VII. RESEARCH IN THE BOTANY DEPARTMENT UNIVERSITY OF MALAYA, KUALA LUMPUR

Dr. B. C. S t o n e, the present Head of the Botany Unit, is continuing his investigations on Pandanaceae, which form the major research work; and on Rutaceae and Araliaceae, two other families which are his favorites. The genus Freycinetia is the nearest to completion; it is expected to have about 180-200 species when completed monographically. Pandanus is being studied partly at the micromorphological level, and studies of leaf anatomy and cytology and embryology are and have been carried out, with much of this work in the

hands of research students. The results of explorations in Mauritius, Madagascar, and East Africa are being readied for publication, including several large papers on the rich pandan-region of Madagascar. This work has been done with the considerable aid of Mr. J.-L. Guillaumet of 'ORSTOM' in Tananarive, who is continuing to collect material and has found much of interest. Regional treatments of Freycinetia in Borneo, of the same genus in Malaya, of Pandanus in Malaya and of this species in Borneo, are nearly ready for publication or are already in press. A review of Java Pandanaceae is being prepared. A review of Sumatran Pandanaceae is next contemplated. In Rutaceae, the long-awaited monograph of the Hawaiian genus Pelea has finally appeared (Phanerog. Monogr. Tom. III, J. Cramer Verlag, 1969). Also the treatment of Rutaceae for the new Tree Flora of Malaya (ed. T.C. Whitmore) is in preparation. Work in Araliaceae is presently quiescent except a report on some chromosome studies of Polyscias which is to appear in the J. Jap. Bot. in 1969. The MS for the 'Flora of Guam' is now with the printers and should be out within 2 years of this writing (Sept. 1969). It will appear in the journal 'Micronesica' (which Dr. Stone founded and continues to co-edit). The then College of Guam has now become the University of Guam (Agana).

Academic staff:

Dr. N. P r a k a s h recently joined the staff, coming from Australia, where he was a Research Fellow at the University of New England, Armidale. Dr. Prakash will undertake the teaching of plant anatomy, embryology, and comparative aspects of morphogenesis, as well as ancillary topics. He arrived in August and is settling down, but indicates that he will be ready to take research involving Malaysian plants shortly. Previously he has devoted his attention to some embryological problems in Australian Myrtaceae.

Mr. R a t n a s a b a p a t h y is vigorously looking into the distributions and taxonomy of the Malayan freshwater algae, and has assisted and collaborated with Dr. G.A. Prowse, of the Fish Culture Institute in Malacca. Some joint publications, involving distribution records and taxonomic-morphological observations, will be appearing soon.

Dr. A. N a w a w i, staff mycologist, besides teaching and supervising several research students, is busy on the problem of how Ganoderma, which causes basal rot in the oil palm (Elaeis), of much economic importance in Malaya, enters the plant and damages it. In line with this he is also looking into various other diseases which affect palm seedlings. The Malayan Myxomycetes or slime-molds form another aspect

of his research interest, and these are actively being collected and studied. Furthermore the fungus Dolabra nepheliae which damages rambutan trees (Nephelium spp.) is being studied, especially its status as a parasite on rambutans, and its imperfect state.

Dr. E. S o e p a d m o continues his major work on the Malesian Fagaceae both in the field and the herbarium. Another family, the Ulmaceae, is also being studied. He supervises several Honours students and continues to work on an approach to Malayan palynology, something most needed here. Recently Dr. Soepadmo and Dr. Gordon Smith of this school visited Borneo and collected a fair number of plant specimens. Dr. Smith is a taxonomist and ecologist now in the Ecology Unit, and came from the University of Aberdeen.

Dr. E. F. A n d e r s o n is for 1970 a guest professor under the Fulbright Program of the United States. He comes to Kuala Lumpur from Whitman College in the State of Washington. A taxonomist, his interest is centred in the Cactaceae, but he hopes to take up work on some Malayan plants while he is there.

Students:

The second successful Ph.D. candidate in Botany, Mrs. (now Dr.) C h o n g S i e w N g o (née L i m S i e w N g o) recently was awarded her degree on an outstanding dissertation entitled "Cytogenetic and Taxonomic Studies in the Genus Globba (Zingiberaceae)". Her work drew high praise from all the examiners, internal and external. Dr. Chong has produced in effect a revision of the Malayan species and has examined virtually all of them in considerable detail cytologically. Her abstract reads:

"A taxonomic review of the Malayan Globbae based on cytological and morphological studies has been carried out and a few amendments to Holttum's classification (1950) made. The genus in Malaya now stands at 12 species, 5 subspecies, 8 varieties, and a natural hybrid, of which 2 species, 4 subspecies, 1 variety and the natural hybrid are new. — Somatic chromosome numbers recorded for the genus so far are 22, 24, 32, 44, 64, and 80; those of the Malayan species being 32, 48, and 80. Chromosome races of 2n = 32 and 48 occurred in 3 species and 1 subspecies. The morphology and distribution of these infraspecific taxa were compared. Chromosome association in taxa with somatic numbers of 32 and 48 were strongly suggestive of their being diploid and triploid respectively. An unusual subgrouping of chromosomes predominantly into 8 bivalents/trivalents/chromosomes in some taxa, however, indicated that the original basic number

might be 8. Taxa with 32 and 48 chromosomes would thus be allotetraploids (AABB) and hexaploids (AAABBB) respectively. — A general trend of increased sterility has been observed with decreased chromosome association and increased meiotic irregularities. Hybrid swarms suggestive of introgressive hybridization of G. patens Miq. into G. cernua Baker have been found in 3 separate locales. Evolution of the genus in Malaya is discussed and a scheme of specific interrelationships proposed."

It is hoped that the new taxa can be published fairly soon. Mrs. Chong is presently with the Unit of Genetics of the University of Malaya and is busy teaching as a Lecturer. Her interest in Globba is continuing and no doubt further work on the genus will be of interest to readers of this Bulletin. A large collection of living plants representing most of the Malayan taxa is in the Botany Unit Garden.

Miss K a m Y e e K i e w (Y. K. K a m) has submitted her M.Sc. thesis entitled "Comparative Systematic Foliar Anatomy of Malayan Pandanus". This very useful work, part of the continuing major research on the family Pandanaceae which is going on at the University of Malaya, under the leadership of Dr. B.C. Stone, will shortly be prepared for publication. Miss Kam has shown both the advantages and limitations of using anatomical data in the systematics of the genus. Species-linked characters are few but the generic sections often show well-marked and sometimes even diagnostic characters such as the degree of elaboration of the stomata, the presence and arrangement of silica bodies, the appearance and construction of the epidermal and hypodermal layers, and the presence and location of denticulations. To quote from her abstract:

"The internal structure of the leaf is very uniform, basically consisting of a cutinized 1-layered epidermis, a multiseriate hypodermis, isolated fibers and raphide sacs in the mesophyll, silica bodies of 1 type, and parallel, equivalent veins. Epidermal and stomatal characters can be used with caution as diagnostic aids. The presence or absence of papillae, their distribution and association with stomata, provide data of some taxonomic value. Stomata exhibit a very wide range of structure in the genus, this being the result of the degree of papillosity of subsidiary and neighboring cells. Based on their structure, the stomata are divided into 5 classes. This wide range in stomatal structure can often be partly or wholly demonstrated within a single individual. Stomatal frequency, size, and index are not comparable between species, and often vary considerably between individuals of the same species. Physiological and ecological considerations are discussed with relation to stomata. Com-

parative anatomy is of restricted application at the species level. A combination of diagnostic anatomical features rather than the use of single characters provides information of taxonomic value at the sectional level. Conclusions arrived at from anatomical observations do not conflict with macromorphological data, in fact they complement the latter. From histological and morphological findings the eleven sections (present in Malaya) are tentatively divided into 4 seemingly natural groups which at this juncture are not accorded any rank."

Miss Kam has been awarded a scholarship at the University of Toronto, Canada, to work toward a Ph.D. in plant anatomy, and will be in Toronto from September 1969. Before leaving she spent 2 months in a special project that has extended her work on the Malayan pandans to materials from Mauritius, Madagascar, and Africa which were collected in 1968 by her supervisor, Dr. B.C. Stone. This work should be of much use in the difficult matter of working out the sections of the genus in those regions.

Miss C h e a h C h o o i H w a has submitted her M.Sc. thesis on the cytology and floral morphology of Pandanus. As with the work of Miss Kam this forms part of the large continuing project on Pandanaceae being carried out in the University of Malaya under Dr. B.C. Stone. Miss Cheah has successfully analyzed the chromosome numbers and karyology of a fairly large number of species of Pandanus (and one of Freycinetia). The preparation of this material was unusually difficult, but she was able to evolve a suitable microtechnical schedule. She finds that the regular somatic number in every species of Pandanus examined is $2n = 60$. In a few cases a slightly larger or smaller number (such as 58), possibly aneuploid, was observed, but this was rare. In general the detailed karyotype is not overly useful since the chromosomes are almost continuously graded in size; there is however a definite sequence from larger to smaller. Chromatin totals and other data have been worked out. Her work in floral morphology extended to embryology and the observations of Fagerlind (Bull.Jard.Bot.Btzg 1940) have been confirmed. A satisfactory theoretical approach to the morphology of the carpel structure and arrangement has been worked out also. Miss Cheah hopes to continue working toward the Ph.D., probably in plant cytology.

Mr. C h e o n g Y o n g Y o u n g continues to work on his M.Sc. thesis project, begun over a year ago, on the systematic phytochemistry of the Malayan species of Euodia (Evodia; Rutaceae) and its near relatives. By means of spectrophotometric analysis he is testing whether comparative

phytochemistry will be of aid in species discrimination. His work will last about one more year.

Miss Vijaya S. K a n a p a t h i p i l l a i has submitted her M.Sc. thesis: "Some observations on Curvularia eragrostoides (Henn.) Mey., the cause of seedling blight of oil palm". She worked mainly on the cultural, morphological, and physiological aspects of the causal organism. Infection of oil-palm seedlings was traced and a few factors affecting the infection were discussed. She has been awarded a Commonwealth scholarship to work toward the Ph.D. at Queen's University, Belfast.

Miss C h e a C h a r k Y e n has enrolled as a M.Sc. candidate and is presently working on anthracnose of oil palm seedlings caused by Melancomium elaeis, under the supervision of Dr. Nawawi.

Mr. Jimmy B o a y H o n g Y e w joined the School recently and is now investigating the canker disease of rambutan (Nephelium lappaceum) associated with (or caused by?) Dolabra nepheliae. The work will probably form the subject of a thesis for the M.Sc. degree.

Herbarium:

The University of Malaya Herbarium is slowly coming into shape; the collections approach 15.000 now, and are growing apace. Botanists wishing to borrow material are welcome to write; special collections are often much more difficult to provide as much material is still unidentified, but they can at least try.

Besides being a 'teaching' herbarium they have decided to attempt several specific goals: (1) valid voucher specimens for all projects involving plant materials carried out at the University; (2) representation of families not found in Malaya for the benefit of students and local teachers (we need good gymnosperm specimens); (3) accumulation of materials not well represented at Kepong, i.e. mainly small trees, shrubs, climbers, and herbs; (4) cultivated plants and weeds.