

## Firing our grass trees

Fire has been a natural phenomenon in the Australian bush for many thousands of years, so it is not surprising that a number of Australian plant species have become adapted to it.

Dr Malcolm Gill of the Division of Plant Industry's ecology section in Canberra has been investigating the effects of burning on a number of native species in south-eastern Australia. In one of his more recent studies he has looked at *Xanthorrhoea australis*—better known as the grass-tree or blackboy—a species he believes has become largely dependent on fire for reproduction.

The Aborigines, most appropriately, called it the fire tree—maybe because of the extremely flammable material its bushy undergrowth provided. Or perhaps, like later observers, they had noted that it rarely bloomed unless it had first been fired.

Dr Gill and Mr Frank Ingwersen of the Department of Capital Territory began a study in 1972 to find out the extent to which the species depends on fire for its reproduction and to assess its fire-resistance at various stages of development.

Their work has been centred on the Tidbinbilla nature reserve near Canberra, where grass-trees occur naturally. They chose four groups of 30 plants, and subjected each



Grass-trees in flower at Tidbinbilla.



An experimental burn—the green crowns readily recover.

group to a different treatment.

They burnt one group by setting alight the dead thatch around the stem, and clipped the leaves of another to simulate burning. They treated a third group with ethylene gas (a treatment given to pineapples to stimulate flower-stalk development), as ethylene occurs naturally during bushfires. The fourth group received no treatment.

Treatments were given in September, and by the following April most of the burnt plants showed the

first signs of a flower head. Heads appeared on the clipped plants about the same time, and both groups produced their first flowers in June. Twenty-two of the burnt plants and 18 of the clipped ones produced flowers.

However, the ethylene-treated and the untreated plants did not produce their first flowers for more than a year. Ten of the untreated and 20 of the ethylene-treated plants produced flowers.

The researchers believe, though, that 1973 was an

exceptional year and that it was most unusual for such a large number of untreated plants to flower. In fact, in experiments carried out the following year, only 1–2% of untreated plants produced flowers. The exceptional behaviour in 1973 might have been due to a build-up of carbohydrates over the years. Observations of cross-sections of the plants indicate that it is not unusual for them to flower only once in 50 years if there has been no fire. With firing, they can flower within 2 years.

Despite the increased flower production of the burnt and clipped plants, these did not seed any better than those in the other two groups, apparently because they flowered in winter, when few insects were around to pollinate their flowers. The others flowered in spring and early summer when insects were active.

The researchers suggest that maximum seed production could be obtained by burning the plants in summer—say every 6 years—but this requires further study.

Growth of *Xanthorrhoea australis* in relation to fire. A. M. Gill and F. Ingwersen. *Journal of Applied Ecology*, 1976, **13**, 195–203.

Fire and the Australian flora: a review. A. Malcolm Gill. *Australian Forestry*, 1975, **38**, 4–25.