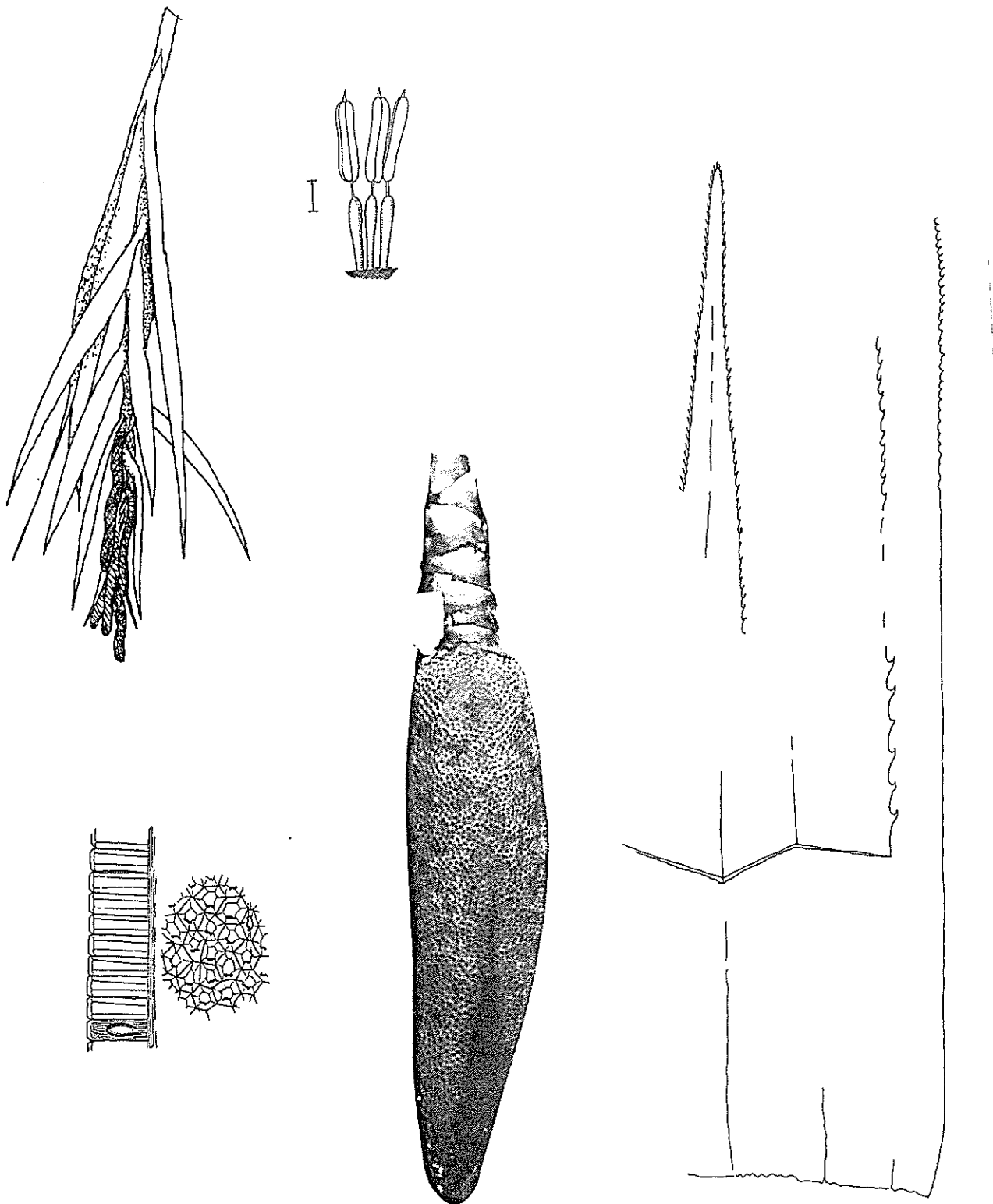
Section: MAYSOPS

***Pandanus concavus* St.John**

Branched tree to 15 m; proproots to 2 m, with upcurved spines; leaves to 200 x 11 cm, lateral pleats ±thorned; cephalium cylindrical, to 48 x 14 cm; drupes to 15 x 7 mm, apical drupes with long conical pileus, lateral drupes with flattened pileus with 2 mm high style, dark brown, drupe fleshy red below; male unknown.

Forest; 1,000 to 2,000 m.



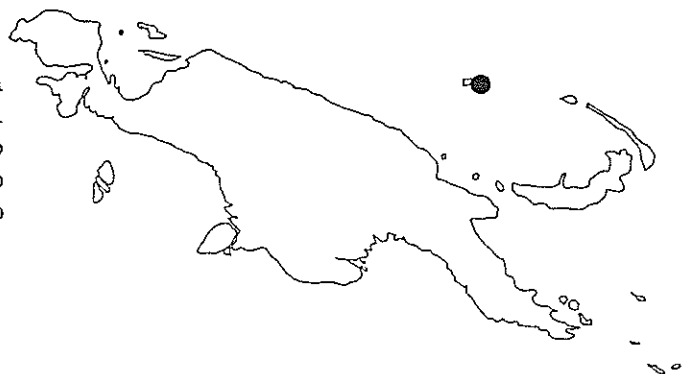


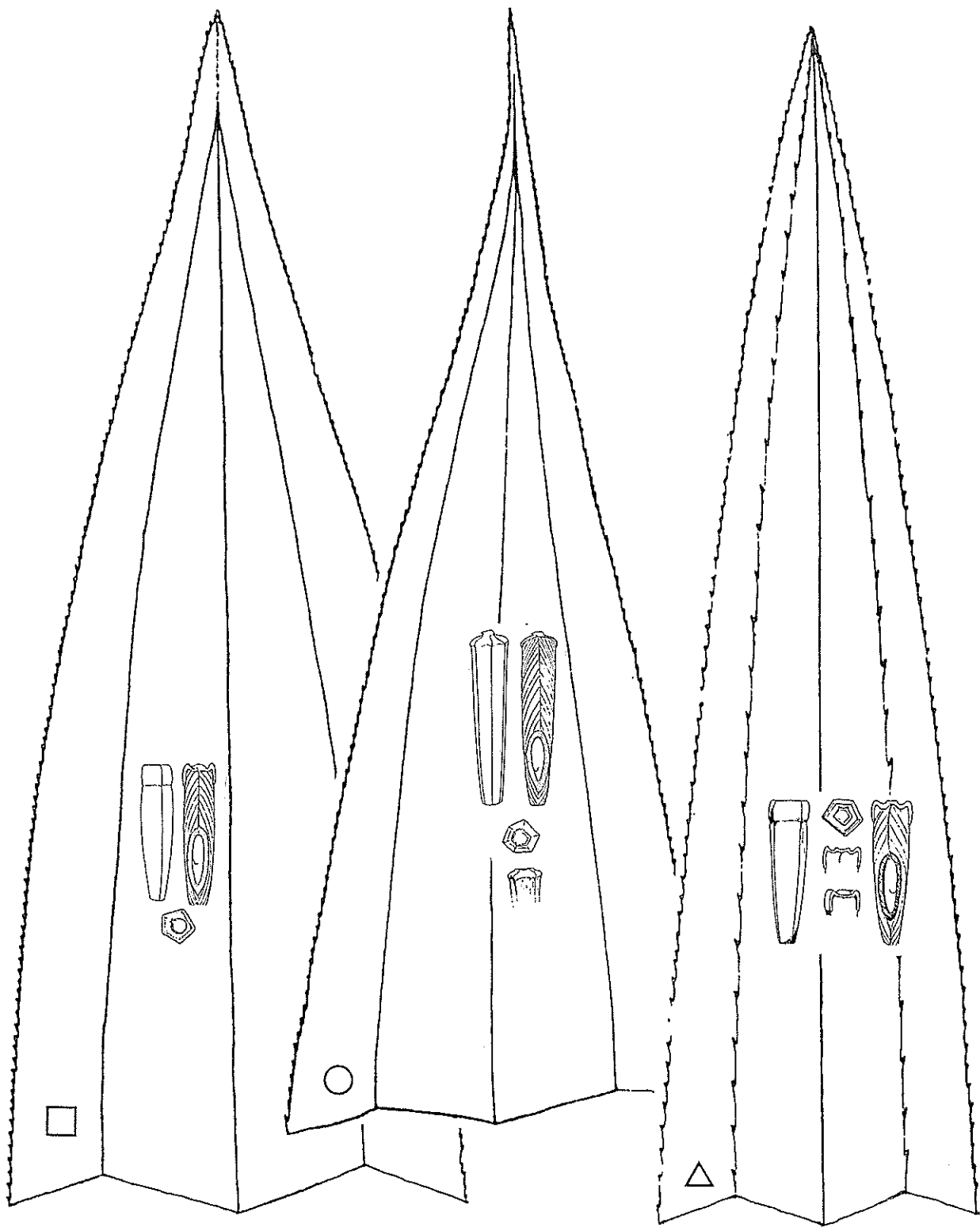
Section: **MAYSOPS**

Pandanus croceus Stone

Sparsely-branched tree to 15 m; propoots to 2 m, spreading; leaves to 300 x 10 cm, dark green above, glaucous grey-blue below; cephalium narrowly conical, to 41 x 13 cm, bracts purple to salmon-pink within; drupes 13 x 4.5 mm, yellow to orange; male spikes 9, to 18 x 2.5 cm, filaments to 2.5 mm, free, anthers to 3 mm, orange.

Forest; sea level to 500 m.





Section: MAYSOPS

Pandanus flavicarpus Stone □

Leaves 250 x 13 cm, dark glossy green above, glaucous grey below; cephalium 40 x 15 cm; drupes yellow below, pileus orange-red.

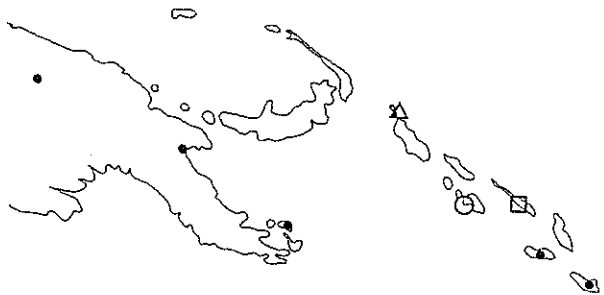
Pandanus roseus Stone ○

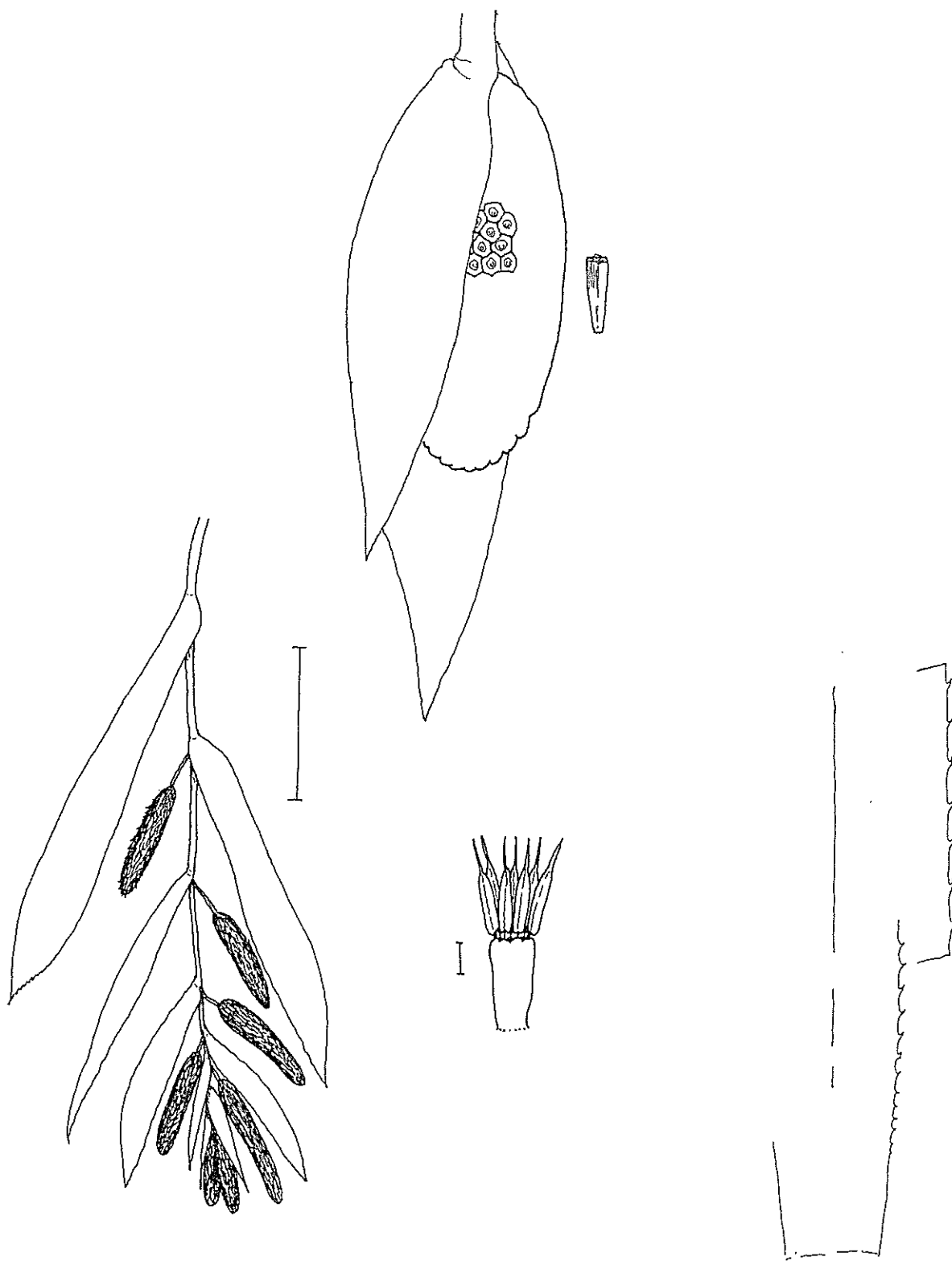
Leaves 190 x 11 cm, dark green above, pale green below, ±glaucous near base; cephalium 28 x 12 cm; drupes creamy-pink.

Pandanus rubellus Stone △

Leaves 230 x 6.5 cm, dark green above, pale green below; cephalium 30 x 12 cm; drupes dark red.

All in swampy forest; coastal.





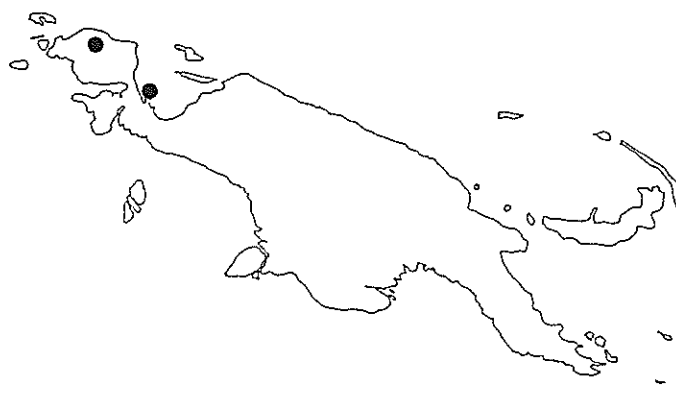
Section: **MAYSOPS**

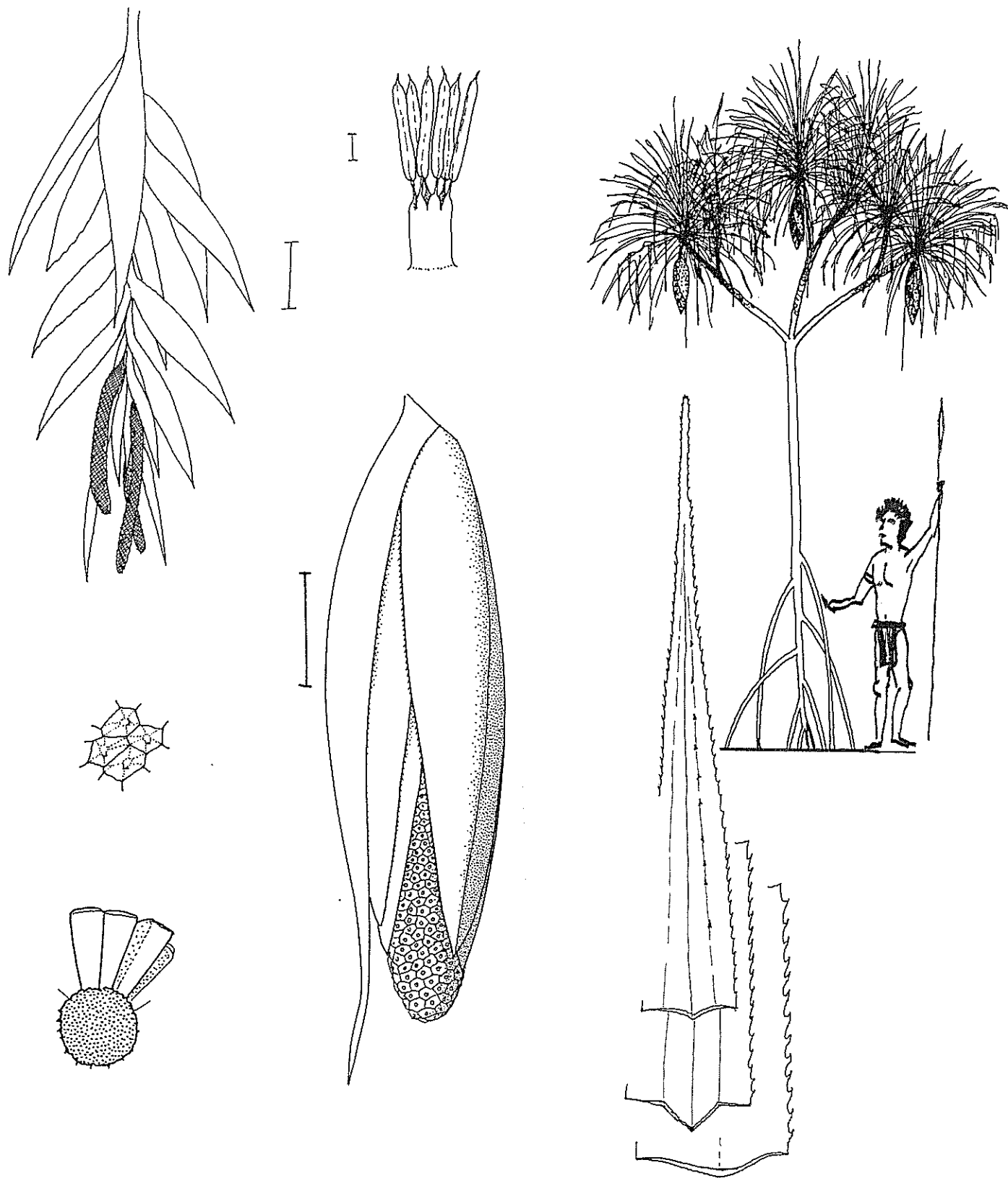
***Pandanus kosteri* Stone**

Dwarf tree to 1.7 m, trunks to 1 cm in diameter; proproots ? unknown; leaves to 100 x 3.7 cm, lateral pleats irregularly thorned; cephalium 6.5 x 3.5 cm, bracts red; drupes to 15 x 5 mm, red; male spikes 5 to 7, 3-8 x 1 cm, brown; filaments to 3 mm, 5-9 connate, anthers 3 mm long, bracts also red.

Forest; 900 to 1,300 m.

Known from a single collection of each sex.





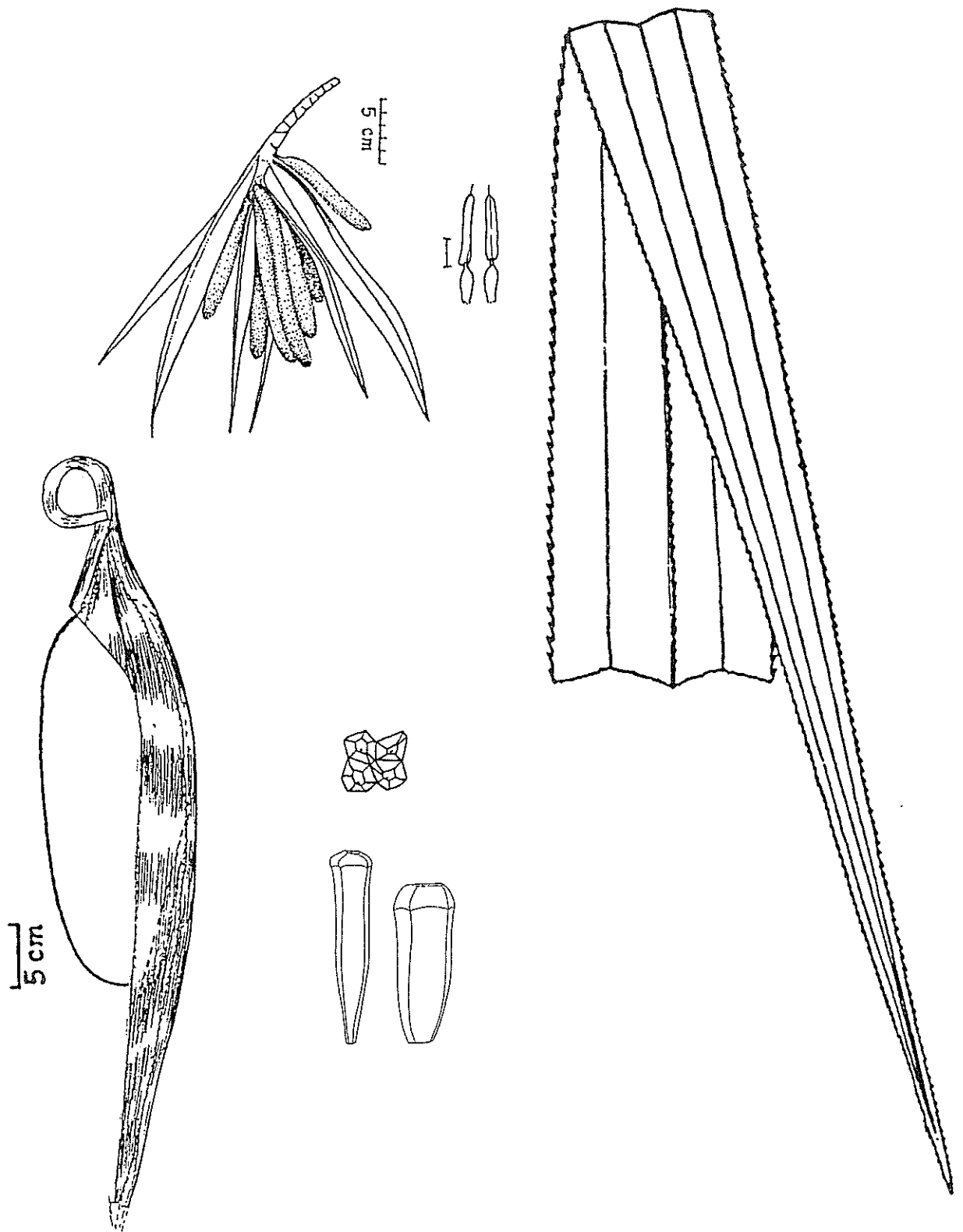
Section: MAYSOPS

Pandanus krauelianus K. Schum.

Well-branched tree to 8 m; prop- roots spreading, slender, to 2 m, longitudinally ridged, with small blunt spines; leaves very numerous, narrow, to 180-300 x 3.5-6 cm, apex long tapering, lateral pleats irregularly thorned, rarely smooth, glaucous below, drying grey-green; cephalium pendent, bracts yellow to pink; drupe apices flat, style and stigma \pm sunken, yellow to brown; male spikes 5 or more, to 17 x 1-2 cm, filaments to 2.5 mm, 6-8 connate, anthers to 4 mm, yellow.



Mangrove swamps to hill forest; sea-level to 1,200 m.



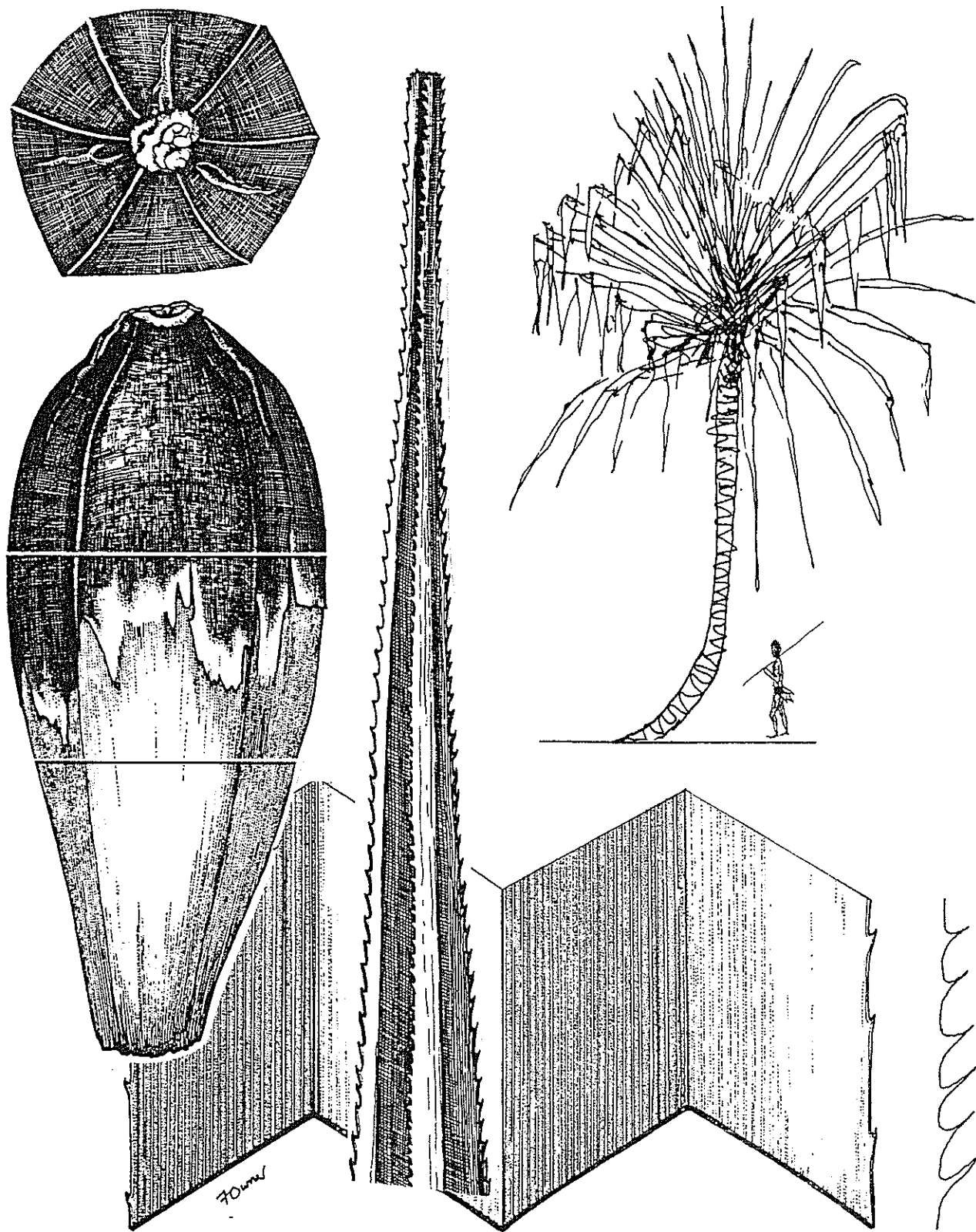
Section: MAYSOPS

***Pandanus spodiophyllus* Stone**

Branched tree to 20 m; proproots present; leaves narrow, 210 x 6 cm, apex long tapering, glaucous-grey below; cephalium pendent, to 28 x 11 cm, inner bracts pink, outer bracts purplish; drupes 20-30 x 4-12 mm, apices angular, stigma minute, 2-toothed, pileus brown, drupes orange, fleshy below; male inflorescence a compact raceme, spikes 6-7, to 12 x 1.7 cm, filaments 1 mm, ±free, anthers 3 mm, yellow.

Forest; 200 to 300 m; edible.





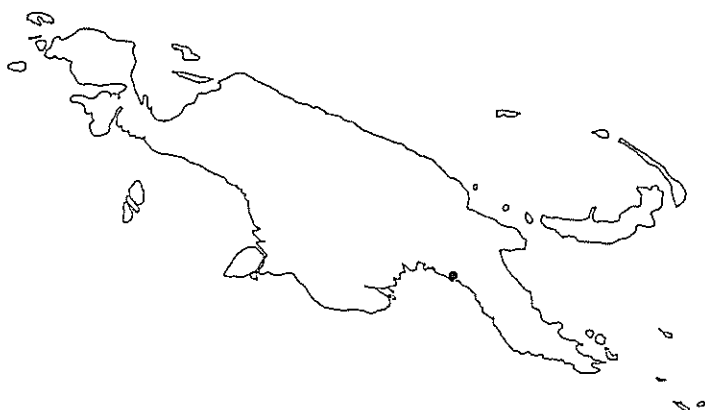
Section: MEGASTIGMA

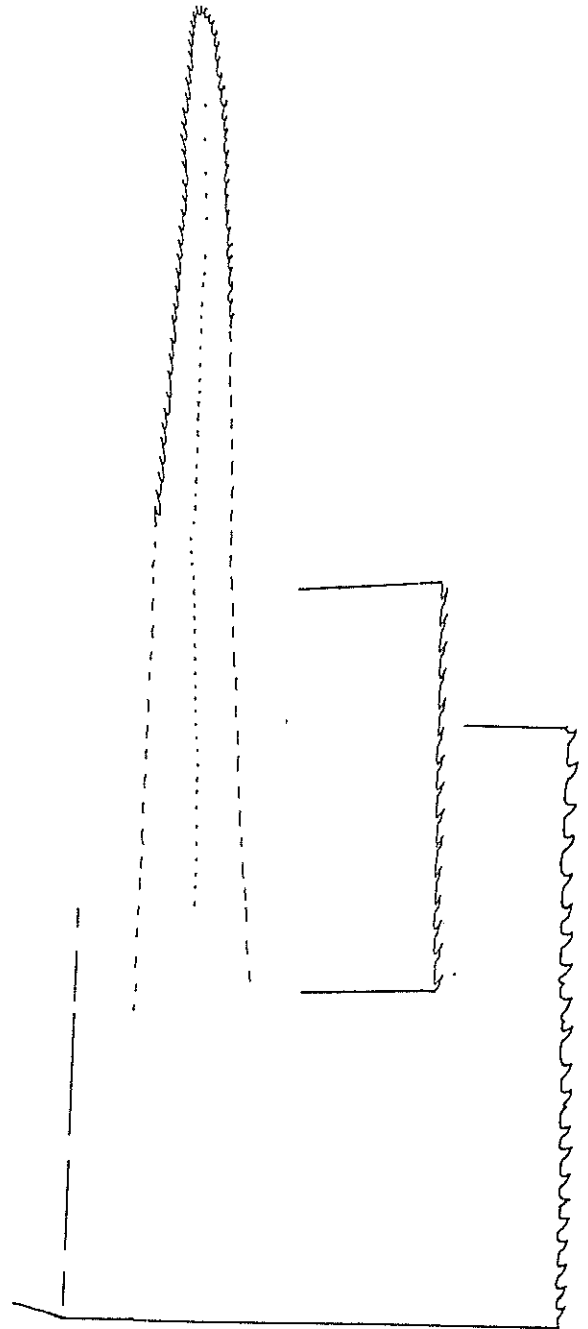
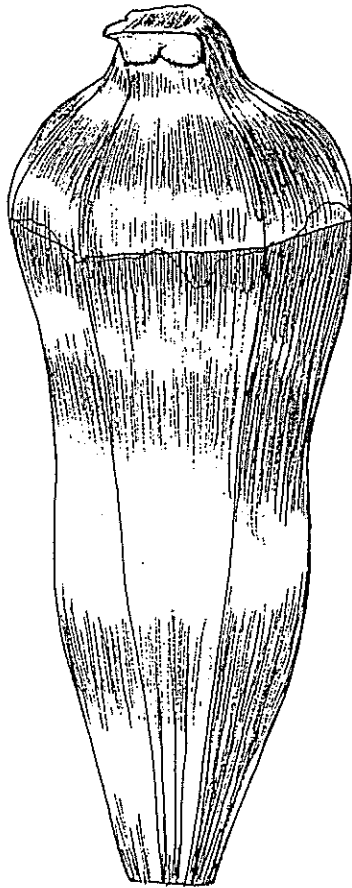
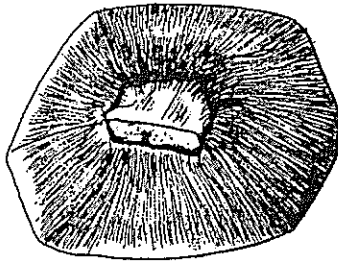
Pandanus rex Stone

Massive, unbranched tree to 8 m tall; trunk prostrate (for at least 1.8 m) at base, lacking propoots; leaves to 600 x 18 cm; cephalium 81 x 35 cm; drupes 130 x 45 mm, grey-brown, red below; male unknown.

Forest at sea level.

Known from the type specimen only.





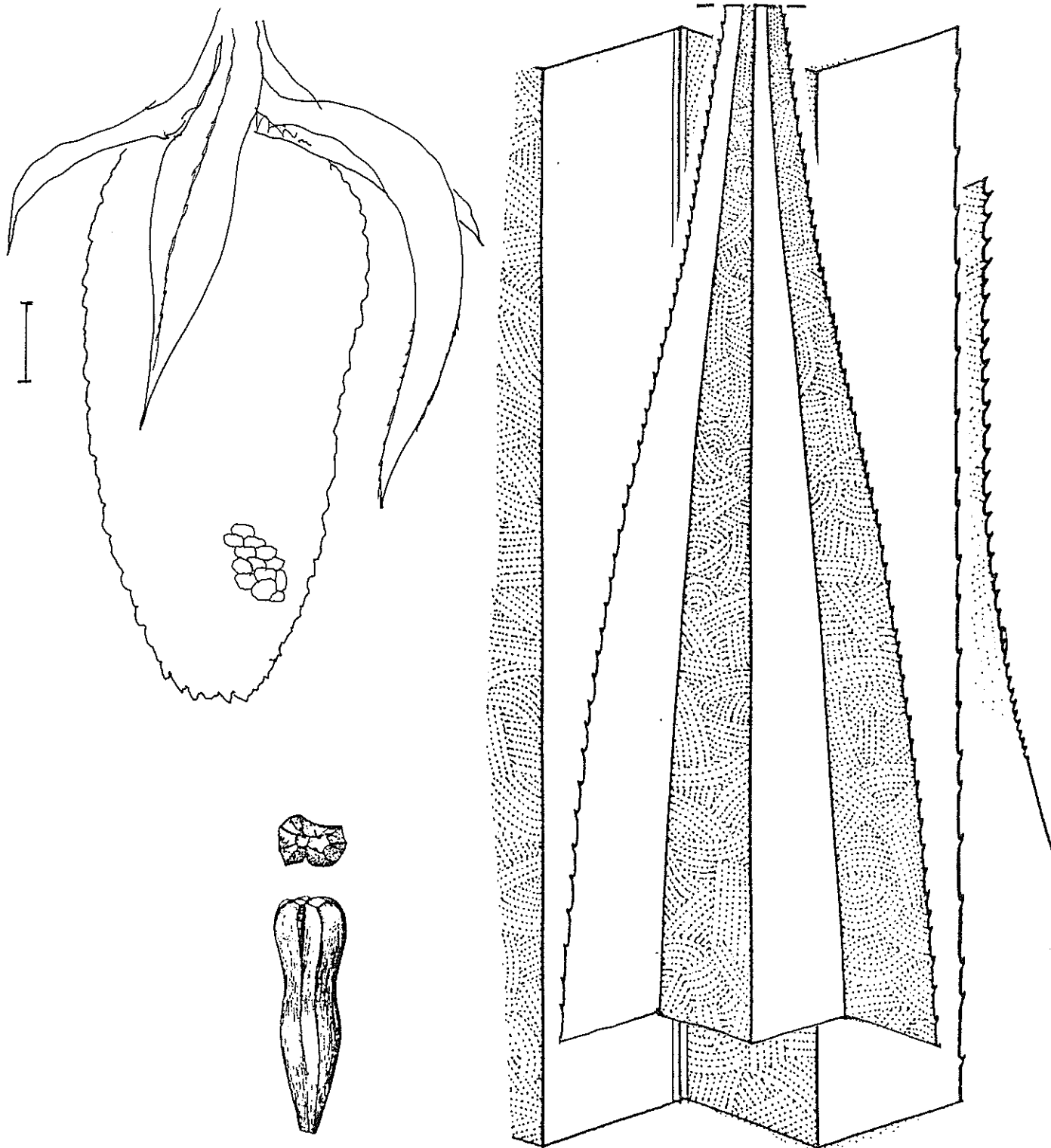
Section: MEGASTIGMA

Pandanus schoddei St. John

Branched tree to 12 m tall; with proproots; leaves to 300 x 13 cm; cephalium ?; drupes to 110 x 50 mm, pileus rounded, stigma to 12 mm across, vertical; male unknown.

Montane Forest; 1,500 m.





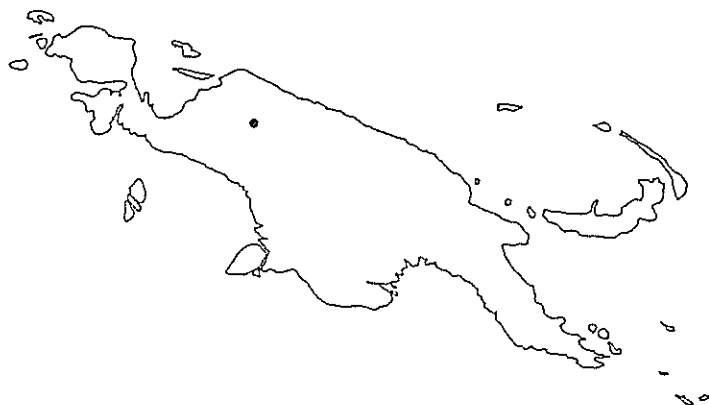
Section: **METAMAYSOPS**

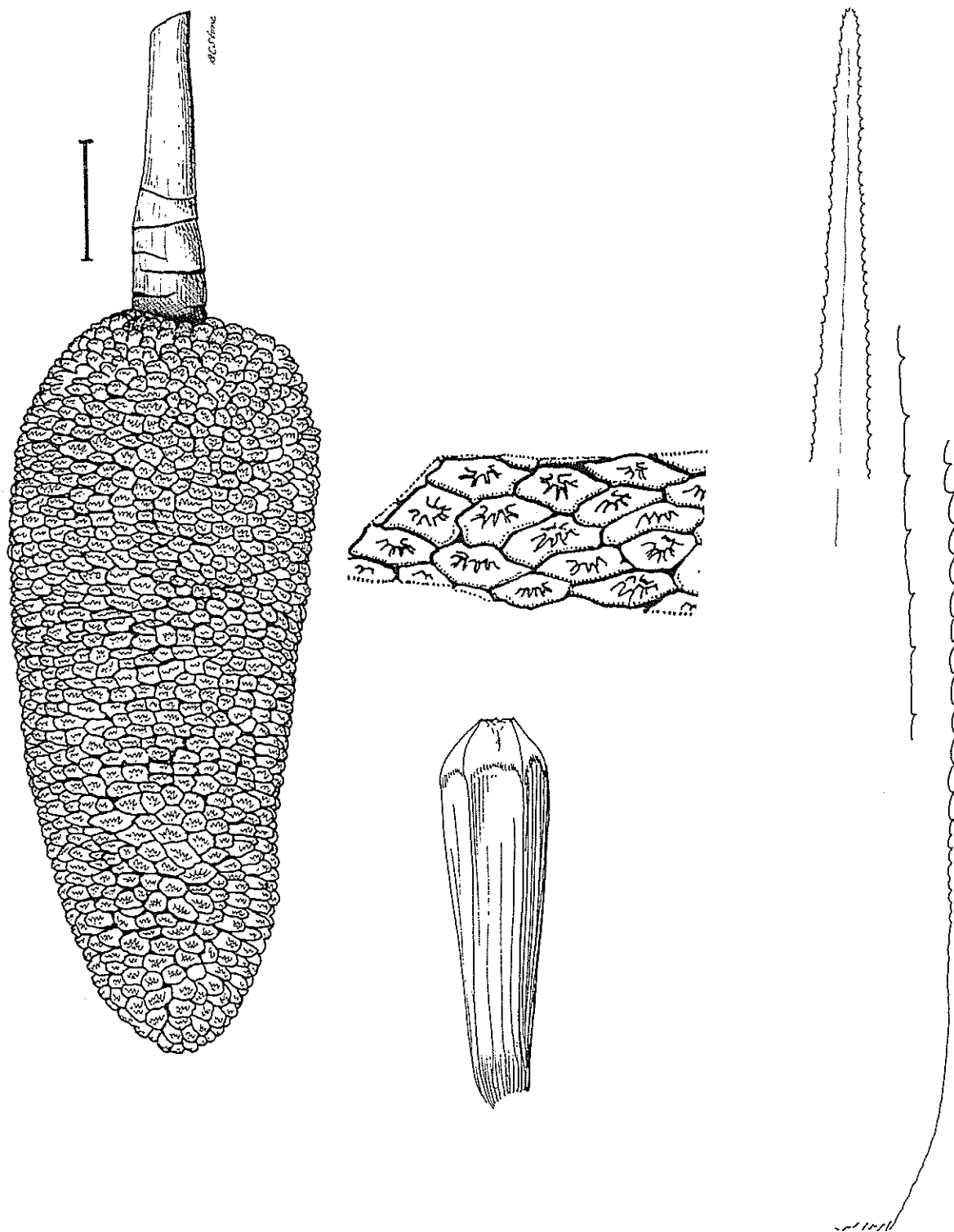
Pandanus brachyphyllus Merr. & L. M. Perry

Branched tree to 25 m; proproots numerous, not spreading, to 5 m long; leaves 150 x 9.5 cm; cephalium solitary, terminal, pendulous, and hidden by leaves, to 37 x 17.5 cm; polydrupes 1-4 loculed, 45 x 13 mm long, lower part red, purple-brown at apex; male unknown.

Mossy forest, in wet gullies; 1,800 m.

Known from the type specimen only.



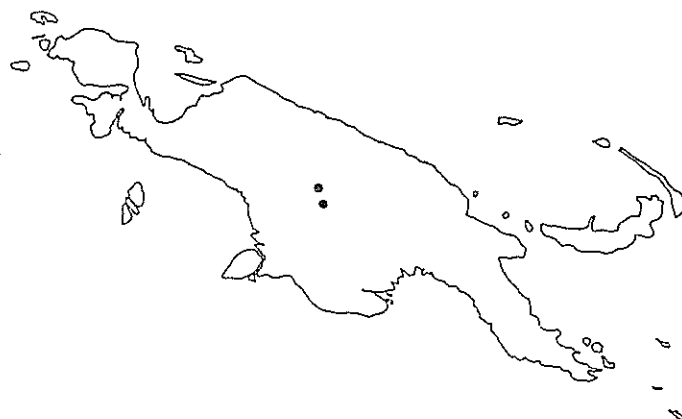


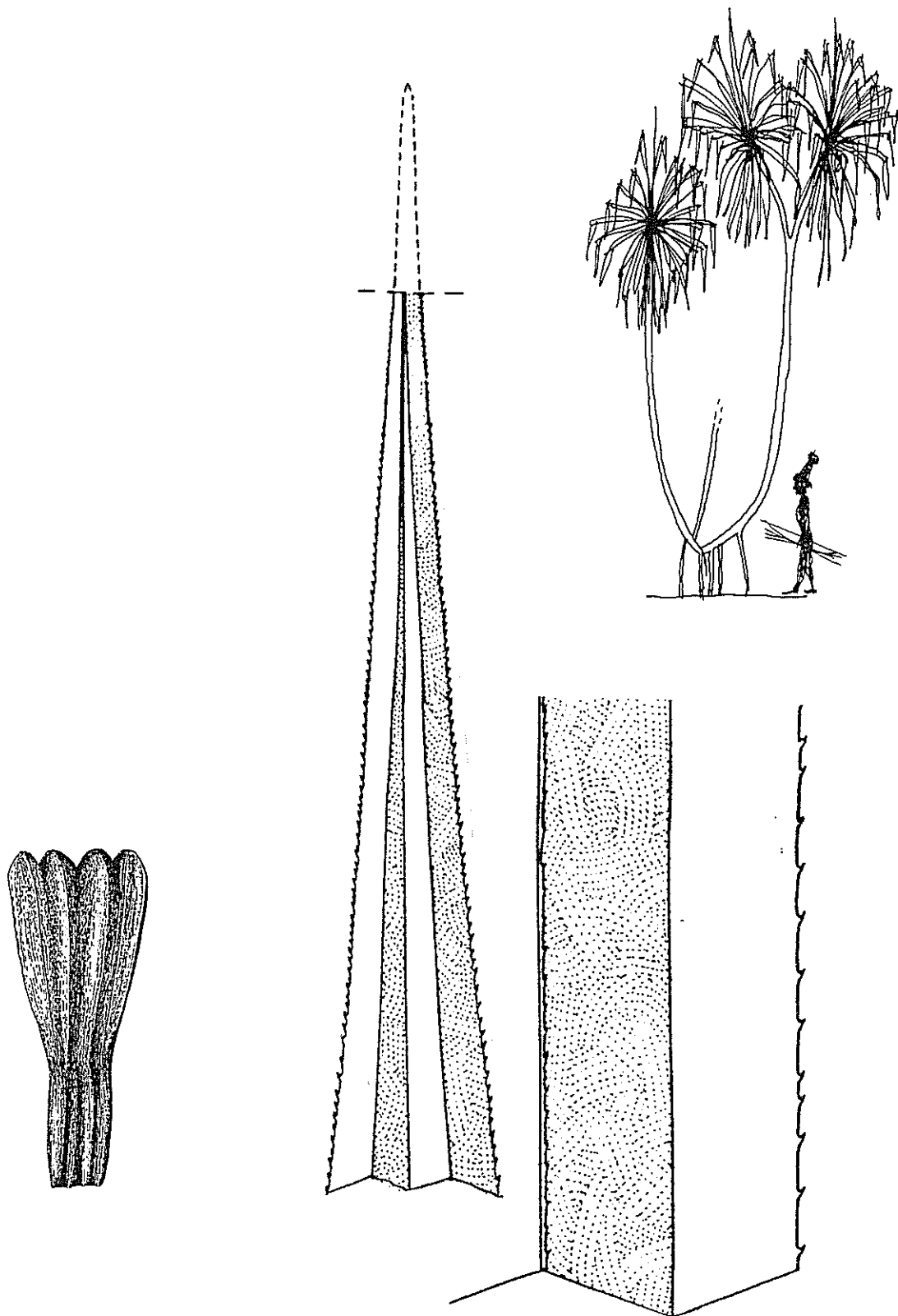
Section: METAMAYSOPS

Pandanus galorei Stone

Little-branched tree to 13 m; propoots to 6 m; leaves to 200 x 10.5 cm, shortly acuminate, lateral pleats scarcely apparent; cephalium terminal, pendulous 35 x 10 cm; polydrupes 4-7 loculed, 55 x 18 mm, red; male unknown.

Forest; 1,200 to 1,600 m.





Section: **PERRYA**

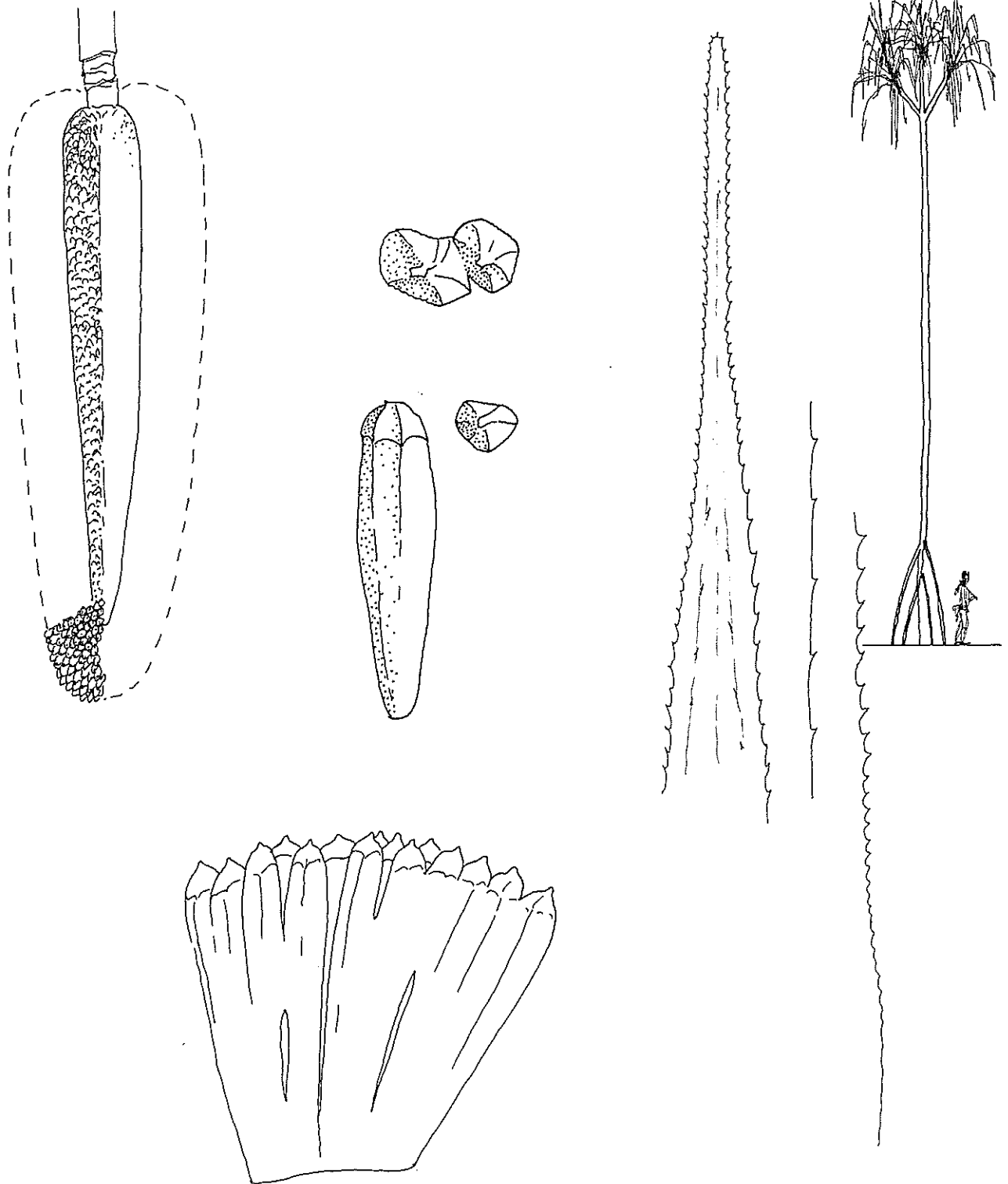
***Pandanus aggregatus* Merr. & L. M. Perry**

Clump-forming tree to 14 m, branched; proproots erect; leaves 300 x 8.5 cm; cephalium pendent, 30 x 21 cm; drupes 55 x 8 mm, apex rounded, style central, lower fleshy part scarlet, pileus purple, falling gradually, leaving a remarkable rosette effect; male unknown.

Riverine forest at 100 m.

Known from the type specimen only.





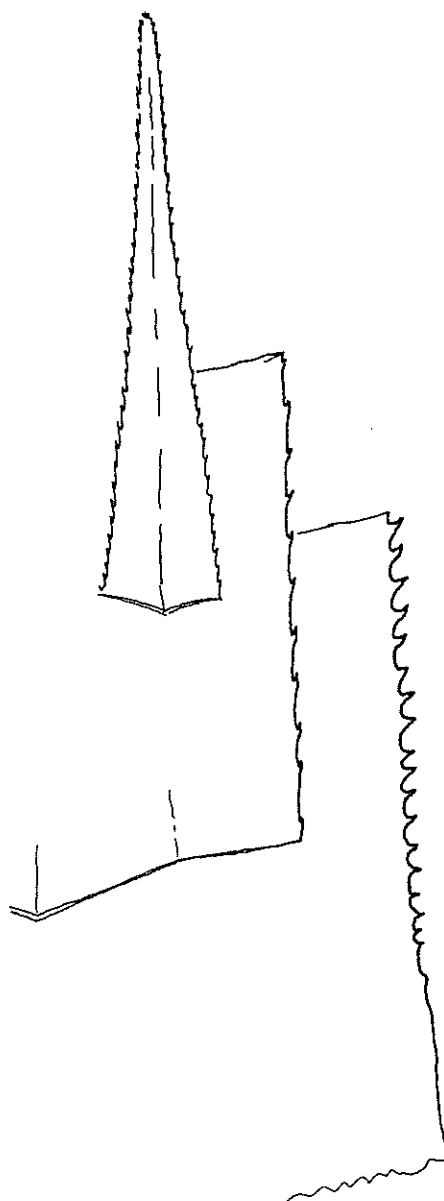
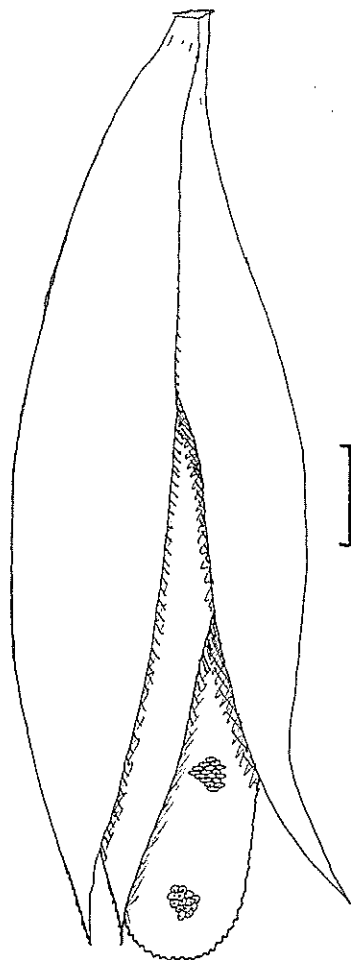
Section: **PERRYA**

Pandanus archboldianus Merr. & L. M. Perry

Branched tree to 23 m, bole to 20 m; crown small, of 2 to 3 very short branches; propoots few, slender, erect to 2.5 m, rarely lacking; leaves to 300 x 13 cm, apex acuminate, lateral pleats sometimes thorned; cephalium pendent, bract covered, 32(-90) x 21 cm; drupes to 60 x 10 mm, sometimes connate below into loose masses of up to 16, orange-pink or red below, green above, style an abrupt, flat-topped area in the centre of the drupe apex, stigma very small, lateral; male unknown.

Ridgetop forest and gullies; 1,700 to 2,100 m.





Section: **PERRYA**

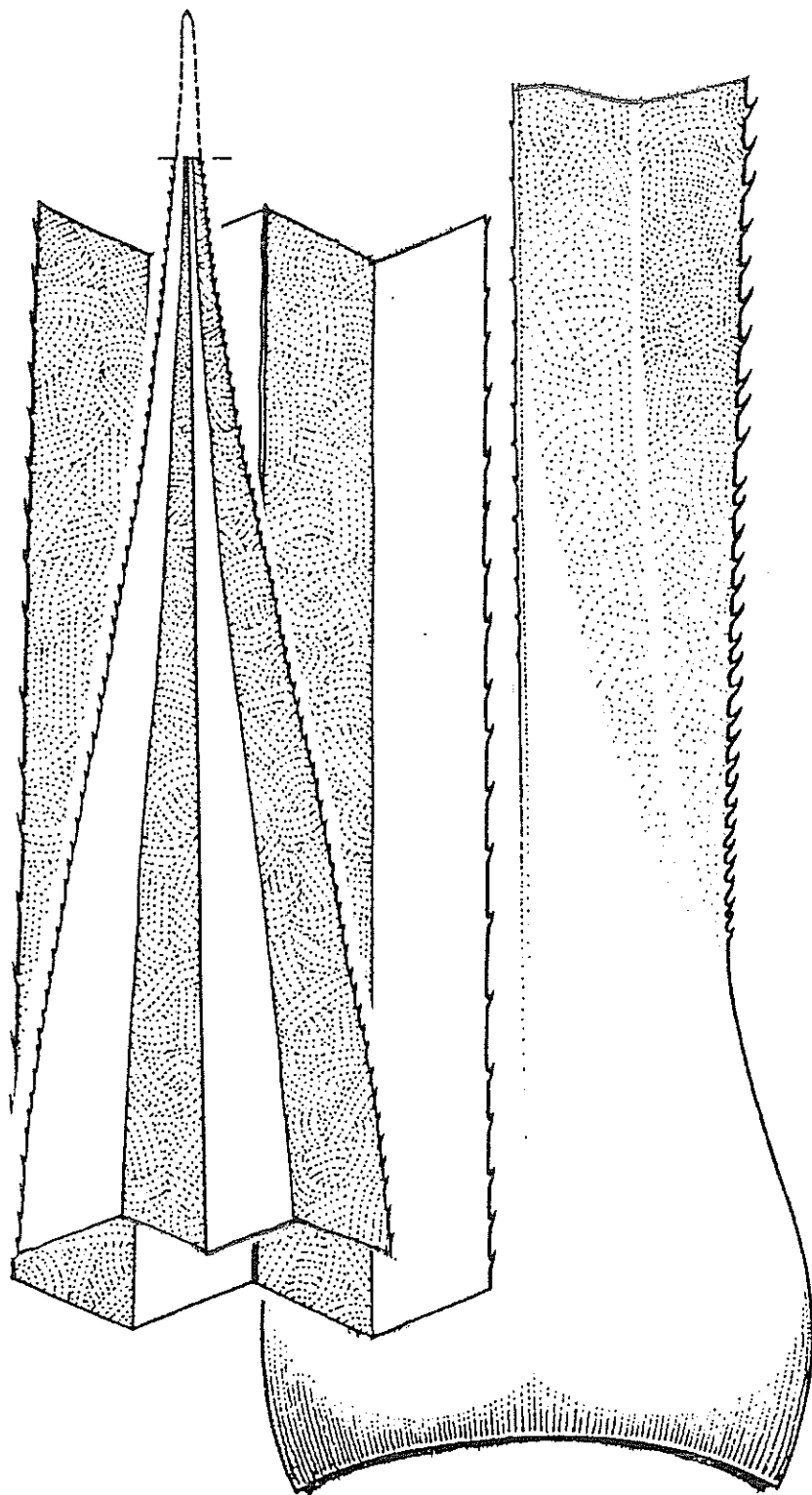
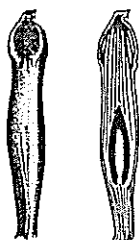
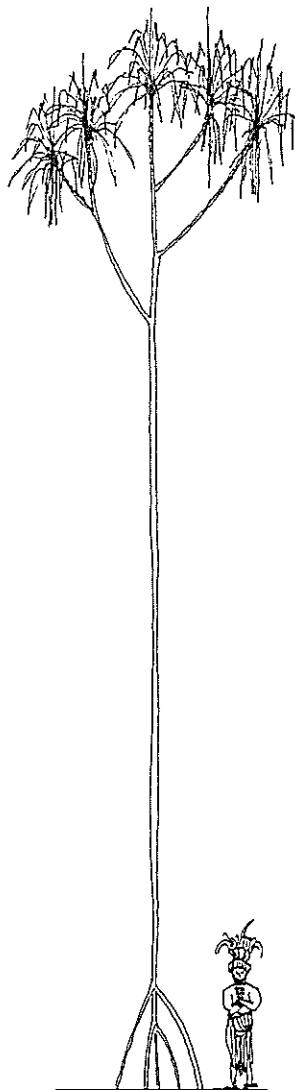
Pandanus galeatus St. John

Branched tree to 20 m; proproots thick, erect, crowded; leaves 160 x 11 cm; cephalium pendent, 38 x 13 cm, triangular in section; drupes to 45 x 5 mm, flattened in apical view, red and fleshy; male unknown.

Forest, in damp gullies at 1,600 m.

Known from the type specimen only, but said to be common on Goodenough Island (Brass).





Section: **PERRYA**

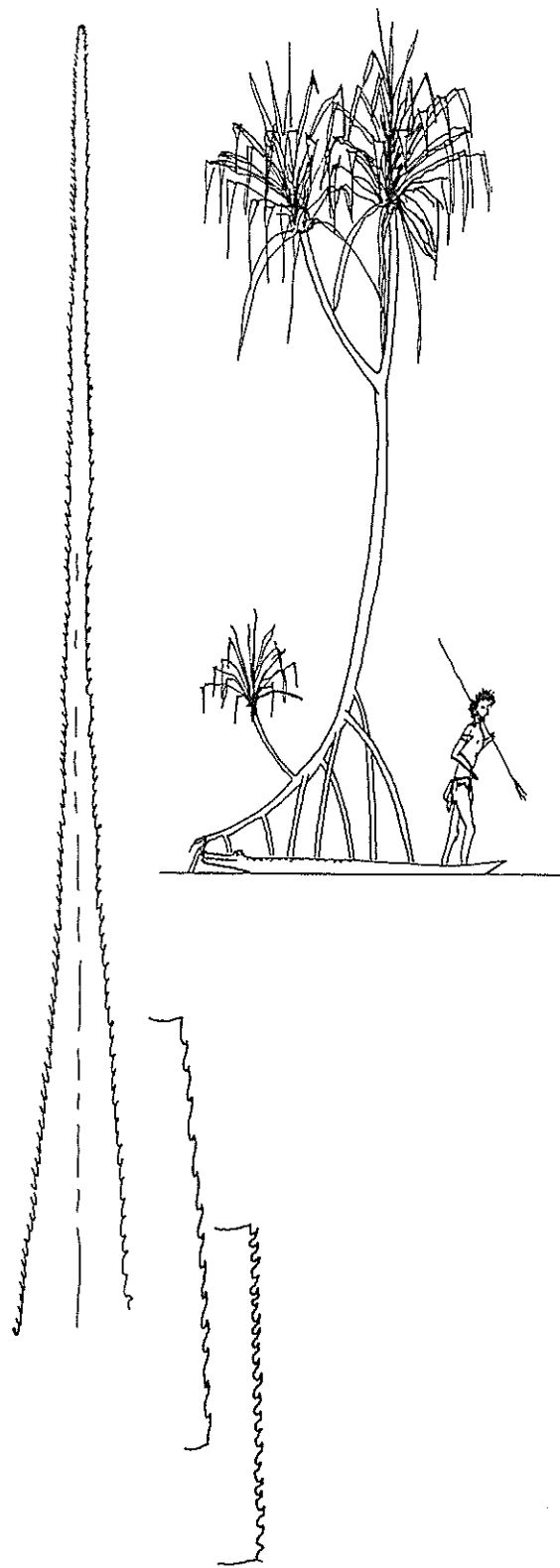
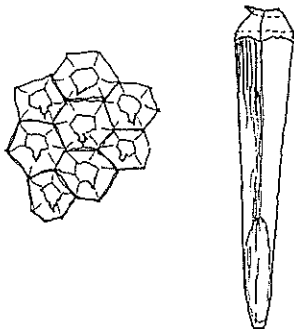
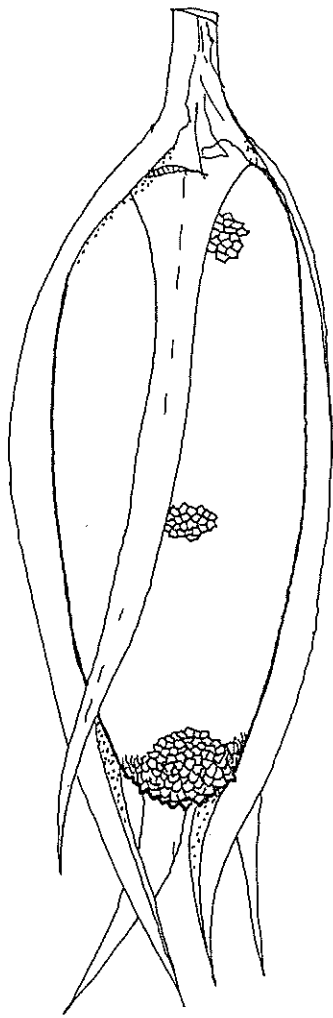
Pandanus species 5

Branched tree to 16 m; proproots to 1.4 m, slender (5 cm); leaves 105 x 6.5 cm; cephalium 29 x 12 cm, markedly triangular in section; drupes 35 x 5 mm, ±flattened in apical view, orange when ripe; male unknown.

Open marshy areas; 1,930 m.

Known from a single collection.



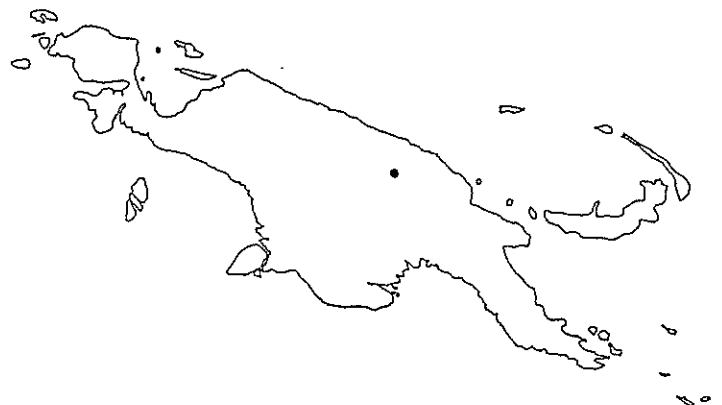


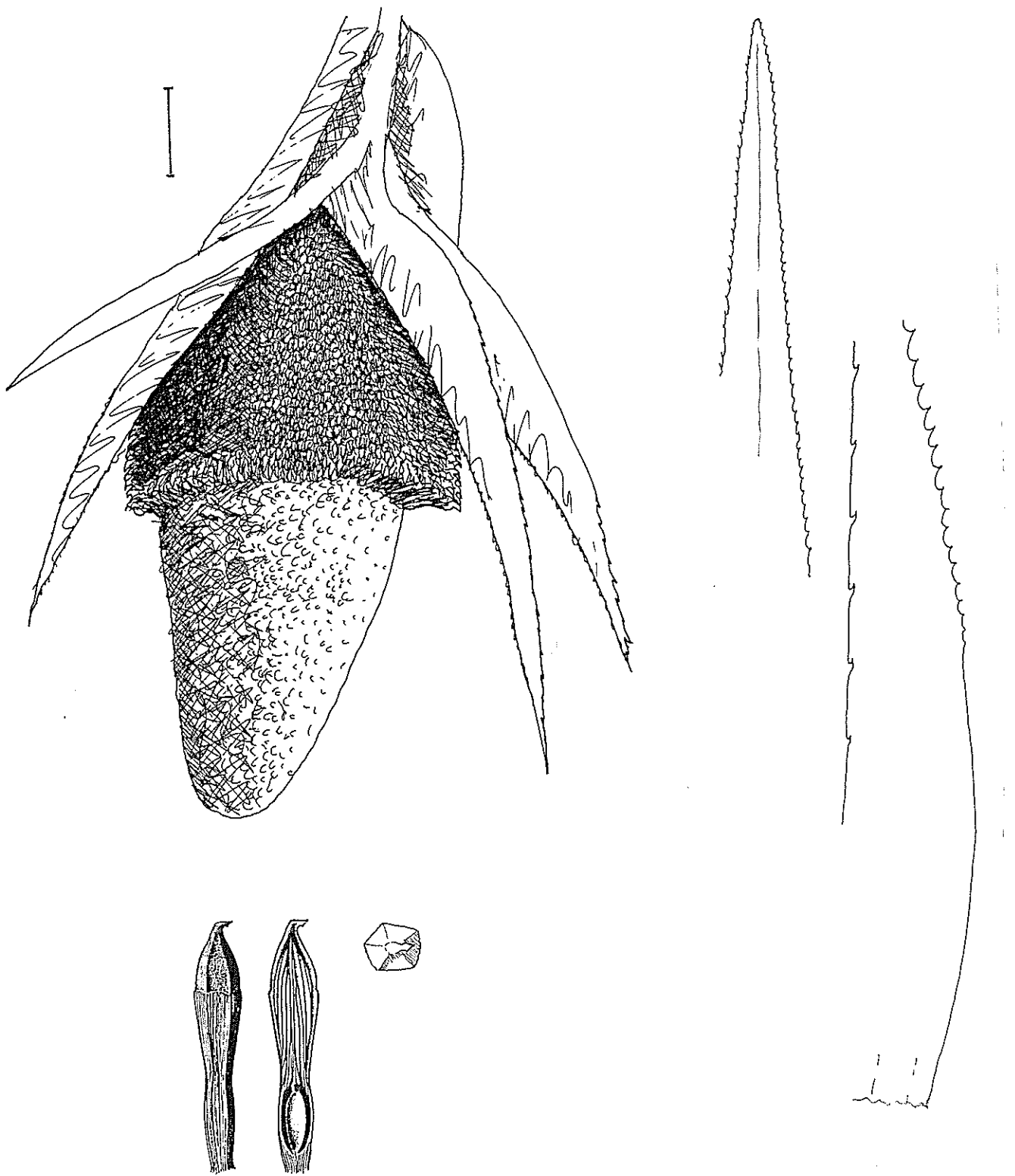
Section: PERRYA

Pandanus species 6

Branched, clump-forming tree to 10 m; proproots to 3 m, spreading; leaves 170 x 11 cm, apex very gradually tapered and long caudate; cephalium totally enclosed by yellow bracts, 32 x 11 cm; drupes 45 x 7 mm, apex with a broad flat top, stigma with a single pointed lobe, eccentric, apex brown, cream coloured below (?imm.); male unknown.

Common along the banks of the Arafundi and Karawari rivers, Sepik basin, at 100 m; known from a single collection.



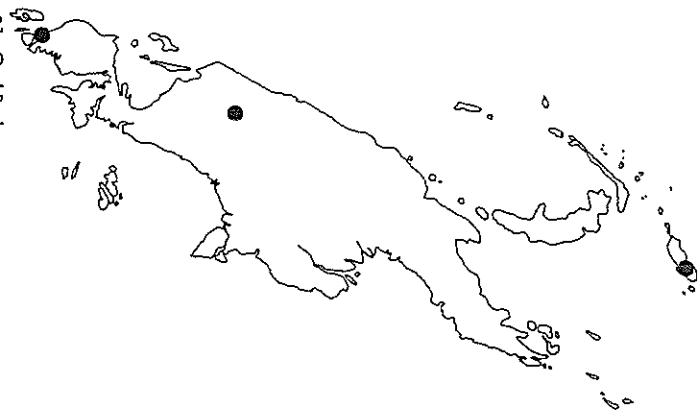


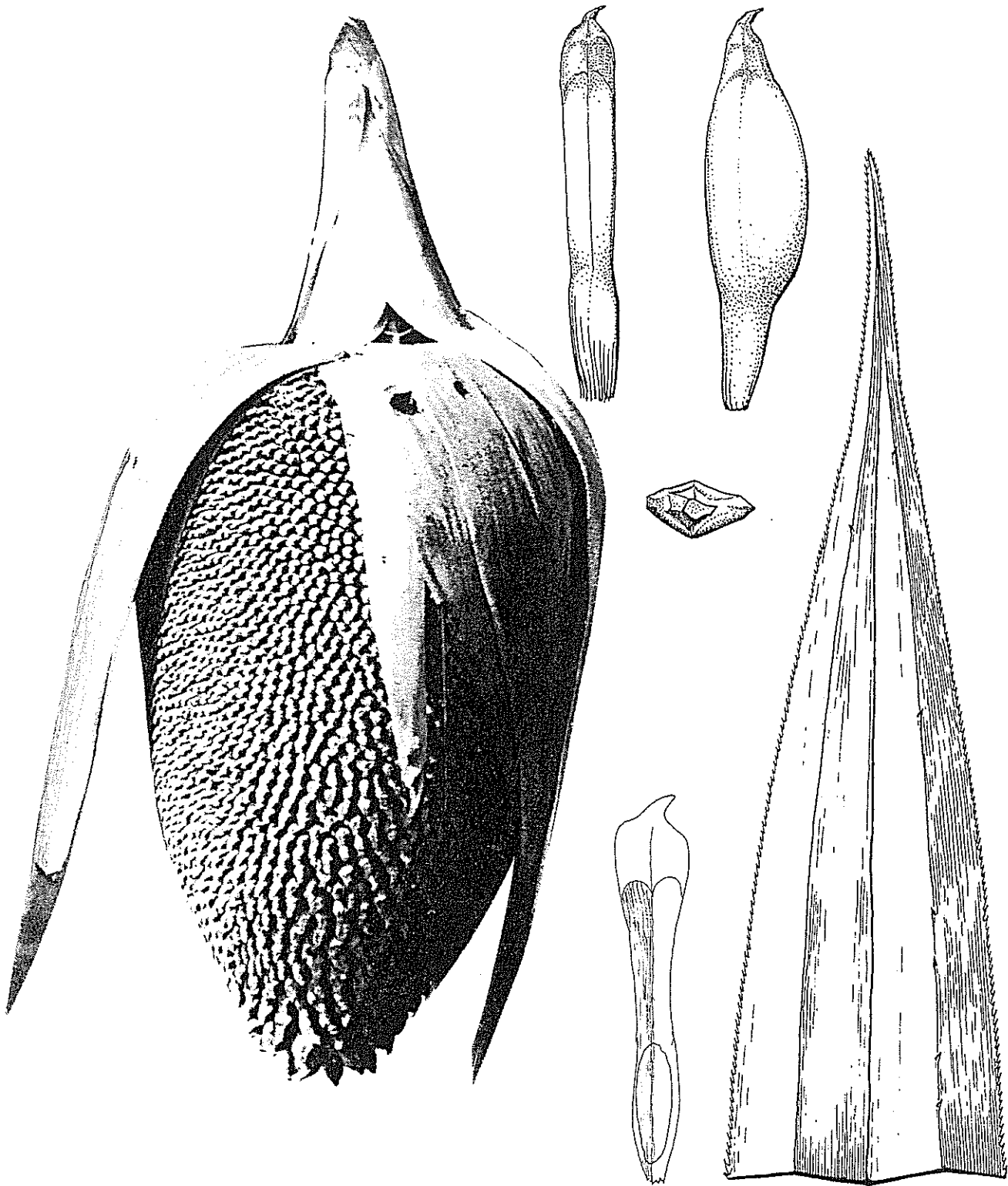
Section: **STONEDENDRON**

***Pandanus atropurpureus* Merr. & L. M. Perry**

Branched tree to 16m; trunk to 8 m; propoots to 2 m; leaves to 300 x 10 cm; cephalium terminal, to 43 x 20 cm, partially covered by divergent bracts; drupes to 45 x 5 mm, red or yellow below, purple-black above; male unknown.

Swampy forest; 10 to 900 m.





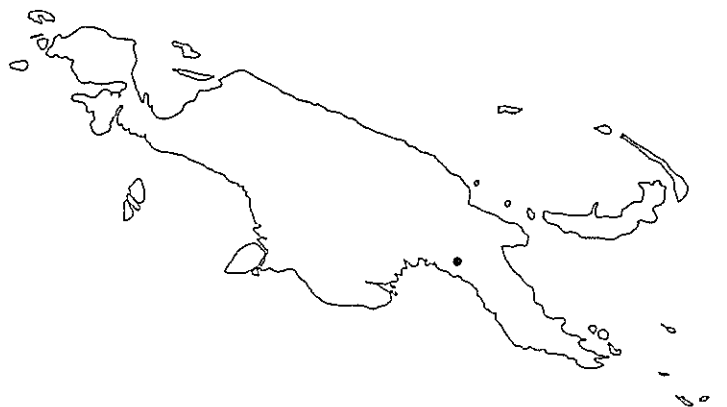
Section: STONEDENDRON

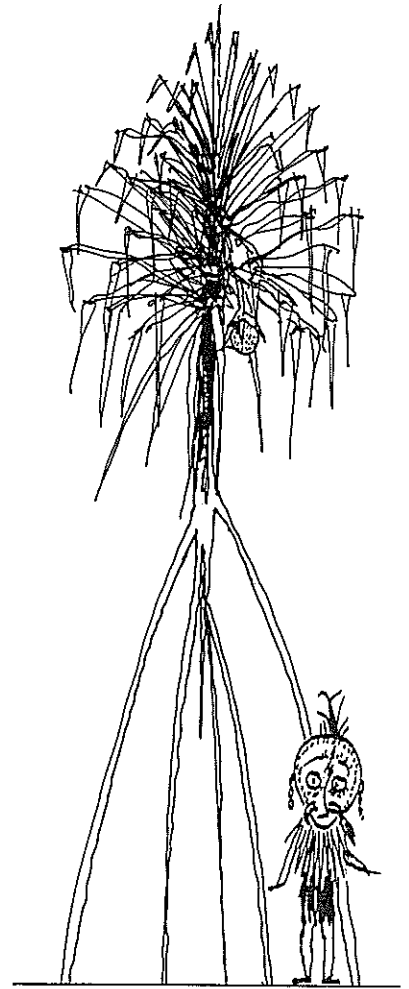
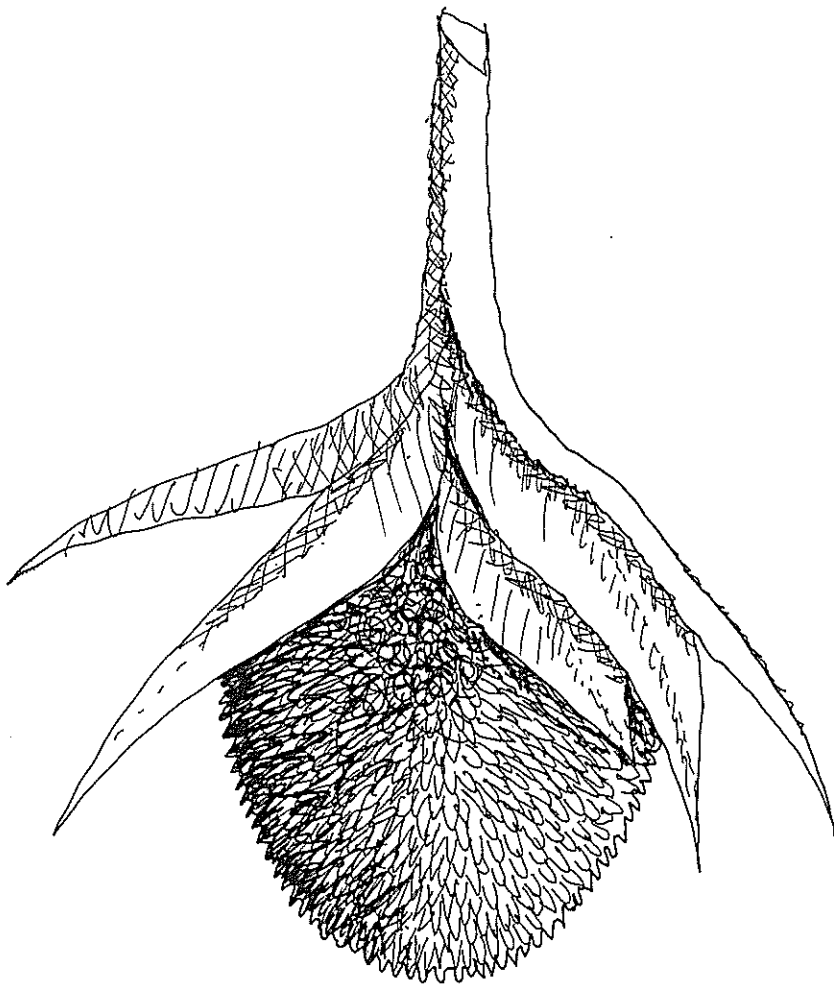
Pandanus columbiformis Stone

Tree to 16 m; branched; prop- roots to 5.7 m long, upright; leaves to 220 x 7.5 cm; cephalium ovoid, with a few bracts, covering half to two-thirds its length, to 33 x 20 cm broad; drupes to 70 x 14 mm, some shaped like small pigeons (hence the name), orange below, pileus purple-brown; male unknown.

Swamp forest; 100 m.

Known from the type specimen only.





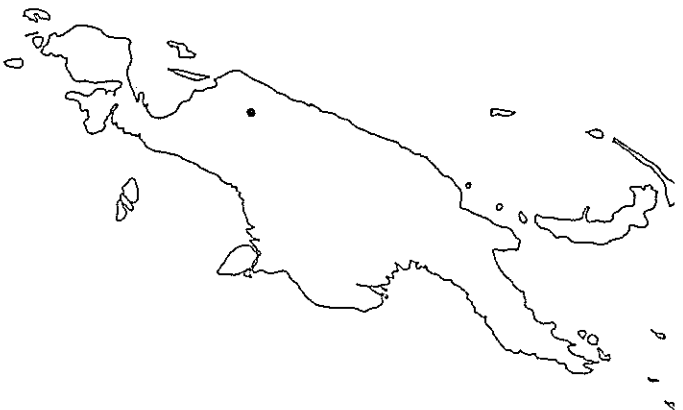
Section: **STONEDENDRON**

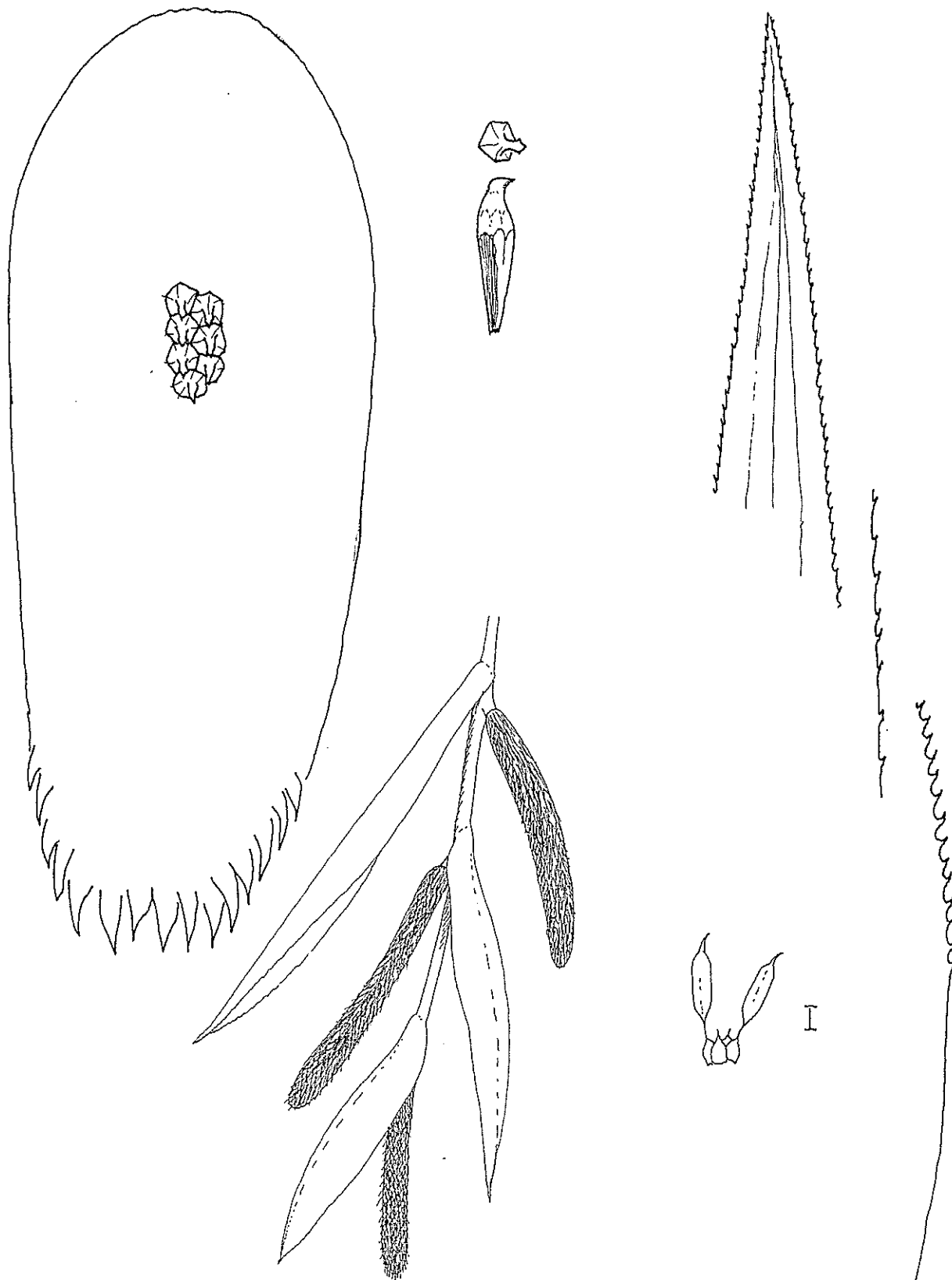
***Pandanus concinnus* Merr. & L. M. Perry**

Unbranched tree to 6 m; trunk short; proproots long; leaves 160 x 4 cm, tapering, acuminate or subulate; cephalium terminal, pendent below the leaves, to 16 x 14 cm, with bracts to 20 cm; drupes to 43 x 4 mm, purple-brown above; male unknown.

Mossy forest at 1,800 m.

Known from the type specimen only.



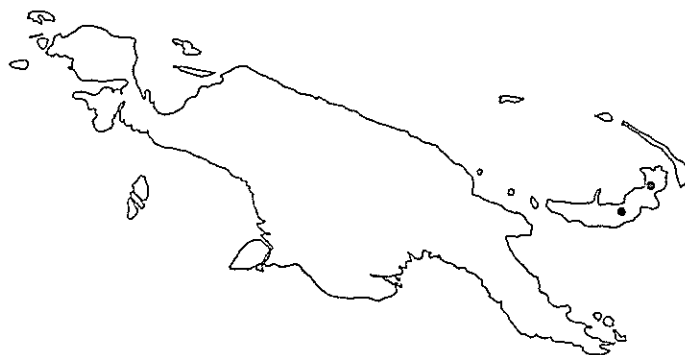


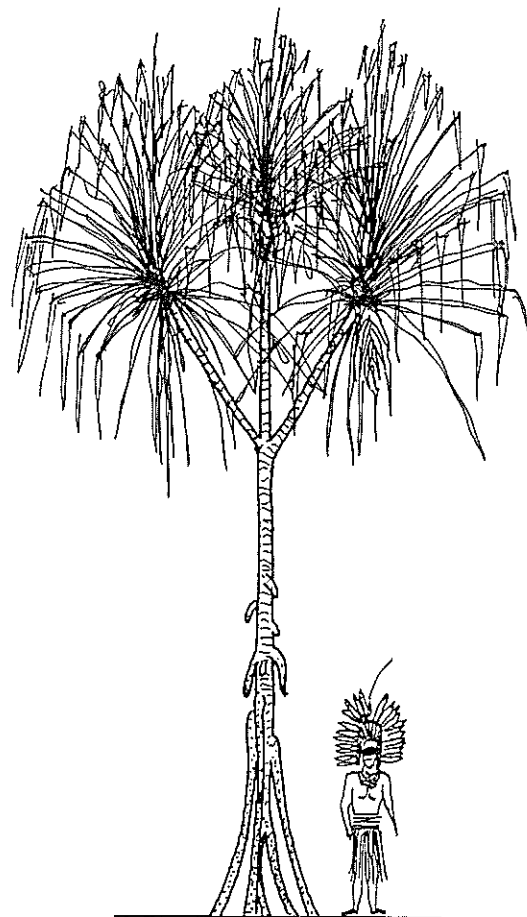
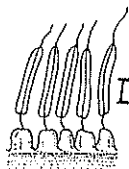
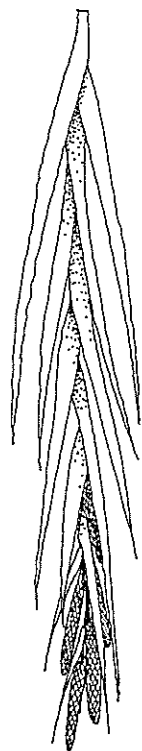
Section: **STONEDENDRON**

Pandanus species 7

Short, sparsely branched tree to 2 m; proproots present; leaves 200 x 12 cm; cephalium bract covered, 17 x 6.5 cm; drupes 35 x 7 mm, pileus woody, orange red, turning brown; male inflorescence a rather loose raceme of spikes, these 13 x 2 cm, bracts to 25 cm, lanceolate, brown, anthers in connate clusters of 6-9, anthers c.3.5 mm long.

Forest; 1,400 m.





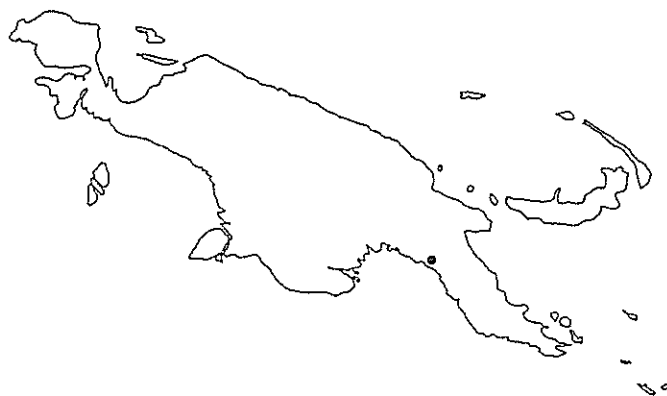
Section: UNKNOWN

***Pandanus pendulinus* Martelli**

Branched tree to 8 m; bark spinous; proproots to 3 m long, outcurving; leaves to 350 x 11 cm, gradually attenuate and slightly acuminate, with very fine teeth; male inflorescence racemose, 1 m long, bracts to 50 x 3 cm, spikes tapering, to 20 x 4 cm; filaments short, to 1 mm, free, but arranged in units of 7-9, anthers to 3 mm with long apical appendage.

An enigmatic species, known by the type collection only - a male plant.

Riverine grassland; 60 m.



SUBGENUS PANDANUS

The sub-genus *Pandanus* is characterised by its multi-loculed phalanges with separate styles. It is the most widespread sub-genus, encompassing almost the entire range of the genus.

Section *Athrostigma* has a single endemic species with small blunt-ended phalanges.

Section *Austrokeura* (as subsection of *Pandanus*) has spine-covered bark and rugulose phalanges which are broadest at their middle.

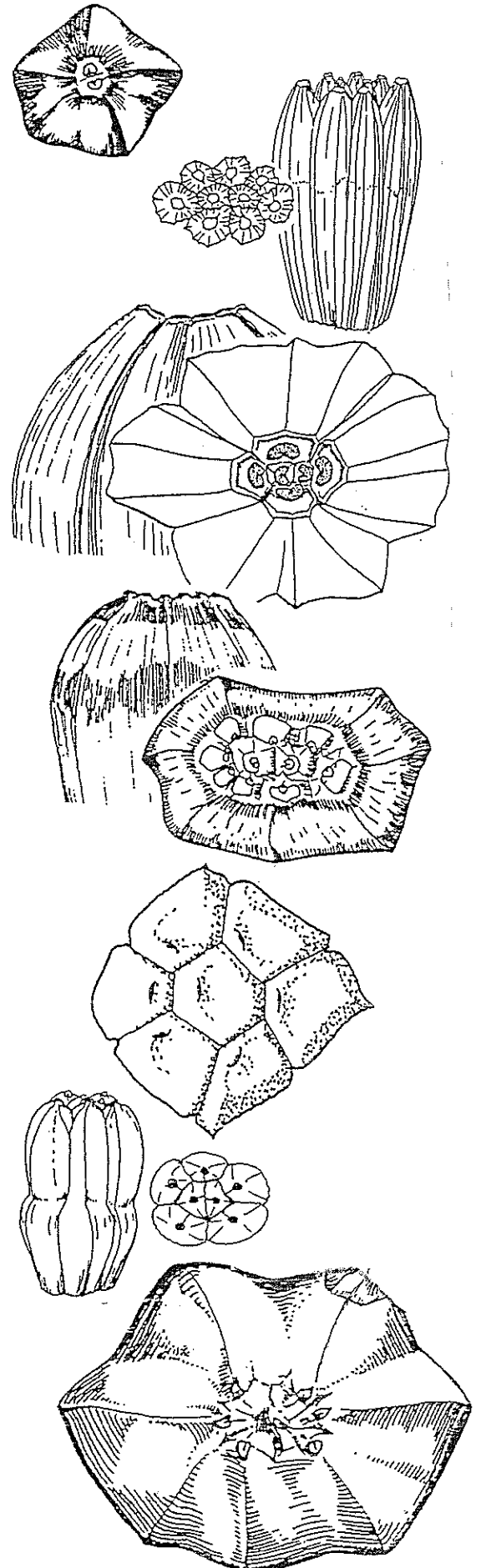
Section *Excavata* contains a single endemic species in which the phalange apex is slightly hollowed, the kidney-shaped stigmas closely clustered.

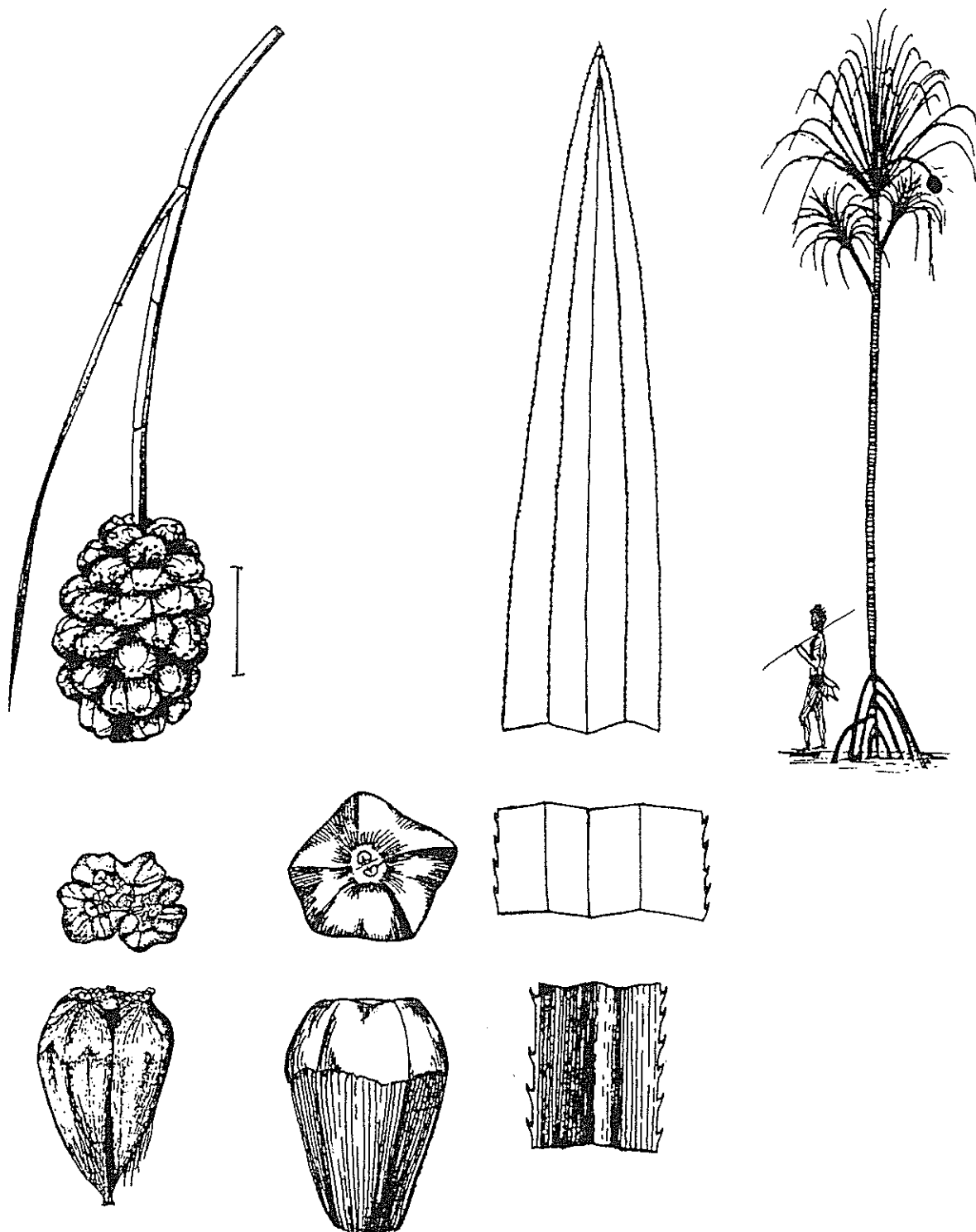
Section *Fagerlindia* is characterised by a raceme of cephalia. The several species are endemic to the region.

Section *Intraobtus* has wedge-shaped and blunt-topped phalanges in which one or more of the distal carpels in each phalange acts as a 'focus' to the stigmas of the other carpels.

Section *Pandanus* has phalanges with parallel, smooth sides, and in which the stigmas all face concentrically.

An unnamed section has large drupe-like phalanges with a cluster of cordate stigmas at the apex.





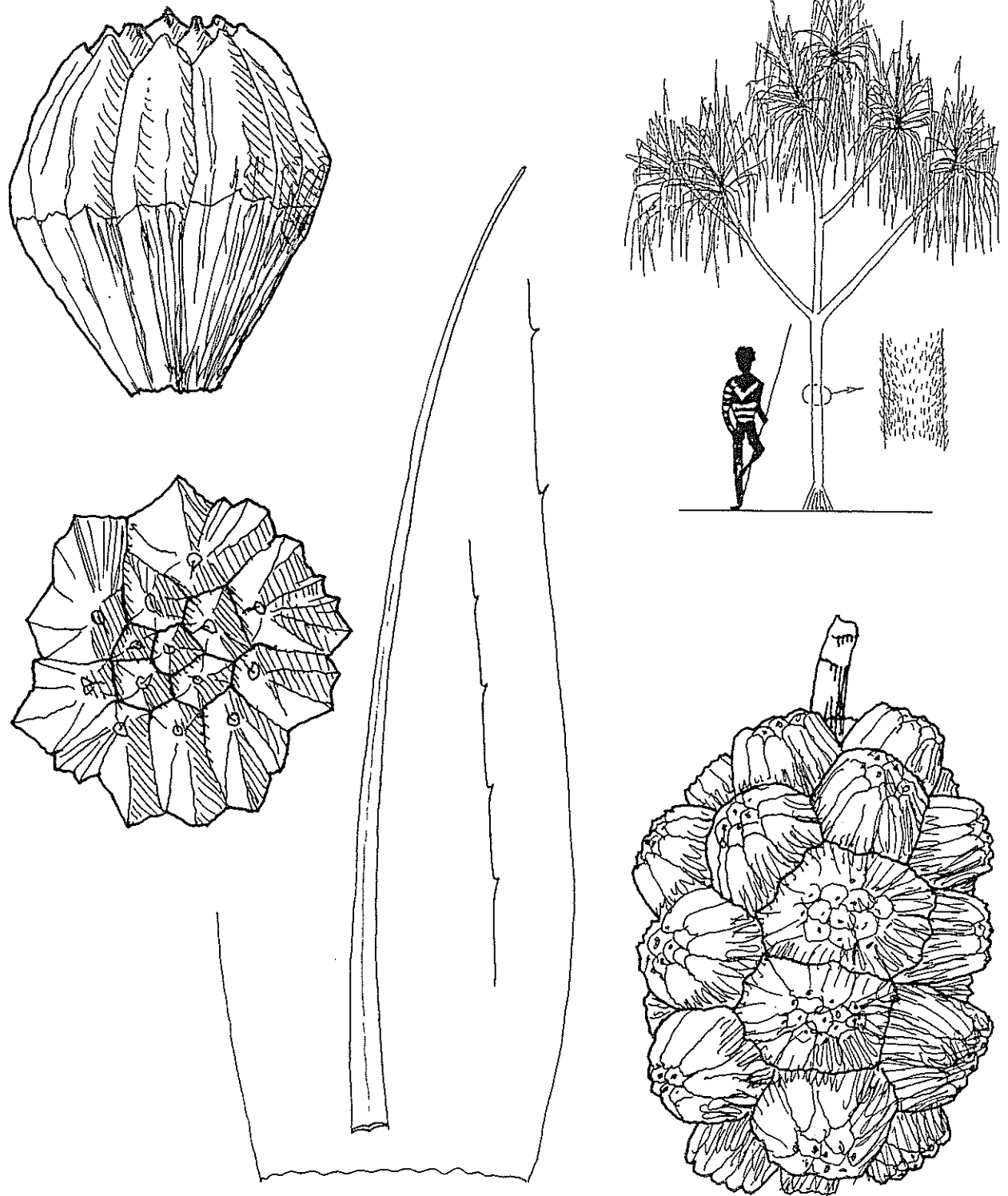
Section: ATHROSTIGMA

Pandanus calathiphorus Gaudich.

Erect, sparsely branched tree to 15 m, terminal crown largest, lateral crowns with shorter leaves; leaves to 215 x 3 cm, lateral pleats thorned near apex, often assymmetrically so; cephalium long pedunculate, to 11 x 8.5 cm; phalanges to 38 x 27 mm with 2-4 stigmas separated by short corky scars, glaucous blue-green, becoming orange when ripe. Male unknown.

Mangrove fringe to forest; sea level to 50 m.



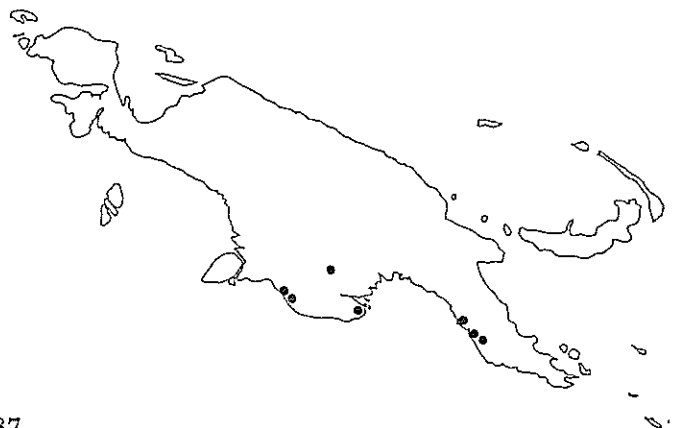


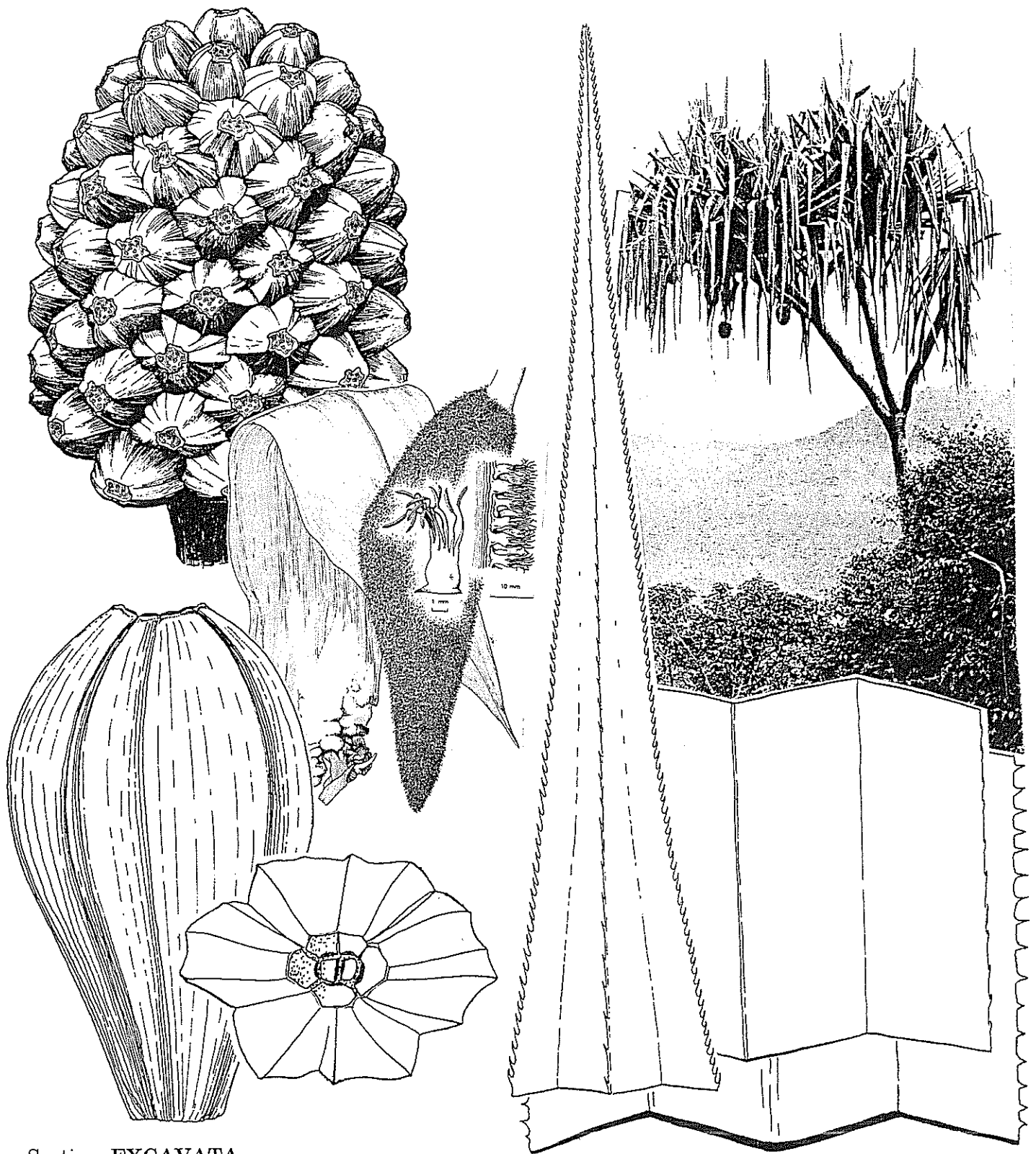
Section: **AUSTROKEURA**

***Pandanus brassii* Martelli**

Branched tree to 8 m; main trunk covered by numerous, upcurved, root-like, flexible spines; proproots to 40 cm, densely clustered at base; leaves to 200 x 7 cm, straight, margin often not thorned, apex long-tapering; cephalium solitary, pendulous (to 40 cm); phalanges 80 x 50 mm, broadest in middle, 6-10 loculed, sides ridged and angular, orange-red when ripe.

Open grassland and savannas, freshwater swamps; sea level to 450 m.





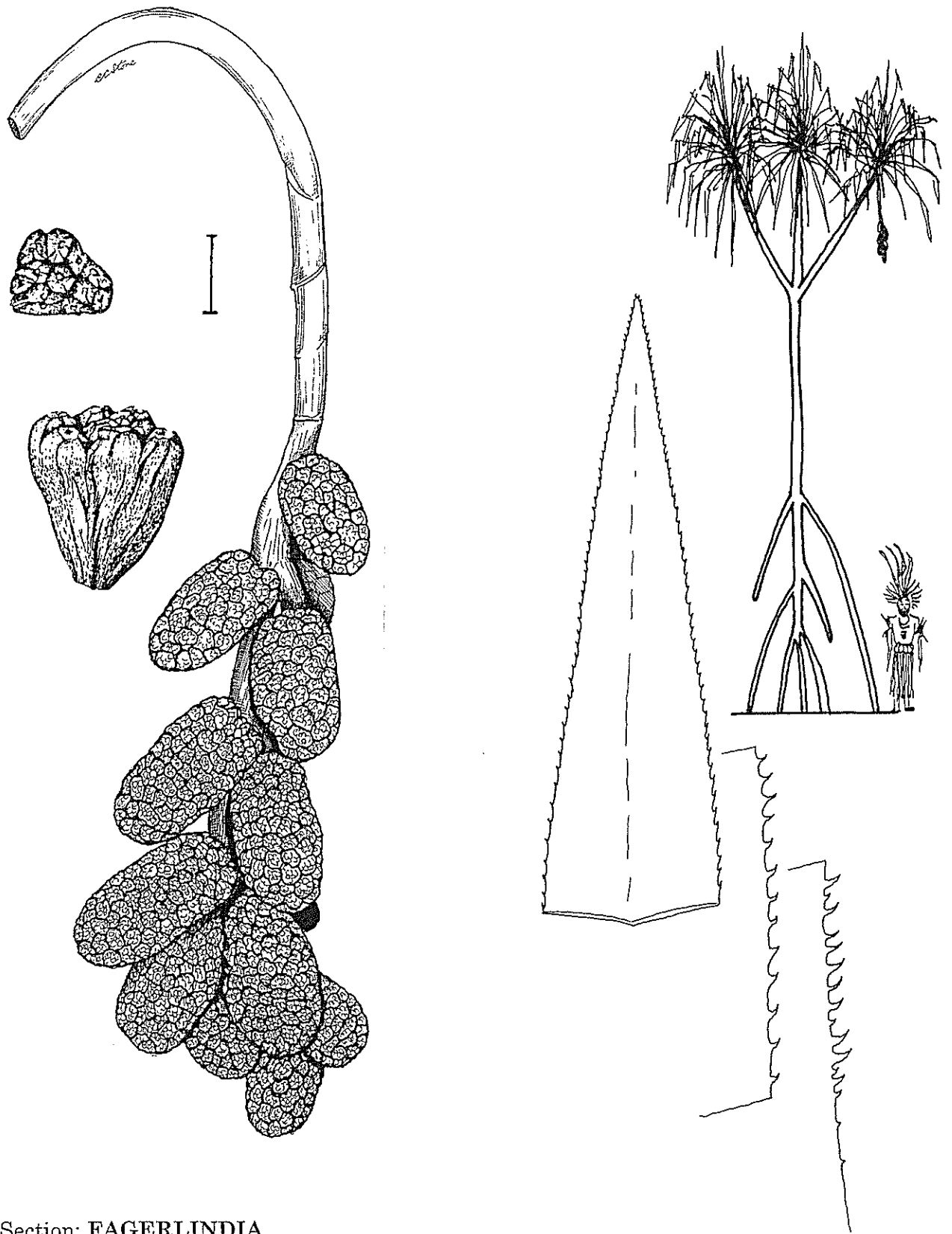
Section: **EXCAVATA**

***Pandanus antaresensis* H.St.John**

Branched tree to 30 m; trunk to 16 m; propoots to 10 m; leaves 250 x 10 cm; cephalium without bracts when ripe, to 35 x 25 cm, long pedunculate; phalanges to 100 x 60 mm, apex sunken, stigmas cordate, orange when ripe; Male inflorescence white, over 2 m long.

Forest; 1,300 to 2,500 m. Often forming extensive stands.

Throughout New Guinea Highlands, and in some areas the seeds are cooked and eaten, apparently more so in the past - the phalanges being abundant in archaeological excavations.

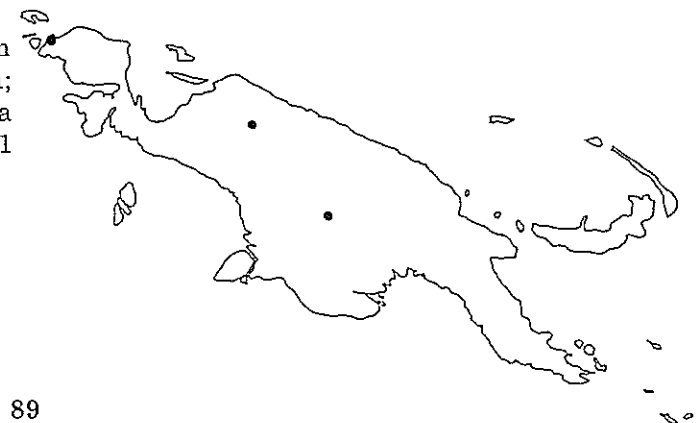


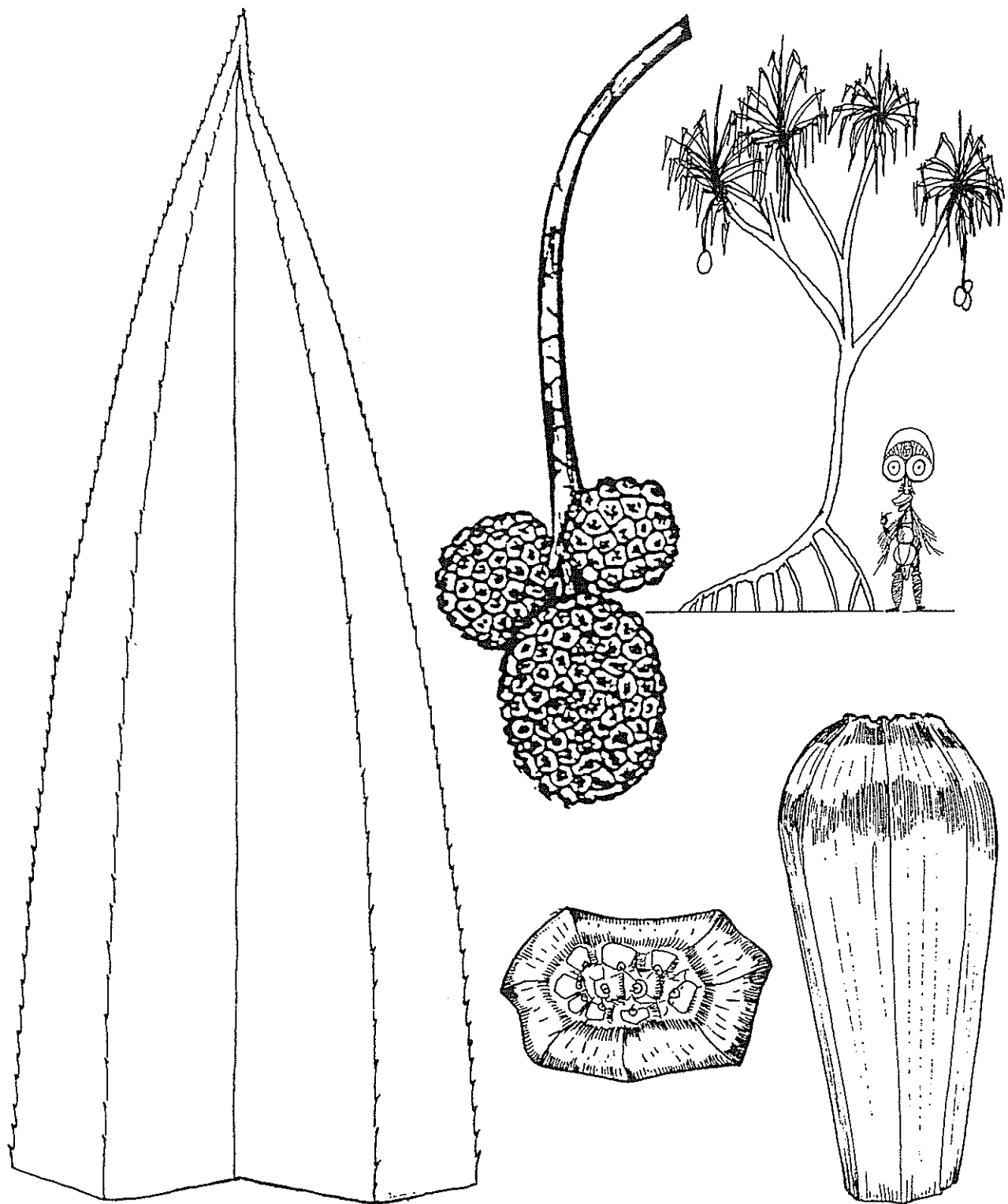
Section: **FAGERLINDIA**

Pandanus dolichopodus Merr. & L. M. Perry

Branched tree to 17 m; bole 15 m; propoots 2-7 m long, spreading; leaves 200-300 x 8 cm; inflorescence a raceme, peduncle to 3 m; cephalia up to 15, oblong, to 20 x 8 cm, phalanges with 7-11 locules, to 35 x 30 mm, glaucous green.

Forest; 700 to 850 m.



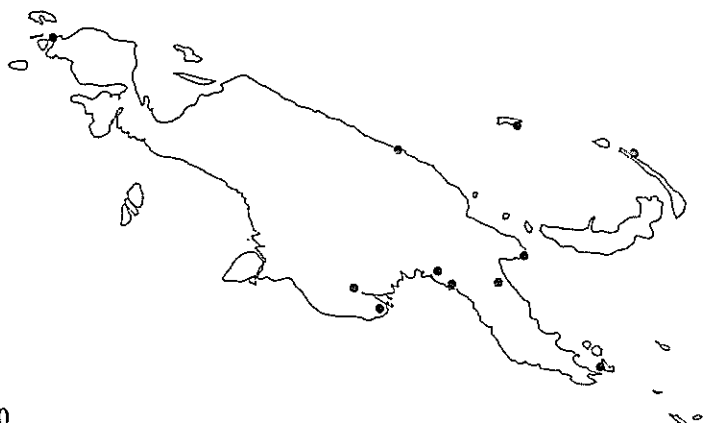


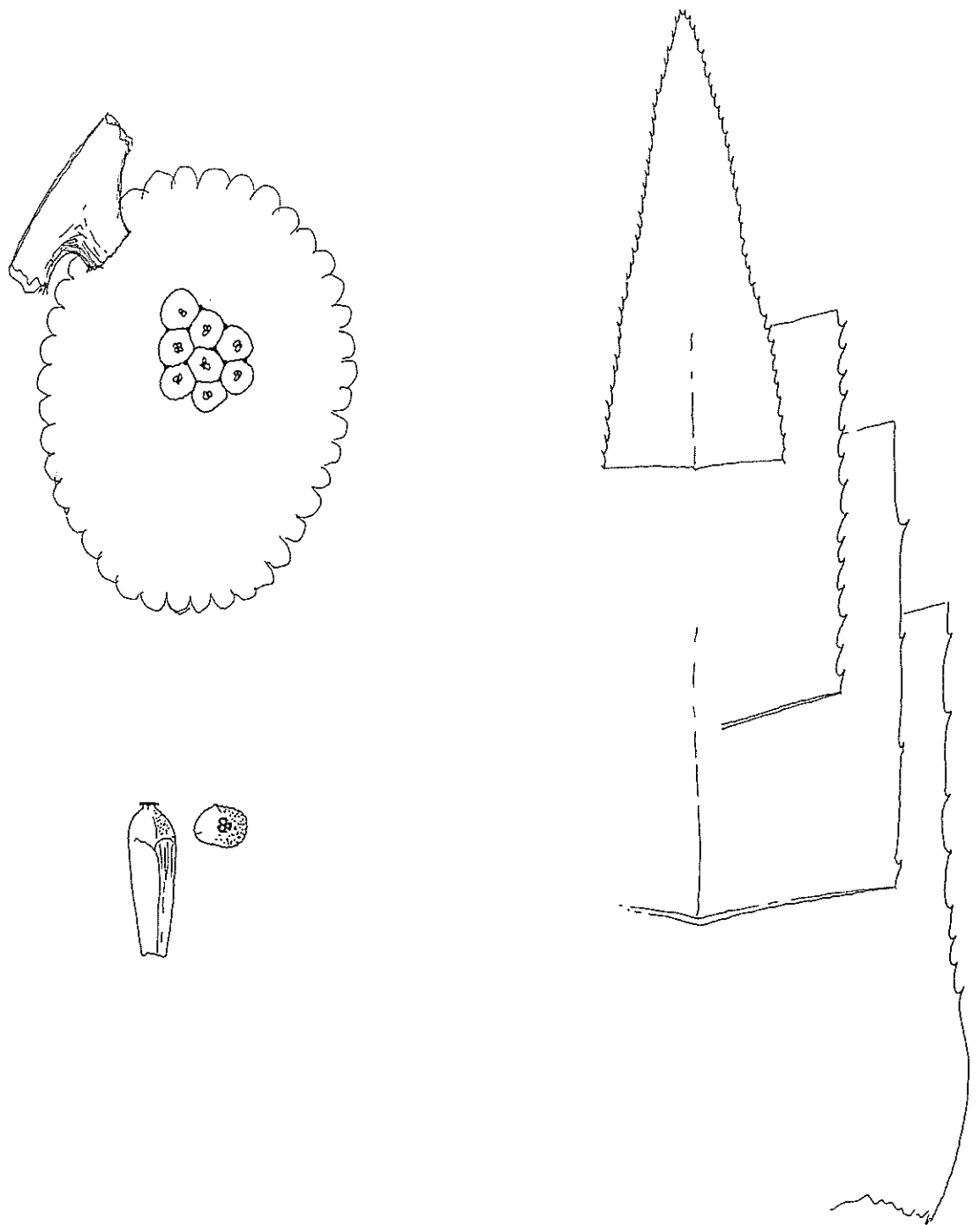
Section: **FAGERLINDIA**

***Pandanus kaernbachii* Warb.**

Branched tree to 10 m; base of trunk often prostrate, upcurving; proproots to 1 m, numerous; leaves to 250 x 10 cm, apex blunt-acute; cephalia 1 to 3, often unequal in size, to 30 x 25 cm; phalanges 8-10 loculed, to 90 x 50 mm, apex brown, sometimes banded, yellow-orange below.

Coastal, in fresh water swamps with standing water; rarely to 600 m.





Section: **FAGERLINDIA**

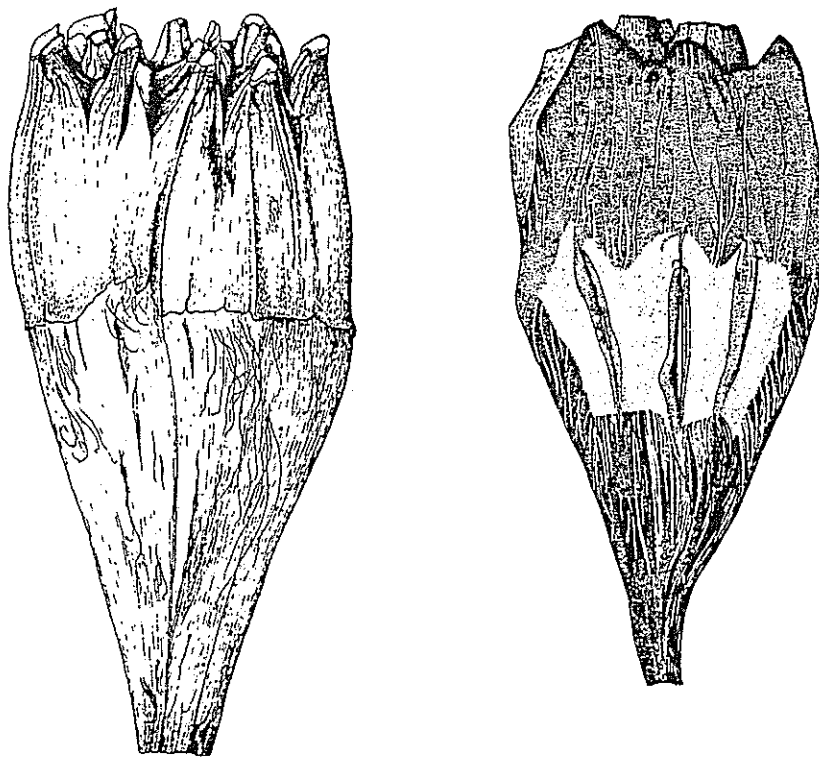
Pandanus species 8

Much-branched tree to 10 m tall; proproots?; leaves 180 x 7 cm; inflorescence a raceme of cephalia (number not recorded), each to 10 x 7 cm; phalanges 25 x 18 mm, with 2-4 rounded, peltate stigmas at apex, red when ripe.

Gregarious on banks of tidal streams on Woodlark Island.

Known from a single collection.





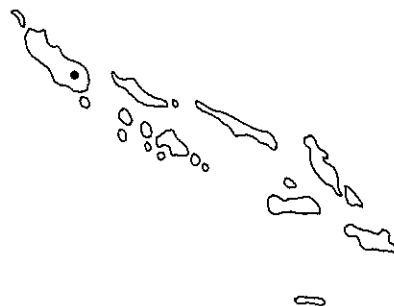
Section: INTRAObTUTUS

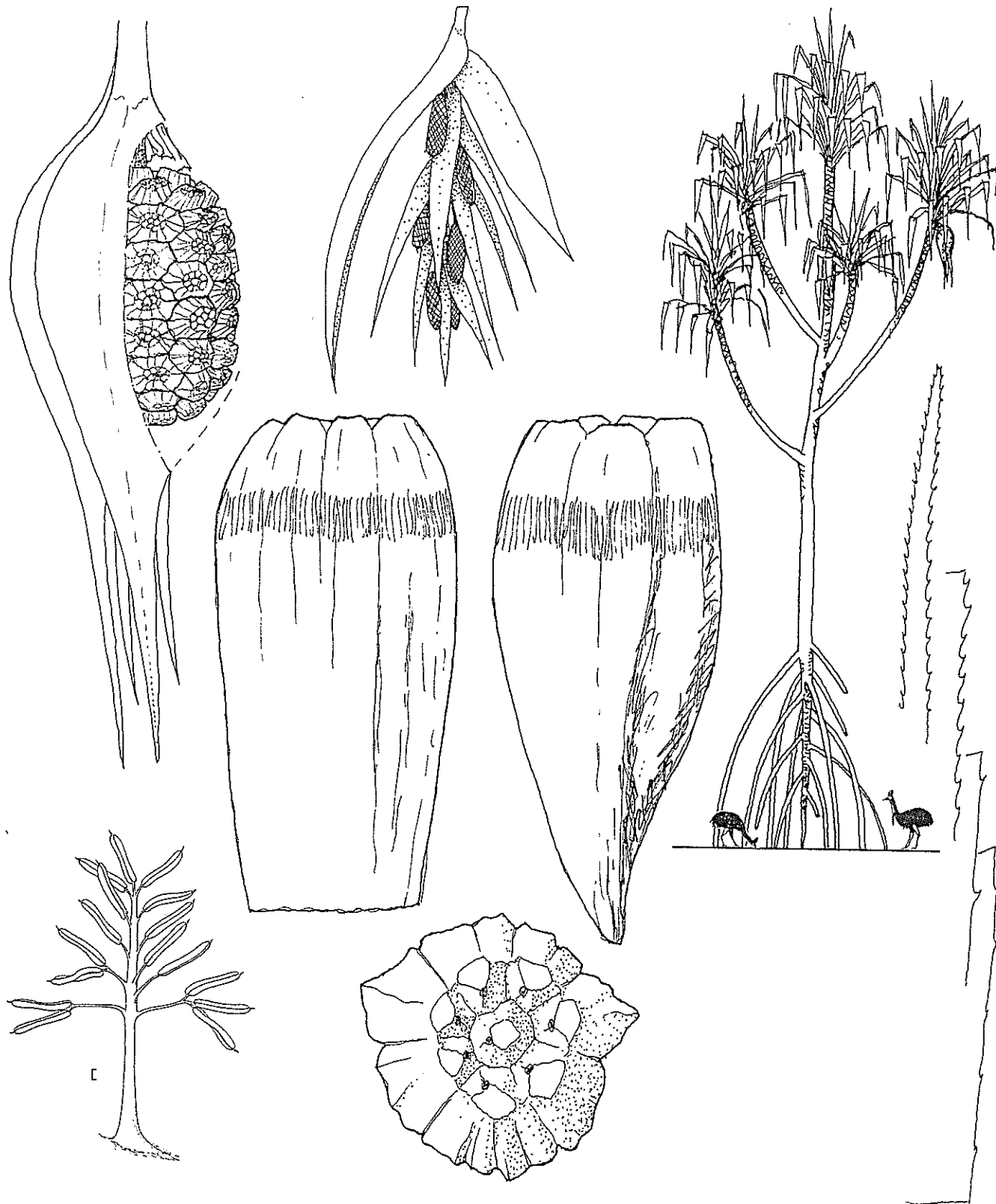
Pandanus kajewskii Merr. & L. M. Perry

Tree to 8 m; leaves to 300 x 7 cm; cephalium conical, to 27 x 21 cm; phalanges to 100 x 45 mm, locules 10-16, styles slender, conical.

Forest at 1,000 m.

Known from the type specimen only.





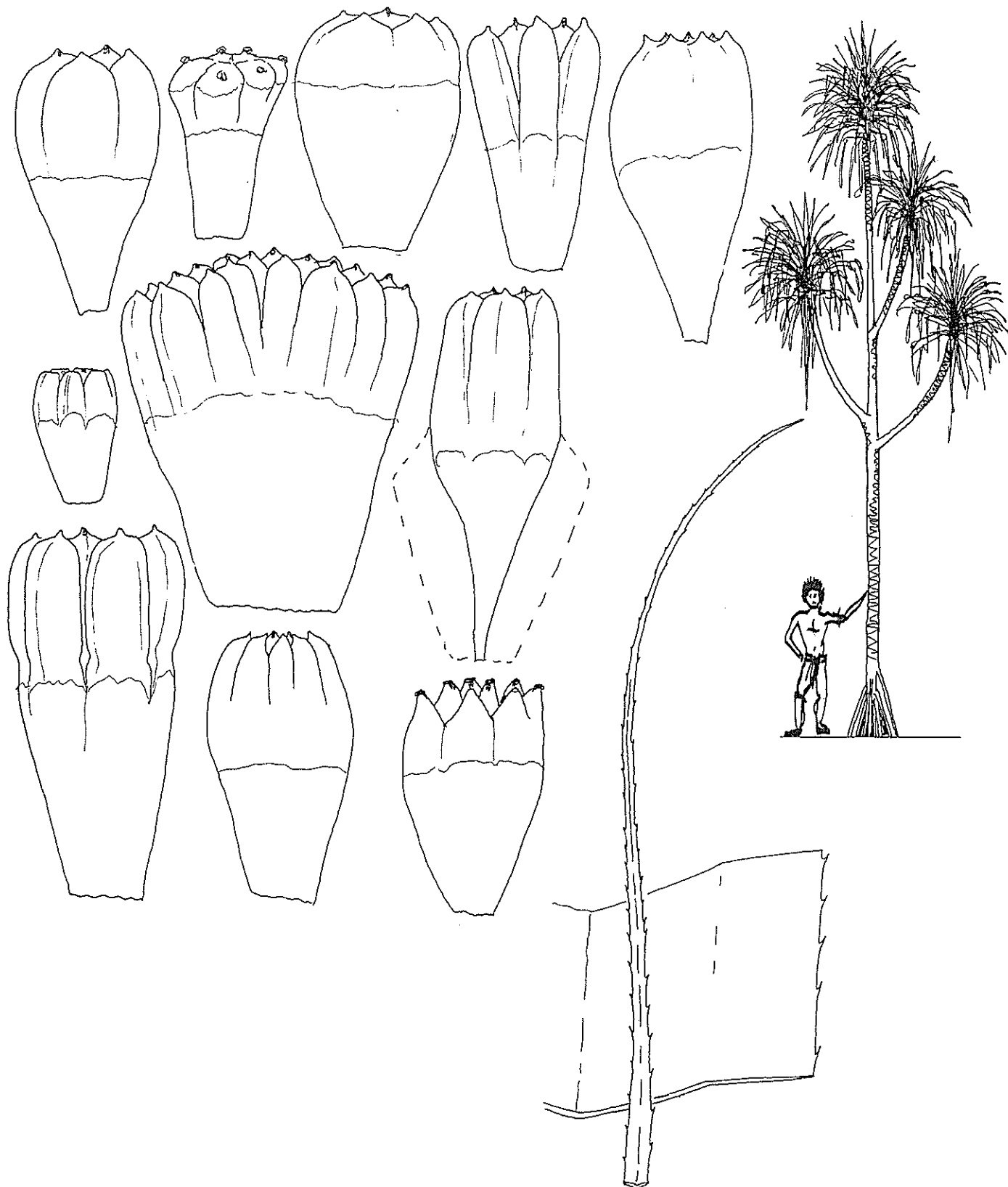
Section: **INTRAOBTUTUS**

Pandanus papuanus Solms-Laub.

Well-branched tree to 25 m; crown conical; bole thick, straight; proproots to 6m, numerous, regular, spreading; leaves to 350 x 15 cm, lacking lateral pleats; cephalium terminal, solitary to few, 42-51 x 25-29 cm, naked or bract enclosed; phalanges 6-10-loculed, to 130 x 60 mm, yellow to orange, individual carpels ±flat-topped, stigmas all facing a focal carpel; male infl. a raceme of spikes to 50 cm long, spikes to 9 x 3 cm, bracts creamy-white, anthers arranged on a branching, common filament to 2 cm overall.

Forest, including swamp forest; sea level to 1,500 m.





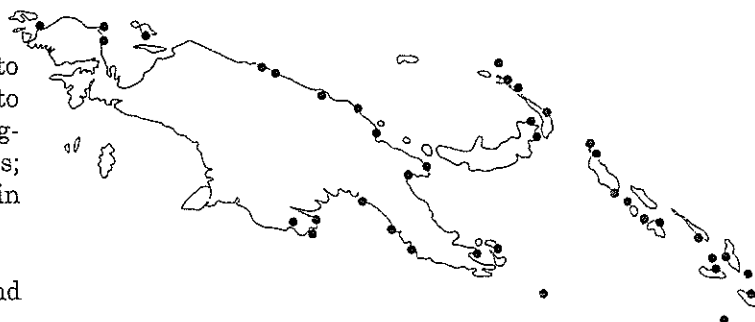
Section: PANDANUS

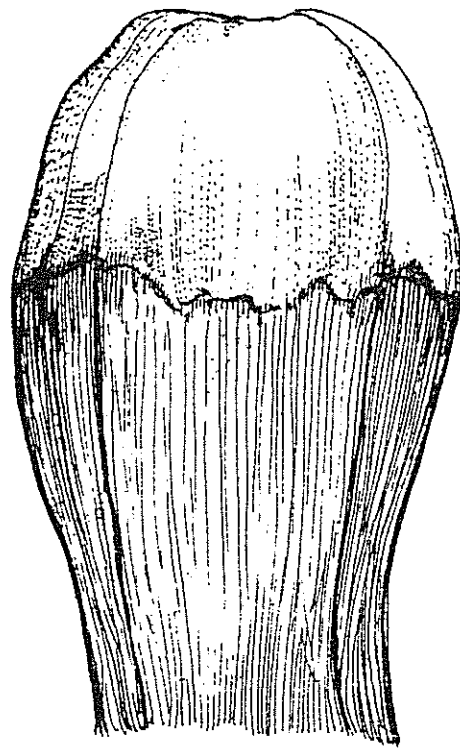
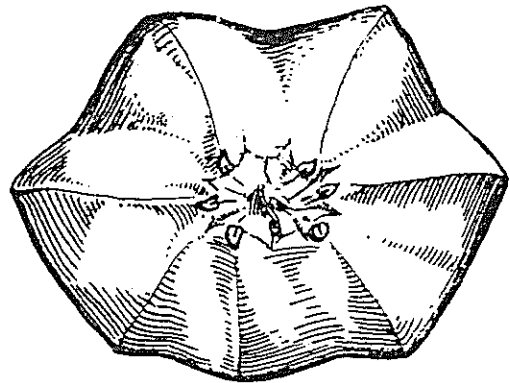
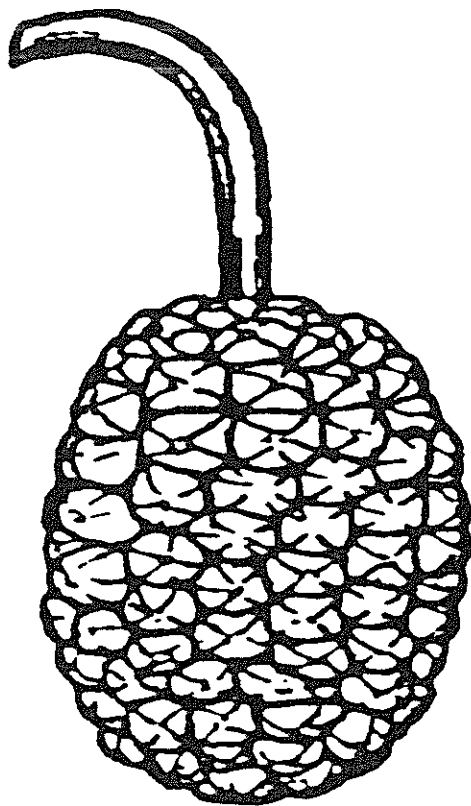
Pandanus tectorius Parkinson

Branched tree to 15 m, bark \pm smooth; propoots to 1m or more, narrow, numerous; leaves curved, to 200 x 13 cm, glaucous grey-green, apex long-acuminate; cephalium rounded, to 25 cm across; phalanges 3-15 loculed, extremely variable within populations, grey-green above, orange below.

Widespread in beach vegetation, and lowland savannas, up to 100 m.

A very variable species. Some sterile cultivars with variegated yellow leaves probably belong to this species. Not as widely utilised in New Guinea as it is in many Pacific Island groups.



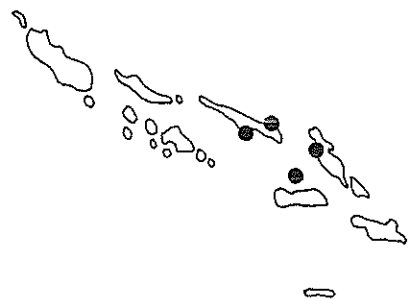


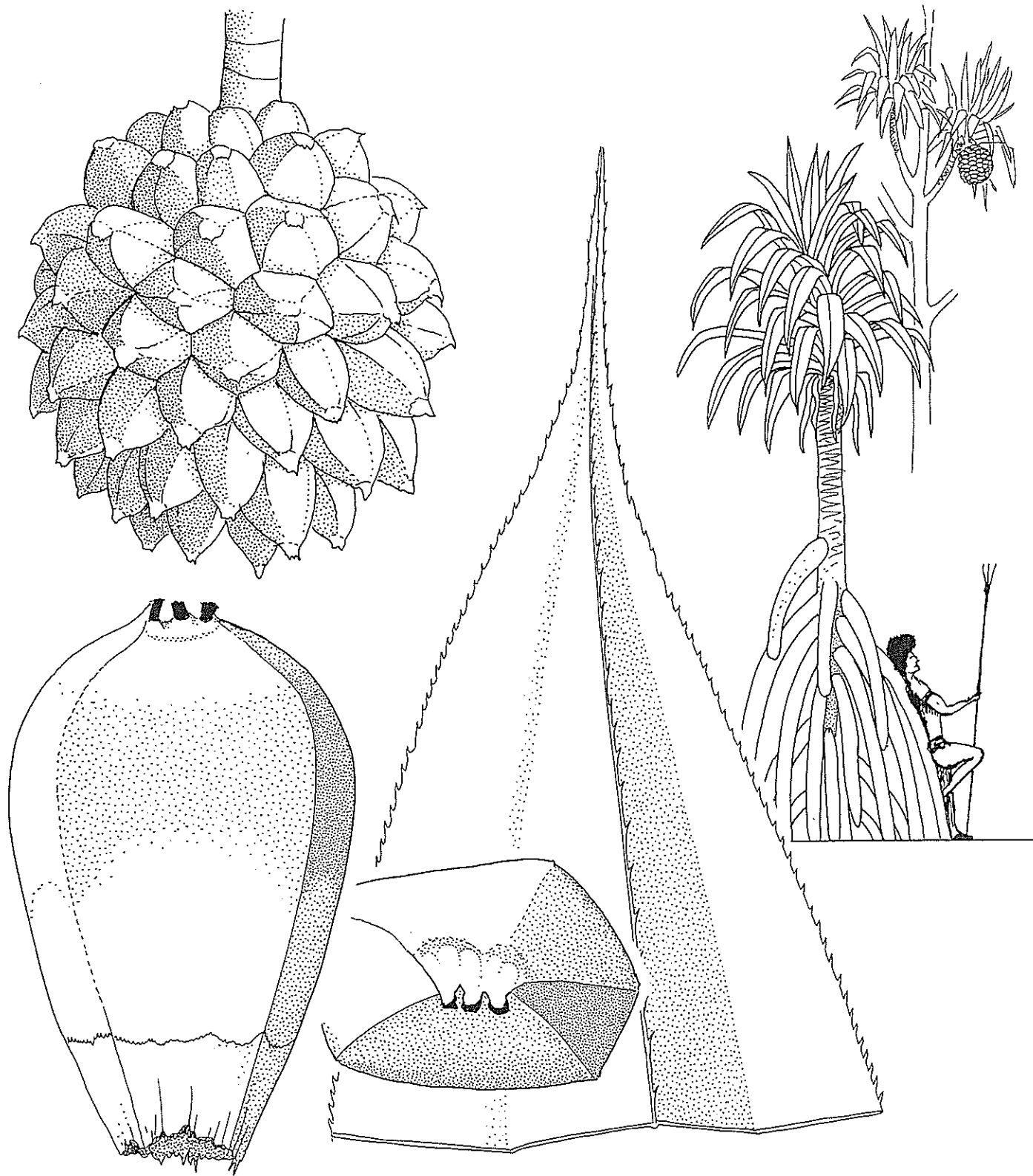
Section: **UNCERTAIN**

***Pandanus solomonensis* Stone**

Branched tree to 15 m; proproots very large, with many thorns; leaves 200 x 17 cm, apex gradually narrowed to a flagellum; cephalium globose to 23 cm across; phalanges to 95 x 60 mm, stigmas 3-7, green above, orange to yellow below.

Coastal, often planted in villages. Similar to *P. dubius* in overall appearance, distinguished by its stigmas.





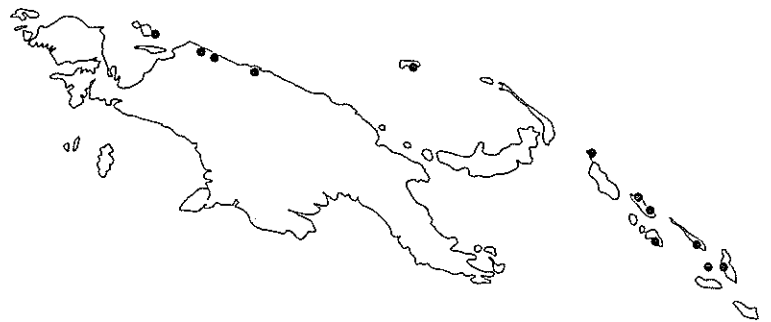
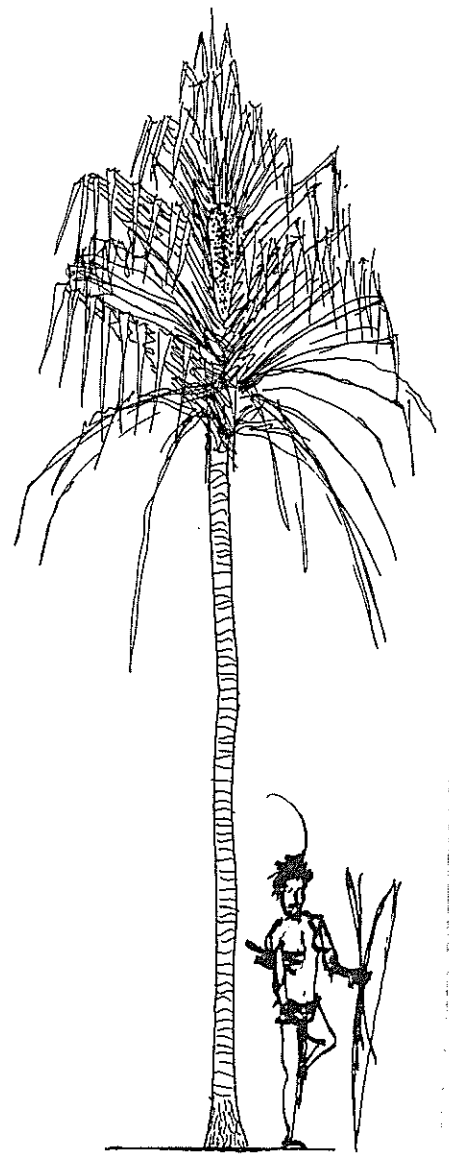
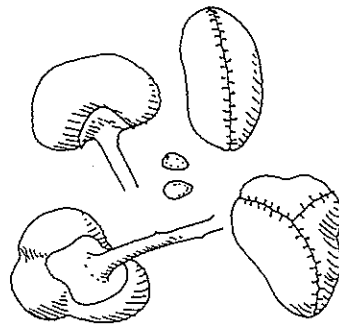
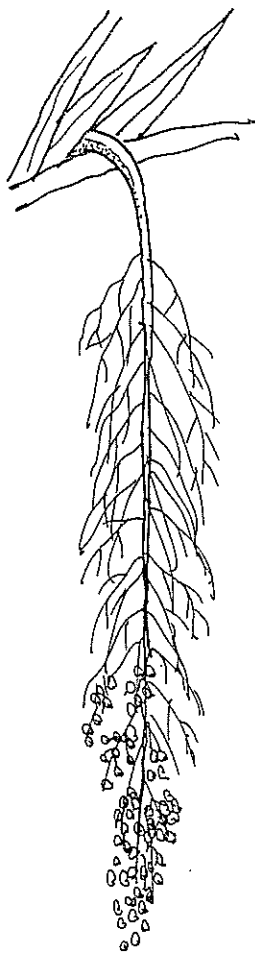
Sub-Genus: **RYKIA** Section: **HOMBRONIA**

Pandanus dubius Spreng.

Tall, erect tree; leaves 150 x 15 cm, apex long-acuminate in young plants, rich glossy-green; prop- roots thick, with straight rows of rounded spines; cephalium spherical, bracts falling early; phalanges with sharp-tipped stigmas in a straight row, glaucous green, pale orange below.

On coral and rocky shores, sometimes beaches; rarely with *P. tectorius*, the latter being more common on shingle or sandy shores.





Genus: SARARANGA

Sararanga sinuosa Hemsley

Branched tree to 15 m; lacking proproots, but with numerous palm-like rootlets; phyllotaxis appearing 4-ranked, leaves to over 2 m; inflorescence terminal, a massive compound panicle, pendulous, to 2 m; fruits reniform, many-seeded berries, white to red, smelling of raspberries; male inflorescence similar in structure.

Savanna to forest; sea level to 550 m.

Distinguished from *Pandanus* by its paniculate inflorescence of fleshy fruits.