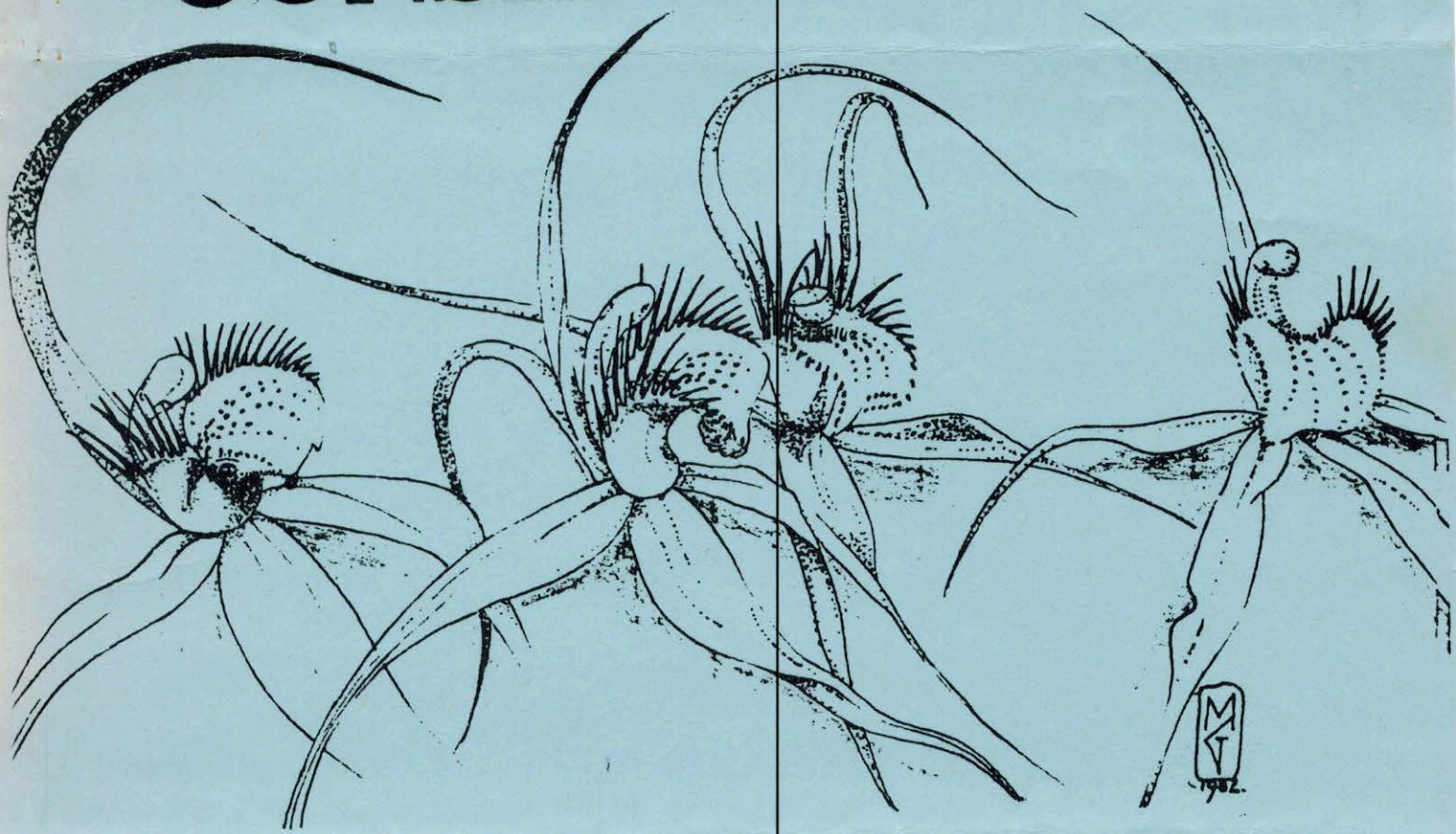
THE W.A. NATIVE ORCHID STUDY & CONSERVATION GROUP



MEETINGS... 3rd WEDNESDAY each month at..

KINGS PARK BOARD ADMINISTRATION CENTRE
Theatrette, KINGS PARK, WEST PERTH.

Official Bulletin

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JUNE GENERAL MEETING

WEDNESDAY - June 20 - 8.00pm
Venue - Kings Park

TOPIC: Rodney Peakall will be discussing the results he is doing at U.W.A. on the fertilization of Caladenia aphylla and Leporella fimbriata. These are the first results Rodney has in his year long research into W.A. Native Orchids.

PLANT DISPLAY: With the early continuous rain many people will have a good number of plants to display therefore bring them along. Car access is now easy so be generous with your display.

RAFFLE: and supper as usual.

JULY COMMITTEE MEETING

WEDNESDAY - July 4 - 8.00pm at Steve Hopper's

GENERAL MEETING NOTES - MAY

The Raffle was won by Nancy Clarke and Alison Harrington won the Plant Display prize with a pot containing Pterostylis scabra var. robusta and Pt. vittatta var vittatta which was potted at the A.G.M. two years ago. (Alison's comment is if it can survive the neglect in her garden anyone can grow Pterostylis).

Plants on display were Caladenia drummondi (in flower), Pterostylis vittatta var vittatta, Pt. scabra var robusta, Pt. nana (leaves).

The Tubers kindly donated by A.N.O.S. and N.O.S.S.A. had been planted out by Noel Clarke and were in early leaf. These were distributed by a raffle system which had its amusing moments ie when the South Australian Visitor kept on winning pots of S.A. Orchids. He kindly donated them back to be re-raffled!

Copies of Noel and Andy's Book were on display - for the first time. They will be available and distributed before the next meeting. The official launching is to be at the end of June.

We were pleased to welcome from N.O.S.S.A., Mr Bert Hocking, who was visiting his daughter, Alison Harrington. Glad to see Orchiding is an inherited trait!

Photographs were shown of the Rhizanthela gardneri located on the field trip to Babakin. They were very healthy specimens.

Ron Heberle made one of his infrequent trips to Perth and notified the group that a summary of Warren Stoutamire's work on Wasp Polination was published in the Australian Journal of Botany 1983 31 383/94.

NEW MEMBERS:

We welcome new members:-

- Lillian Norwell
- Robert Ramsay

Robert (Tripp) Ramsay is currently researching the fungal associations of W.A. Native Orchids for his M.A.

FIELD TRIPS: 17th June 8.30am. Meet Midland Railway Station to travel together to Mogumber in search of the Thelimitra species which grows on the ironstone caps of the hills to the west and north of Mogumber.

Please note well: The October Long Weekend is the 29th and 30th September and 1st of October, not the following weekend as previously advertised.

10TH ANNIVERSARY PARTY: SATURDAY - 14th July 1984 - 8.00pm at Alison Harrington's, [redacted]

Buffet - B.Y.O.G.

Please phone Alison Harrington [redacted] to be allocated what to prepare.

We are looking forward to a happy celebration of 10 very busy achieving years and at the same time to use the opportunity of the group being together in a social occasion to congratulate Noel and Andrew on the successful publication of their book.

Come and join in this double celebration!

The Committee.

MONTHLY BULLETIN: The Bulletin will be in this abbreviated information form from now on. The concept of a larger publication, less frequently, to contain botanical and location data is being researched.

The Editor is now Alison Harrington.

FAY GORDON: Fay, with regret, has resigned from the Bulletin. Fay is always extremely generous with her time and with her dedication to the Club and consequently gets overloaded with work. (Like all workhorses!)

Our thanks to Fay for the time and effort she has put into the Bulletin. It is a thankless, time consuming job, but one essential to our viability as a Club.

While we are sending Bouquets in Fay's direction she is thanked for the extra workload she has taken on with the Club orders for Noel and Andrew's book. Over 80 books have been sold through the Club.

BOOK ORDERS: No further orders for "Orchids of South-West Australia" will be taken after 30th June, 1984. After that date please purchase direct from University Press, U.W.A., Nedlands, W.A., 6009.

INTERSTATE VISITORS: We hear rumours that, other than Bob Bates, we have a number of Eastern State Orchid enthusiasts heading west this spring. Do write to the Committee so that we can assist you as much as we are able in your orchid hunting. Do also come to our meetings. We would love to meet you. (Bring some slides!)

Mycorrhiza of Western Australia Orchids

- Preview of a biological study of orchid mycorrhiza

by Kingsley Dixon* and Robert Ramsay**

* Research Officer, Kings Park and Botanic Gardens, Fellow of the University of Western Australia.

** Research Officer, CRA Pty Ltd.

Literally translated mycorrhiza means mushroom or fungus root and refers to the symbiotic association between a plant and fungus, usually restricted to tissues of roots and underground stems.

This fungal symbiosis apparently benefits the orchid plant by providing a variety of mineral elements and even carbon skeletons in the form of simple sugars not normally available to the host. In exchange the fungus is encouraged to grow and proliferate in the host tissues. Other mycorrhiza associations occur as a superficial weft surrounding fine lateral roots. Pine roots and many other plant roots exhibit this type of symbiosis. Indeed fungi are now being revealed as beneficial agents in a host of plants contradictory to their more notorious pathogenic roles as crop diseases.

However, amongst the plant kingdom the Orchidaceae stand apart. In no other large family of plants do mycorrhizal fungi occur so abundantly and in such an easily observable fashion as the Orchidaceae. All orchids so far examined exhibit some dependence on mycorrhiza, to a greater or lesser extent, for some part of their life cycle. Terrestrial species, particularly tuberous herbaceous perennials, are a rich source of fungal material. True epiphytes on the other hand show a more limited infection pattern reflecting in part the rigors of diurnal and seasonal moisture stresses prevailent in the epiphytic environment. Common to both growth forms is a critical dependence in the wild for fungal colonization of the seed. From the investigations that are avialable it appears that successful seedling development in the wild depends heavily upon reliable infection by a suitable symbiotic fungus. Ensuring satisfactory fungal growth in a niche is one way of habitat selection which provides the orchid with a preformed and functioning "root system". This dependence on fungi for germination was demonstrated in the past when orchid growers strew orchid seed around the base of a parent plant knowing that the mysterious agent(s) for germination and successful seedling development were somehow inherent in the root system of the mature plant. Even today one can easily observe orchid seedlings developing around a parent plant in wild. For example, in autumn, seedlings of Pterostylis, seen as protocorm bodies will be clustered around a parent plant. These small white globular structures less than 2mm in diameter are often sandwhiched between decaying leaf litter which abounds in beneficial fungal mycelium. When sectioned the protocorms exhibit abundant fungal infection as intracellular fungal coils in outer cells of the convex.

Nutritional supplementation undoubtably is the most important long term benefit of a mycorrhizal association. For the so called leafless achlorophyllous, sprophytic or otherwise holomycotropic terrestrial orchids the nutritional advantage afforded by mycorrhiza is critical to the survival of the plant. Gastrodia species demonstrate this dependence by a physical juxtaposition of hyphae with the underground tuber. Moreover, the hyphae often appear to connect to roots of surrounding vegetation as in the case of Gastrodia species in New Zealand. A similar relationship verging on parasitism may exist between Rhizanthella and the broom honeymyrtle (Melaleuca uncinata). Certainly each discovery of a Rhizanthella plant is adjacent to a broom honeymyrtle. Collaborative studies with Dr J Warcup of South Asutralia have also shown that Rhizanthella will germinate and grow to maturity only in the presence of both a suitable symbiotic dungus and a living broom honeymyrtle plant. The exact nature of this complex association is being investigated.

Although Rhizanthella epitomizes an extreme of fungal involvement with a flowering plant many green-leaved terrestrial orchids may prove to have if not bizarre then certainly an interesting biological association with soil fungi. It is these fungal associations which are to be investigated in this study, building upon the pioneer work of Dr J Warcup and Mr M Clements (Canberra Botanic Garden) on Australian orchids.

The study aims to elucidate the diversity of fungi species associating with Western Australia orchids including systematics of the fungi involved, consistency with which a fungus species infects an orchid species seasonality of infection and control of infection by the orchid plant. The study will also investigate the possible evolutionary significance of funguses specificity by an orchid species hopefully providing clues as to the factors limiting the distribution of rare species and species with disjunct distributions.

Already a pilot study has been completed and 15 species of early flowering orchids from south west W A have been examined for the presence of mycorrhiza fungi. Where infection is well advanced over 100 isolates have been attempted from 10 of the 15 species. As the season progresses and more orchid species become available it is hoped that all 150 native terrestrial species will have at least been examined and isolation of the mycorrhiza fungus attempted. The viability and eventual success of the study will depend however on a suitable source of funding becoming available to cover consumables, chemicals, travel and part time assistance required by a project of this magnitude. Granting bodies and private sources are being approached with a view to partiall or total funding of the two year project.

The next bulletin article will outline the patterns of infection occuring in terrestrial orchids and the ways orchids manipulate fungal symbionts (or vice versa) for optimization of nutrient uptake.