

Some Ecological Aspects of Jarrah Dieback

by P. CHRISTENSEN

The destruction of jarrah forest by the jarrah dieback fungus *Phytophthora cinnamomi* has received much publicity. Jarrah is a valuable timber tree and as such it is easily assigned a definite cash value. Therefore, because of a necessity to create a public awareness of the problem as quickly as possible, attention has been directed largely towards this species. This has tended to distract very largely from a less obvious but nonetheless important aspect of the disease, the destruction of a considerable section of the native flora.

Its wide range of host plants makes jarrah dieback very important from an ecological viewpoint. Many plants are affected, notably members of the Proteaceae, Epacridaceae, Myrtaceae and Leguminosae families. Susceptible plants include species of *Banksia*, *Macrozamia*, *Xanthorrhoea*, *Casuarina*, *Dryandra*, *Adenanthos*, *Lomandra*, *Bossiaea*, *Pultenea*, *Leucopogon*, *Podocarpus*, *Kingia*, *Persoo-*

nia, *Hibbertia*, *Dasypogon*, *Xylomelum*, *Sterlingia*, and *Conospermum*. All of these are not equally susceptible, they range from the *Banksias* which exhibit almost no resistance to the disease, through *Xanthorrhoea* and *Xylomelum* which show some resistance, to *Hibbertia* and *Casuarina* which appear to have a relatively high degree of resistance.

Most of these species have no obvious direct economic value at present and so unlike jarrah the effects of their destruction are not immediately apparent. Nevertheless in the long term the loss of these components of the native flora may well prove to be of greater significance than the immediate dollar value assigned to the dead timber trees.

▼ *The pigmy possum (Cercartetus concinnus), a tiny insect and nectar feeder often found associated with banksias.*





▲ Dying *Banksia grandis* in forest country.

▼ Dead *Banksia attenuata* on the south coast alongside a newly constructed road.



Cause for concern

There is cause for concern over the possible eventual extinction of some of the more susceptible species. This in itself is tragic enough since the extinction of any species means the loss of potentially valuable genetic material; but the implications go far beyond the destruction of the individual species. All organisms depend on one another to a greater or lesser degree for their survival, when one species disappears others are affected.

Take for example one of the most interesting and striking genera of plants in Australia, the *Banksias*. There are over 50 species of banksia and with the exception of only one species, which occurs in New Guinea, they are found only in Australia. They are found in all States but occur most abundantly in the west, where there are some 40 endemic species.

Banksias are very important in the ecology of the south-west. Many species flower during late summer and autumn or winter when little else is in bloom, and their pollen and nectar provides food for a whole host of small animals and birds.

For example, the red wattle bird, the little wattle bird, the yellow-winged or new holland honeyeater, together with the closely allied white-cheeked honeyeater, the western spinebill, the tawny-crowned honeyeater, the white-naped honeyeater, and the brown honeyeater are some of the honeyeaters commonly associated with banksia flowers, particularly on the south coast. Other birds such as the silvereve and the black cockatoos also feed on the nectar of the banksia flowers. The latter also frequents the banksia belts at a later date when the seed ripens. Birds come not only to seek nectar but also for the numerous wasps, moths, butterflies, beetles and ants attracted to the flowers. At night the boobook owl and bats feast on moths attracted to the nectar. At this time another small creature the tiny noolbenger or honey possum emerges to feed on the pollen and nectar of the flowers. This animal is almost entirely adapted to a diet of nectar and banksias are one of the main species it frequents.

The equally tiny doormouse or pigmy possum also frequents the banksia groves at flowering time. They live mainly on an insect diet and have been observed to breed at the time of the banksia flowering on the south coast. Their tiny nests and those of the noolbenger are often found inside rotted hollows in the trunks of the banksia.

The blackboy or grass tree (*Xanthorrhoea preissii*) is another plant of extreme importance in the fauna ecology of the south-west. Whilst it is not nearly as sensitive to dieback as the banksias it can nevertheless suffer considerable mortality on susceptible sites.

The flowering spike attracts many of the previously mentioned honeyeaters and later as the seeds ripen the parrots and cockatoos move in. The mat of hanging dead leaves provides a retreat and nesting sites for small animals, such as marbled geckoes, birds and the tiny pigmy possum.

When the blackboy dies and starts to decay it is attacked by the larvae of the longicorn beetles, the bardee. These and the chafer grubs, also found here in numbers are food for the common marsupial mouse (*Sminthopsis murina*). Incidentally the partially decayed blackboy is one of the favourite nesting places of this animal. They are usually located 3 to 4 ft. from the ground and they use the labyrinth of tunnels initiated by the activities of the grubs. The mardo or yellow-footed marsupial mouse will also shelter in the partially decayed trunks.

As decay proceeds and the trunk hollows out more, the marsupials vacate the premises and lizards such as Smith's skink and the red-legged skink move in. Small colonies of long-eared bats (*Nyctophilous* sp.) occasionally make a home in the hollow trunks.

A number of snakes are also commonly found in old blackboys. For example, the little whip snake, the crowned snake and the small burrowing worm snake. On the south



▲ A grove of healthy *Banksia grandis* in jarrah forest. (Brian Stevenson)

▼ *Banksia attenuata* groves on the south coast. Many species of small animals will disappear from this area if dieback kills the banksia.





▲ *Showy dryandra* (*Dryandra formosa*)—a beautiful wildflower susceptible to dieback. (Peter Skinner)

▼ *Banksia littoralis* is another species threatened by dieback.



coastal heath Muellers snake, until recently believed to be very rare, is commonly found in the bases of old decayed blackboys. The blackboy is of special importance in this area as it is often virtually the only shelter present.

These two examples, the banksia and the blackboy, are only a small sample of the many species affected by dieback. Admittedly they are outstanding examples and even if it were these species alone that were threatened the situation would be serious. However, many other species which play a part in the fauna ecology of the south-west are threatened.

The red rind of the *Macrozamia* nut for example is relished by kangaroos, emus and possums alike. Flowering species such as *Dryandra* and *Adenanthos* are frequented by honeyeaters and multitudes of insects, and the fruits of *Podocarpus* are eaten by a variety of birds including the emu.

It is those plant species that are both highly susceptible and grow largely in moister areas, such as swamp edges and gullies, that are in the greatest danger. Many of the banksias come into this category. The bull banksia (*Banksia grandis*) has suffered heavy mortalities especially in the northern forest areas. In the south the swamp banksia (*B. littoralis*) and the river banksia (*B. verticillata*) are suffering.

Left to itself the disease spreads slowly, being dependent on certain conditions of soil moisture and temperature which normally only occur during spring and autumn. Rapid spread is dependent on man's activities. The fungus can be spread in clods of soil adhering to vehicles, plant and equipment when moving from infected to clean areas.

At the present time no economically feasible method of control exists. However research has indicated that the rate of spread of the disease can be drastically reduced by fairly simple hygiene measures. Areas of forest are classified according to severity of infestation and treated accordingly. Severely infected areas are clear felled and planted with resistant species of trees. Special attention is paid to the location of access routes when logging dieback areas. Roads are designed to limit the distance travelled on soft muddy ground which might be picked up by vehicles moving through the area. Plant and machinery are also washed down and sterilised before moving from an infected area to a clean one.


At the present time there is reason to believe that these hygiene measures are having a considerable effect on the rate of spread of the disease within State Forest.

These are only some of the precautions taken against further spreading



of the disease. Lists of detailed instructions exist which must be adhered to by all organisations operating within State Forest areas. However, there is reason to be concerned about other areas such as private land, various categories of reserves and Crown land. Of particular concern are the large tracts of Crown land which exist along the south and south-west coastal areas. At present these are largely wilderness areas visited only by the occasional week-end fisherman. This will inevitably change, sections will be opened up for recreation, townsites may be planned and scenic drives and native trails will be constructed.

Such developments are always preceded by the activity of heavy earth-moving equipment, and could spell disaster for many native species unless strict hygiene measures are adhered to.

There are also many areas on both private land and in parks and reserves where susceptible species exist that have not yet become infected. Such areas should be guarded with the utmost care as once they have been lost they can never again be retrieved. 

► *Top: New Holland honeyeater (Phylidonyris novaehollandiae) on parrot-bush (Dryandra sessilis).*
(Bert Wells)

► *Middle: Red wattle-bird (Anthochaera carunculata) with young. This is a honey and insect eater associated with banksias and other wildflowers*
(Bert Wells)

► *Bottom: Honey possum (Tarsipes spencerae) on kangaroo paw (Anigozanthos flavida). This species feeds on the nectar and pollen of banksias and other wildflowers.*
(Dick Perry)

◀ *Scarlet banksia (Banksia coccinea) —one of our most spectacular wildflowers—is also susceptible to dieback.*

Back Cover

Crowned snake (Denisonia coronata) found in a dead blackboy.



