ECTOMYCORRHIZAE PROGRAMME

Progress Report: December, 1980

A. MAJOR GOALS OF THE PROGRAMME

1. Identify and define the role of ectomycorrhizal roots of Jarrah in the infection process of *Phytophtora cinnamomi* - specifically by zoospores (and their interaction with the mycorrhizal sheath).

2. Identify and isolate the common ectomycorrhizal fungal genera of the Jarrah forest, confirm their mycorrhizal status by pure culture syntheses and glasshouse inoculation of soil grown seedlings.

3. Investigate and define the major factors influencing the formation and development of ectomycorrhizae on Jarrah. This area is closely associated with increasing the success rate of establishing pure cultures of mycorrhizal fungi (infection and special nutritional requirements) and, identifying the prime conditions for pure culture syntheses.

4. Investigate the effect of the application of N and P on the formation of Jarrah ectomycorrhizae and the stimulation of fungal fruiting (Field project: 1981-83).

B. PROGRESS TO DATE

Preschedules have been written for a number of laboratory and field trails currently underway - as below.

1. Susceptibility of Jarrh Roots to Infection by *Phytophtora cinnamomi*.

   - Jarrah seedlings in four soil types have been set up in root boxes for laboratory infection with P.C by point inoculation with zoospores. (Early 1981 depending on ectomycorrhizal formation.)

   - Zoospore production and point inoculation have been tried on old seedlings. (Repeated Oct/Nov to trial histological techniques.)

   - P10 VP (H) agar is a selective medium for the isolation of P.C. from the soil. Investigations have revealed that the medium does not significantly reduce the number of viable zoospores. The effect of the media on hyphal inoculum is currently underway.

   - Jarrah seedlings exposed to different soil types have been infected with zoospores. The roots are being processed for histological study and scanning microscopy.

2. Development of alternative selective media for the isolation of ectomycorrhizal fungi from epigeous and hypogeous sporocarps and Eucalypt mycorrhizal roots.

   - A culture collection of epigeous and hypogeous fungi has been established.

     - 50 epigeous cultures from 17^{+} genera.
     - 41 hypogeous cultures from 9^{+} genera.

- Freeze dried specimens from which the above cultures were isolated have been stored for taxonomic study.

- No in depth taxonomic studies have yet been attempted.

- Selected antibacterial agents have been added to the basic fungal isolation medium. This has resulted in significantly reduced contamination of field isolation.

- A number of media have been tried as alternative isolation media. Results and literature have indicated a range of media that may increase the spectrum of fungal genera already isolated. These media will be introduced in the 1981 fungal fruiting season.

- Several pure culture syntheses have been attempted on a range of eucalypts (including jarrah) with isolated mycorrhizal fungi. There has been problems in achieving mycorrhizal development and the specific factors necessary for success are currently under study. Bulk cultures of mycorrhizal fungi have been set up for glasshouse inoculation of Jarrah seedlings in the new year.

3. <u>The effect of applied P and N on the abundance of epigeous and hypogeous fungal sporocarps and ecualypt mycorrhizae in Jarrah forest areas (of varying fire history)</u>.

- Trial estimation of the effect of N and P on fungal fruiting and ectomycorrhizal activity was tried on Karri regeneration plots. Possible field techniques tested and the basis of the Jarrah field plots organised.

- N/P plots (5 reps/treatment) have been established in two areas in the N Jarrah forest (Cobiac and Amphion blocks) and at Manjimup. Total No. of plots is 100 to be monitored over the fungal fruiting season of 1981/82.

- Root boxes with Jarrah seedlings and burnt/unburnt litter have been set up to test the effect of N and P on the formation and development of mycorrhizal under controlled conditions. These may be used for zoospores studies in the future.

CSIRO

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11th December, 1980

Mr. L.F. Hammond,
Secretary,
Jarrah Dieback Research Foundation,
W.A. Forests Department,
54-56 Barrack Street,
PERTH WA 6000

Dear Sir,

... Please find enclosed the progress report on the Jarrah Ectomycorrhizae programme from its commencement in May, 1980 to December, 1980.

Yours faithfully,

N. MALAJCZUK
Senior Research Scientist
(Project Leader)

C.L. SANFELIEU
Experimental Officer

NM:SD