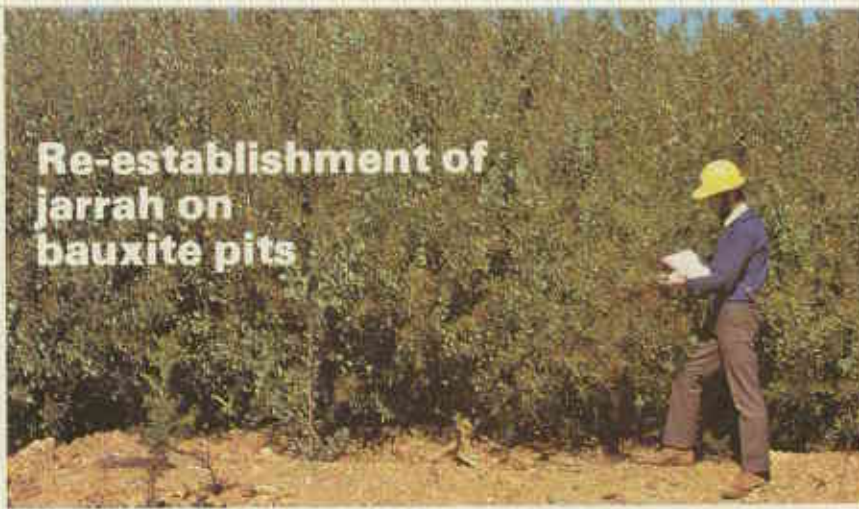


## Re-establishment of jarrah on bauxite pits



▲ A four-year-old stand of myrtle wattle which was established on a bauxite pit by direct seeding. (Les Harman)

Forest ecological research is complex and requires a multi-disciplinary approach. A number of research workers from a variety of organisations have been assisting full or part-time on this particularly jarrah dieback research programme.

**Soil microbiology.** Dr. N. Malajczuk and Mr. D. Darling, C.S.I.R.O., Dr. A. Glen, Murdoch University, and Miss W. Lepard, Forests Department.

**Field experiments.** Messrs. R. J. Kitt, R. G. Fairman and M. L. Mason, Forests Department.

**Laboratory experiments.** Mr. K. J. Gillen and Miss H. J. Warren, Forests Department, and Mr. K. Russell, C.S.I.R.O.

**Analysis of volatile chemicals from legumes.** Drs. F. Whitfield and K. J. Shaw, C.S.I.R.O.

**Plant chemistry.** Mr. A. B. Hatch, Forests Department; Drs. R. Kagi, B. Alexander, K. Croft and R. Bradbury, Western Australian Institute of Technology.

**Fire ecology.** Messrs. J. McCormick, R. M. Buehrig and C. C. Portlock, Forests Department.

**Ant ecology.** Dr. J. D. Majer, Western Australian Institute of Technology.

**Fire management.** Mr. L. Robson, Forests Department.

Jarrah has not been used on any scale to rehabilitate bauxite mine sites since, during mining, it is probable that *P. cinnamomi* spores, if they were not already present in the soil, would be introduced during the mining process. A range of alternative tree species which are resistant to *P. cinnamomi* has been established on bauxite mine sites. While it is possible that these species may replace jarrah, it may be desirable to re-establish jarrah on bauxite mine sites, particularly if mining extends to salt-prone areas of the forest.

It is likely to be more difficult to achieve control of *P. cinnamomi* by use of an understorey of native legumes in comparison to unmined forest. For example, drainage is impeded on bauxite mine sites and this is likely to increase the susceptibility of trees to the disease. It is possible, however, that native leguminous species if interplanted with jarrah could confer on it resistance to the disease and thus permit re-establishment of jarrah on bauxite mined sites.

Part of the mining procedure involves removal and stockpiling of the topsoil. Much of the seed and lignotuberous material is killed during prolonged stockpiling so that the understorey and shrub layer is not re-established naturally on bauxite mine sites. Research by W. Tacey of Alcoa has shown that if the topsoil is

immediately replaced a considerable proportion of the seed stored in the soil remains viable. There are logistical problems associated with avoiding storage of topsoil, and even if these can be overcome it is probably still desirable to enrich the shrub and understorey layers on bauxite pits.

A series of trials was initiated by Forests Department research officers to determine if it was possible to re-establish a native understorey and shrub layer on bauxite pits to improve stability of the pit surface and increase the diversity of plant species on rehabilitated mine sites. Native legume species were primarily used because of the availability of seed, and their resistance to *P. cinnamomi*, and their ability to improve soil fertility by nitrogen fixation. The trials were highly successful and were expanded to include other native shrubs and a variety of tree species. Aerial seeding of shrub and understorey seed on bauxite pits has now been adopted on an operational basis.

Tests are currently being conducted, using some of the early legume trials on bauxite pits, to determine if the reduction in fungal activity, which has been demonstrated under native legume stands in the forest, can be reproduced on bauxite pits.

In trial areas jarrah seed has been incorporated into the mix of legume and shrub species which is applied to mined-over areas after they have been replanted with dieback-resistant trees. Establishment of jarrah as part of the shrub and understorey layer beneath the fast-growing planted species may provide the opportunity in the future, if control of jarrah dieback by legumes is achieved, to re-establish jarrah as the dominant species on bauxite pits.