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Leader - Len Butt - Phone No. 07 - 8483515

Asst. - Brian Runnegar - Phone No. 07 - 2861164

The following articles are reproduced here from "Principes minor", the magazine of the Sydney branch of the Palm and Cycad Societies of Australia:-

MACROZAMIA DIPLOMERA

by Paul Kennedy

Macrozamia diplomera is a small to medium-sized cycad which is endemic to New South Wales and which has a subterranean caudex; it normally, though not always, has bifurcated (divided) pinnae.

M. diplomera grows in north-western New South Wales in dry, flat, sandy and inhospitable country in a broad corridor running roughly to the east and west of the town of Coonabarabran.

Coonabarabran (elevation - 509 metres) has an annual average rainfall of 735 mms (spread over 80 rain days) with winter minimum and summer maximum daily temperatures (reached at least once per week during July and January) of -3.9 degrees and 35.0 degrees C. respectively. Frosts occur on an average of 76 days per year.

If a person familiar with *M. communis* and its geographical size variations were to see a stand of *M. diplomera* for the first time his or her first impression would be that they were viewing a stand of small *M. communis* plants, though a distinct colour variation from the glossy dark green fronds of coastal *M. communis* plants to a pale pastel green would be evident. A reappraisal of the initial identification would quickly follow when a closer inspection of plants in the stand revealed fronds with divided pinnae.

In dealing with cycads, however, one quickly forms the conclusion that the only consistent factor about cycads is their inconsistency. This is certainly true with *M. diplomera* as a detailed examination of plants within the stand would indicate fronds with three differing types of pinnae variation. These different frond/pinnae characteristics, which can often be found in various combinations on individual plants, are as follows:

(a) those fronds with predominantly divided pinnae (which are, by far, the most commonly occurring frond type),

(b) those fronds with completely entire pinnae, and

(c) those fronds having a combination of divided and entire pinnae.

Given that plants with these varying frond/pinnae characteristics grow immediately adjacent to each other and can be virtually identical in size and number of fronds, two alternative forms of identification are possible:

first, that the stand contains both *M. communis* and *M. diplomera* species plus a naturally occurring *M. communis/M. diplomera* hybrid, or

secondly, that the stand contains *M. diplomera* plants only, albeit with genetically variable frond characteristics.

The average number of fronds per plant is extremely hard to estimate, as the number of fronds per plant varies significantly, but would be somewhere in the 10 to 15 range, with some plants having as few as 5 fronds and others as many as 30. The height of the fronds above ground level also varies but would range from an average of 70 to 90 cms to a maximum of approximately 110 cms.

The canopy cover varies in different habitat locations from being predominantly Callitris sp. (Australian Cypress pine) to being predominantly eucalypt. *M. diplomera* tends to grow in a pattern of scattered individual plants, though sometimes, under the more shaded eucalypt canopy, it forms thickly populated localised stands.

The coning cycle of *M. diplomera* is very difficult to estimate - I have never seen a large scale coning at any of the locations which I have observed over an 10 year period (with fairly regular visits to one of the larger stands). At one location, where a limited coning had taken place, I sighted some female plants with two cones. There were also both red and yellow coloured seeds.

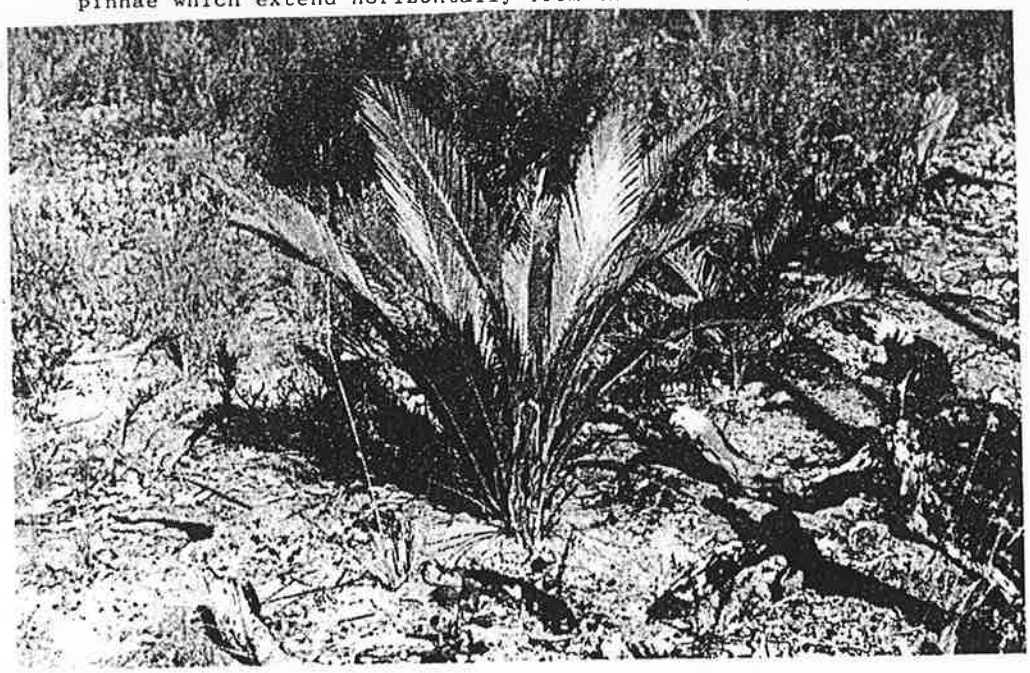
One peculiar characteristic of *M. diplomera* is that some plants seem to have a 1.2/1.5 metre long whip-cord like tap root extending from the base of the caudex straight down into the sandy soil in which they grow (quite possibly as a means of drawing extra moisture from the sub-layers of the soil).

M. diplomera normally has an unbranched subterranean caudex, though I have seen one plant which was growing in a road-grader formed earth bank on the side of a dirt road (and which had obviously been damaged in a road grading operation) which had three separate heads of fronds at ground level and two underground 'suckers' with emerging fronds.

Near Coonabarabran, *M. diplomera* appears to hybridise naturally with *M. heteromera* (see future article).

On an affinity basis, *M. diplomera* is closely allied in size and general appearance to the small ('dwarf') *M. communis* plants which grow in the Newcastle-Cessnock area (and in some inland areas which are geographically isolated from the distribution range of *M. diplomera*) - though this affinity does not extend to the larger and more robust coastal *M. communis* plants . Identification of the two species is relatively simple as *M. communis* only has entire pinnae, whereas *M. diplomera* normally has divided pinnae.

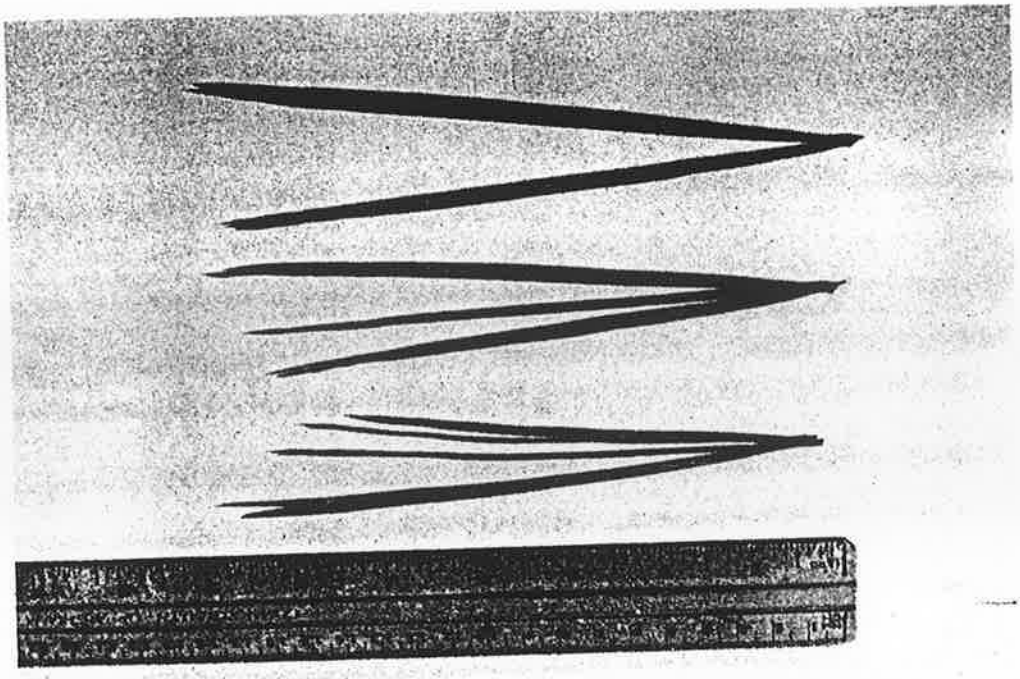
M. diplomera is readily distinguishable from the other split pinnae species (*M. heteromera* and *M. stenomera*) because of its size and number of fronds, its straight rhachis and its divided pinnae which extend horizontally from the rhachis,



(above) M. diplomera - in habitat near Coonabarabran.

(front cover) M. diplomera - frond detail.

(below) M. diplomera - individual pinnae.



I agree with the latter identification on the basis that:

(a) the nearest stand of pure *M. communis* plants is several hundred kilometres away, and

(b) that the frond variations are common to three widely separated stands containing plants which are locally identified and accepted as *M. diplomera*.

Independent support for this identification can also be drawn from the fact that *M. heteromera*, which has no basic affinity with *M. communis*, has the same divided/undivided pinnae characteristics.

The bifurcation of the pinnae is normally a simple division into two parts or segments - which I term sub-leaflets for the purpose of clarity - while the spread of the sub-leaflets ranges from those which are almost parallel to those which are angled, with the angle of divergence varying from narrow to wide.

Infrequently, the pinnae division can vary from the normal division into two sub-leaflets to a double division into four sub-leaflets. There is also an intermediate stage in which the pinnae divides into two segments, with the first segment again dividing (into two sub-leaflets) but with the second segment remaining entire - giving, in effect, three sub-leaflets. Occasionally, instead of remaining entire, a second segment can be found to be partially divided (with either a limited apical division or a partial division commencing between the mid-section and the apex).

Very rarely, the pinnae division can result in five sub-leaflets being formed.

The pinnae, whether divided or entire, are angled slightly forward and extend horizontally in a flat plane from the normally straight rhachis - though the lower pinnae, which are gradually reduced in size, tend to sweep forward at a very acute angle to the rhachis.

The division of the pinnae into sub-leaflets has the effect of creating a crowded look on the frond as the sub-leaflets extend outwards at various angles and tend to overlap each other. When a pinnae division does take place it normally occurs very close to the rhachis - usually within 1 cm of the rhachis. On those fronds with predominantly divided pinnae, the division of the pinnae normally ceases towards the apex of the frond with the last few pinnae usually being entire.

M. diplomera normally has pale creamy-white coloured callouses where the pinnae join the rhachis, though occasionally the callouses can be either pinkish or orange-red coloured.

MACROZAMIA STENOMERA

by Paul Kennedy

Macrozamia stenomera is a small (Section Parazamia) cycad which is endemic to New South Wales and which has a subterranean caudex.

M. stenomera has unique multi-divided pinnae and grows in north-western New South Wales in an area centred principally around the Nandewar Range (located approximately 50 kms east of the town of Narrabri). I have also sighted an outlying 'relic' population growing in the Tamworth district (approximately 140 kms south-east of Narrabri).

Narrabri (elevation - 212 metres) has an annual average rainfall of 660 mms (spread over 64 rain days) with winter minimum and summer maximum daily temperatures (reached at least once per week during July and January) of -1.1 degrees and 37.8 degrees C. respectively. Frosts occur on an average of 29 days per year.

There is no official weather station on the Nandewar Range but the climate on the higher altitudes of the ranges, where *M. stenomera* grows, is significantly cooler and wetter than in nearby Narrabri. According to local sources, the temperature on the upper altitudes of the ranges can be up to 10 degrees lower than Narrabri; while the annual rainfall is considerably higher, averaging approximately 1100 mms annually.

High winds, frequent frosts and occasional snow (4/5 times per year) are also encountered on the upper altitudes of the ranges.

M. stenomera can be found growing on steep, sometimes sheer, rocky, generally north-facing slopes, at elevations of up to 1,450 metres (4,500 feet). *M. stenomera* is thus a true mountain dweller and is subject to extreme weather conditions.

In contrast with *M. diplomera* and *M. heteromera*, which have pinnae that normally divide into two sub-leaflets, *M. stenomera* has much narrower multi-divided pinnae which generally divide from two to four times forming four to eight sub-leaflets. Like *M. diplomera*, *M. stenomera* can have either an odd or an even number of sub-leaflets (as some of the divided segments remain entire). I have seen *M. stenomera* pinnae divide five times to form nine sub-leaflets, but only very rarely.

The multi-divided pinnae give the fronds a very bushy look and make it extremely difficult to be able to clearly distinguish the pinnae detail, even in habitat locations, unless a thorough close-up examination of a frond is undertaken.

Because of the bushy effect of the multi-divided pinnae it is virtually impossible to capture details of the frond characteristics in a photograph of a plant - to overcome this problem, I have photographed an individual pinna and a frond with a majority of the pinnae removed so as to only leave every sixth set of pinnae on the rhachis. The effect is to give a clear impression of the pinnae detail to a person who may not have seen *M. stenomera* in the wild.

M. stenomera normally has an unbranched caudex and usually grows under a eucalypt canopy in a pattern of scattered individual plants or, sometimes, small groups of plants.

The pinnae are angled slightly forward and extend a short distance from the rhachis before the first division occurs. The first set or sets of sub-leaflets generally extend horizontally from the rhachis but the next set or sets of sub-leaflets sometimes tend to be offset at right-angles to the first set and rise and spread vertically (thus, as a consequence, tending to accentuate the bushy look of the multi-divided pinnae).

Unlike *M. diplomera* and *M. heteromera*, which do not always maintain a pattern of consistently divided pinnae, the pinnae on *M. stenomera* are virtually always divided (though the number of divisions does fluctuate) except sometimes towards the tip of the frond when the last few pinnae can be either divided or entire.

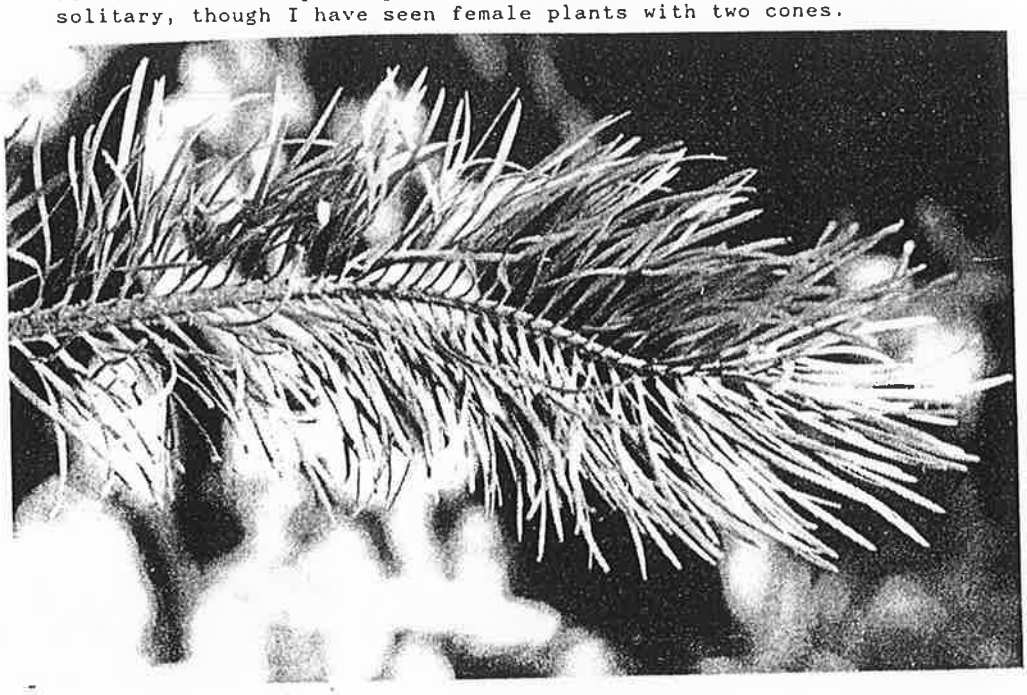
The division of the pinnae is also evident in juvenile plants and seedlings - though the divisions are not as numerous.

M. stenomera fronds rise to a average height above ground level of approximately 50 to 70 cms and reach a maximum height of approximately 90 cms. The number of fronds per plant averages 4/6 with some plants having as few as 2 fronds and others up to a maximum of 10.

The more or less initially upright rhachis twists slightly, sometimes irregularly, as it rises and the apical section is often moderately curved.

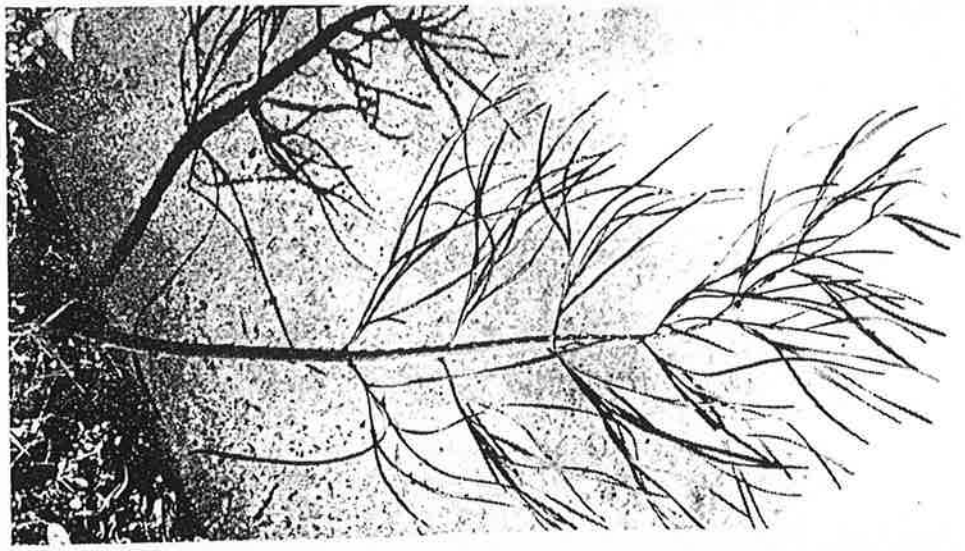
Emerging fronds on mature plants are a very distinctive light green colour but undergo a colour transformation with age and ultimately change to a gunmetal blue-green colour. The callouses where the pinnae join the rhachis are normally a pale orange-yellow colour.

Seeds which I have seen were an attractive lemon yellow colour with a green segment where the sporophyll had obviously opened up as the cone had ripened prior to disintegrating. Cones are usually solitary, though I have seen female plants with two cones.



(above) M. stenomera - new frond.

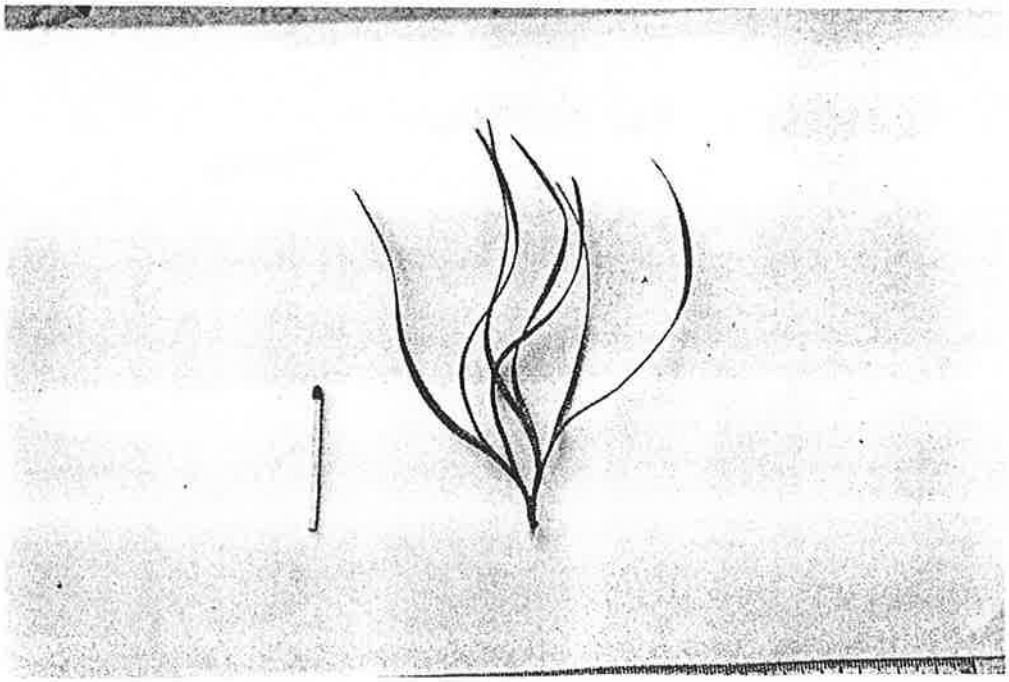
(below) M. stenomera - frond, with every 6th set of pinnae remaining.



The plants which grow in the Tamworth area are worthy of specific mention insofar as the fronds are a mid to dark-blue colour with a distinctive reddish coloured callous where the pinnae join the rhachis; the stem of the pinnae up to the point of bifurcation and the smaller callous at the point of bifurcation are also identically coloured. Unlike the plants which grow near Narrabri, the pinnae do not divide more than twice.

As an aside, the highest peak on the Nandewar Range is Mt Kaputar which is 1525 metres high and which is now part of the Mt Kaputar National Park. The view from the peak of Mt Kaputar is quite spectacular and a Visitor Information sign indicates that on a fine day up to 10% of New South Wales can be seen. Kangaroos and multi-coloured feral goats can often be sighted within the confines of the National Park.

On an affinity basis, *M. stenomera* is related to *M. heteromera*, especially the more robust 'blue form' of *M. heteromera* (see future article). Both species are small in overall stature and have divided pinnae, but *M. stenomera* has narrower pinnae which are normally multi-divided as compared with the normal simple bifurcation of *M. heteromera*. Additionally, *M. stenomera* consistently maintains a pattern of multi-divided pinnae whereas *M. heteromera* has fronds with either entire or divided pinnae or a combination of both.



M. stenomera - individual pinna.

A SPELLING LESSON

WHY IS IT SO

Have you ever wondered why some species names are spelt with one i as in Macrozamia moorei or with a double i as in Macrozamia macdonnellii ? There must be a reason for it and of course there is.

Sometimes, when a species is described, a descriptive name is given which identifies some characteristics of the plant ;

eg. Phoenix reclinata - meaning reclining (stems)

or Encephalartos longifolius - meaning long foliage.

Sometimes a geographical location is used such as

Laccospadix australasica - meaning from Australia or

Livistona australia - meaning southern.

At other times, and what forms the basis of this article, the surnames of people are used. There are several rules that must be followed with the spelling to be in accordance with the International Code of Botanical Nomenclature.

[I] Basically, if a person 's name ends in any vowel except a (ie; e,i,o,u) then the single letter i is added to the end of the name if male or ae if female.

eg. Macrozamia moorei - after Moore.

Zamia lecointei - after Le Cointe.

[II] If the name ends in an a then the letter e is added.

eg. Ceratozamia zaragozae - after Zarágoza

Archontophoenix alexandrae - after Princess Alexandra

[III] If the name ends in a consonant then ii is added for males or iae for females except if it ends in y,er,ar,or, then only one i is used.

eg. Ptychosperma macarthurii - after Macarthur

Licuala ramsayi - after Ramsay

Notice that lower case letters are used for the species even though named after people. This conforms to other rules which make the system of naming uniform.

What makes things more complicated is that words from foreign languages such as Greek are 'botanically Latinized' and as such have masculine, feminine and neuter forms.

According to the above "rules", Archontophoenix cunninghamiana, named after Cunningham, should be A.cunninghamii (ends in a consonant so add ii) So why isn't it so? This is because the commemorative word is given in the form of an adjective and so must conform to the gender of the genus -iana being the feminine gender of the genus. The Masculine form would be ianus whilst neuter would be ianum.

Nothing is supposed to be easy and as you can see spelling is no different. Some other words which could trick the unwary are :

Trachycarpus wagnerianus - after Wagner (not T.wagneri)

Howea forsteriana - after Forster (not H.forsteri)

Areca hutchinsoniana - after Hutchinson (not A.hutchinsonii)

From this you can tell that the nouns Archontophoenix, Howea and Areca are feminine and Trachycarpus is masculine.

Something to think about on a rainy day perhaps.