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**ASSOCIATED SOCIETIES FOR GROWING AUSTRALIAN PLANTS STUDY GROUP  
NEWSLETTER 72**

**CYCAD, ZAMIAD and PALM STUDY GROUP - OCTOBER - NOVEMBER 1996**

**LEADER: L.P. Butt 25 Ortive Street, Yeronga 4104 - phone 07-38483515**

For all members who do read my newsletters, this is an important one!!!!

This news sheet has now been going some 15 years, and if those who read it wish it to continue, as I do, the time has come to say in which direction are we heading, if any.

Lots of water has flowed under many bridges, and sometimes I have wondered the worth of it. One must make allowances for passive members, and welcome their interest. However, now it appears our members are at least 90% passive. This also was quite acceptable until my own health failed.

Since February 1996 I have had four operations and nearly five months of Vet Affairs hospitals. This is not a biography of me, but it does point out that without active members, this newsletter is now an impossibility. My well of information has run dry, and not now being fit to travel, I cannot fill it again.

This is an urgent plea, and I am willing to act on any alternative.

Financially, the subs still come in, but now it is October, and not June, and we have 23 paid out of 50. This fact, however, is not important enough to stop this newsletter as I have broad shoulders and have carried it before.

You will notice this newsletter is made up of other people's papers and opinions outside the group. They are real cycadologists, however, and their opinions are really first class.

One alternative, which will be used now, is a condition of future or continued membership, and that is that all members contribute a minimum of 100 words twice a year or an article of, say, 300 words annually. This can be your own collection, palms or cycads; a trip where you have seen them; cultivation; queries, etc etc.

This naturally does not apply to the old stalwarts who over a long time have contributed - no need to name names - my grateful thanks go to them.

As ever,

L. P. Butt

Leader

PS: If the new condition cannot be met, please write or telephone me.

Whitelock, Loran M. County of Los Angeles Department of Arboreta and Botanic Gardens, 301 N. Baldwin Ave., Arcadia, California 91006, USA. Field Studies of the Genus *Cycas* in Australia, Thailand, and China.

*Cycas* is no doubt the least known of all the cycad genera with the possible exception of *Zamia*. Taxonomic work has been hampered by a lack of information and sufficient specimens, due largely to an extensive range in countries of difficult access.

In Australia species of *Cycas* are sometimes difficult to separate because of overly concise descriptions coupled with vague locality data. Field studies have shown *C. media* to be a complex and highly variable species ranging over a huge area. Confusion has also existed with *C. normanbyana*, *C. cairnsiana* and *C. kennedyana* on the Queensland coast. Species in the Northern Territory and Western Australia are less difficult because of their widely disjunct and restricted distributions. Increased interest in the genus has led to the discovery of several new species and at least two cases of hybridization.

In China and Thailand much of the native vegetation has been cleared for agriculture making field studies very difficult. Political situations often impede travel, especially to border areas, making field work impossible. However, the cycad flora of the orient is varied and worth the additional effort needed for its study. Preliminary field studies in Thailand indicate that several new species may be present.

WILSON, ALLAN F., Department of Geology & Mineralogy, University of Queensland, St. Lucia Qld. 4067 - Possible role of Cycadales in formation of micro-nuggets of gold in soil. Considerable geological and chemical research is trying to identify details of the role of certain plants in aggregating gold atoms into micro-nuggets of gold, or gold-bearing colloids within the upper layers of soils. In near-surface layers of plant litter in forests biochemical processes can result in traces of cyanide and thiocyanate ions during decay of vegetation. These are capable of forming water-soluble gold complexes in aerated conditions.

In the presence of nitrogen-fixing organisms it is envisaged that, if these could extract nitrogen from the gold cyanide complex rather than from the air, tiny particles of free gold should result. Once sub-micron nuclei of gold and suitable organic complexes of gold have developed, continued biochemical activity should enlarge the gold particles by accretion. A significant feature of the micro-nuggets of very pure gold, which are common in some Australian soils found above primary gold-bearing lodes or rocks, is their strange shape. They have grotesque or complex mammillated shapes which distinctly differ from the shape of gold particles in quartz veins. However, these shapes are strongly reminiscent of shapes of nitrogen-fixing nodules of various plants.

The possible role of cycads in these phenomena is two fold. Firstly: cycads have very well established nitrogen-fixing symbiotic organisms within their prominent coralloid structures. These ought to be able to decompose auriferous nitrogen-bearing complexes. Secondly: the toxins within the cycad "leaves" and seeds have chemical properties somewhat similar to those of the cyanides. Thus, the litter from cycads could be more effective than, say, the litter from North American conifer or hardwood forests which are known to produce notable amounts of nitrogen-bearing compounds capable of forming water-soluble gold complexes.

A progress report will be given of experiments using macrozamia, especially those of long life and a sub-surface caudex. Electron microscope studies of soil particles will be discussed.

Prof D D PANT & RITA SINGH

The authors have enumerated the characters which are common or different between various species of Cycas. They point out that these are of taxonomic importance and they can help in distinguishing the genus from other genera of cycads and the various species of Cycas from each other.

Particularly interesting features noticed during the investigation include the occurrence of mucronatoid tips in C. angulata and C. basaltica, a midrib which falls short of the lamina at the extreme tip in C. pruinosa, the presence of occasional stellate hairs in C. calciola, amphistomatic pinnae in C. armstrongii (besides C. comorensis and C. micholitzii where such pinnae are already reported) and three or two mucilage canals in the basal parts of the pinnae of C. beddomei and C. taiwaniana, respectively.

PANT, D.D. AND RITA SINGH. Department of Botany, University of Allahabad, Allahabad 211002, INDIA. - Preliminary observations on insect-plant relationships in Allahabad plants of Cycas.

The present study of the male cones of Cycas circinalis Linn. and young compact crowns of megasporophylls in female plants of C. rumphii Miq. and C. revoluta Thunb. growing in Allahabad has shown that the male cones alone are invaded by pollenivorous small beetles and other insects including ants. Once inside the cones the beetles were found to continue to live there by laying their eggs which hatched into larvae and gave rise to their next generation. Even though these investigations are in sharp contrast with those of Norstog et al. and Tang who found snout weevils pollinating cones of Zamia furfuracea and Z. pumila in Miami, they find that their present observations can still be fitted in the generally accepted concept of evolution of insect pollination. The authors regard the insects invading the male cones of C. circinalis to be comparable with the insects which initiated insect-plant relationships by becoming pollenivorous before the relationship became reciprocal and the insects started pollinating the plants.

PATE, J.S. Department of Botany, The University of Western Australia, Nedlands WA 6009.

Nitrogen fixation in cycads with special reference to Macrozamia riedlei (Fischer ex Gaudich.) C. Gardner.

This paper will assemble information on the symbiotic association between the SW Australian cycad Macrozamia riedlei and the cyanobacterium Nostoc. The formation and structure of the mature coralloid root will be described and data presented concerning the seasonality and ecological significance of nitrogen fixation in natural habitat. A number of unusual morphological features relating to the cycad will be described.

Using a series of short-term labelling studies involving  $^{15}\text{N}_2$  and  $^{14}\text{CO}_2$ , information will be presented on the pathway of assimilation of nitrogen within coralloid roots of M. riedlei, and the eventual transfer of certain compounds containing fixed nitrogen to the host cycad through the xylem. The biochemistry of fixation in this species will then be compared with that of a range of other cycads, including representatives of most of the world's genera. It will be shown that interesting differences exist between genera and species and the significance of these will be assessed.