

FOREST FOCUS

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THE TIMELESS FOREST



Seedling, six months after germination
Virgin karri forest south of Pemberton



Three-years-old regrowth





FOREST FOCUS

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FOCUS on the Karri Forest

The giant karri (*Eucalyptus diversicolor*) of the south-west of Western Australia—together with the mountain ash of Victoria and Tasmania—has no equal for height and grandeur among the broadleaved species of the world.

Cover:

THE TIMELESS FOREST

Photographed in February, 1970, there is nothing in this picture that would suggest that the scene could not be one of several thousands of years ago.

Among the purest and most magnificent hardwood forest stands in the world, the karri forest's tallest trees eclipse in height all of Perth's modern buildings. The individual karri tree is a masterpiece of natural engineering in its great strength, symmetry and beauty combined with economy of material. Trees up to 286 ft. in height with girths at breast height of 24 ft. have been measured. Girths up to 38 ft. 6 in. have been measured on shorter trees.

Each tree is a highly complicated and well balanced food factory supplying energy to the countless living cells which in turn help man in so many ways. Life on this planet could not survive without trees like the karri and other green plants to provide oxygen and help purify and control the environment.

With the aid of chlorophyll, green plants commence the chain of life by manufacturing their own food from sunlight, minerals, water and carbon dioxide.

Karri is the largest tree in Western Australia and is second only to jarrah in importance. Uses of the timber are numerous. Its strength and stiffness combined with extraordinary long, clean lengths which may be obtained render it unsurpassable for super-structural work.

It is possible to secure karri in larger sections and longer lengths than any other known hardwood in the world.

In beams, rafters, columns, warehouse floor joists and other members where strength is the essential factor, it gives every satisfaction. In many instances karri has replaced oregon for scaffolding planks, where its greater strength has more than offset the increase in weight.

Forests are a regenerative resource, and with modern technology continually seeking and finding more uses for forest produce in the way of cellulose plastics, wood chips, fibre and chemical extracts, the future appears limited only by man's knowledge and ingenuity.

Regeneration

With this high demand for karri, jarrah and many other native timber species, one might well ask what is being done by foresters to regenerate this valuable natural resource.

Together with protecting the forest from the ravages of uncontrolled wildfires and disease, the most important task of karri region foresters is to regenerate cut-over stands.

Nearly 4,000 acres of prime karri forest cut over for sawmills at Pemberton, Northcliffe and Jardee during 1967 and 1968 were treated for regeneration early in 1969. The treated areas have now been closely studied by local foresters and their surveys indicate a highly successful restocking. Up to 2,000 seedlings per acre are now well established over 95 per cent of the treated areas. The remaining 5 per cent will be restocked with hand planted karri seedlings this winter.

To achieve this an intimate knowledge of the flowering and seeding cycle of the tree is required. The length of the karri floral cycle from bud initiation to seed maturity is roughly four years. Flowering usually occurs at two and a quarter years, but this can vary from under one and a half to over two and a half years.

From a moderate crop of buds, a co-dominant tree will bear well over a quarter of a million flowers, but only about 50,000 seeds may be expected from this tree.

An experiment carried out over a five-year period in the karri forest measured the annual seed fall per acre at 1,000, 19,000, 59,000, 179,000 and 30,000 seeds. These results showed the variability of flowering and seed production.

The flowering period usually lasts two or three months, although occasionally it may spread over a period of more than two years in some stands. In general, heavy



Karri regrowth at Lefroy Brook, 95 years old

blossom occurs at intervals ranging from four to seven years.

When in flower the karri forest is one of the most prolific honey yielders known, contributing about 25 per cent of all the table honey in Western Australia. From 400 to 600 lb. of the finest quality honey may be harvested from each hive.

The immature seed capsules are located among the thinned-out oldest leaves. Following flowering, the seed crop ripens over one full winter. Seed shed occurs in the summer at the end of the fourth or fifth years of a cycle. Usually two consecutive years' seed, adequate for natural regeneration, are followed by intervals of from two to four years without seed.

Fire stimulates regeneration

The cheapest and most effective means of obtaining karri regeneration is to burn the logging slash and scrub at a time when there is adequate seed in the crowns of the special trees retained as "seed trees". Timing is determined by sampling and testing. This is important, as burning before seed is ripe allows the weeds to establish first, while burning after seedfall incinerates the seed on the ground.

The burning provides a clean mineral seedbed and removes established scrub which, if left untouched, would overtop the young karri seedlings and prevent their proper development.

Where seed falls on an ashbed, seedling development is quite remarkable and results in the absolute dominance of karri over weeds. At the centre of a two-year-old ashbed karri seedlings may be 10 to 12 ft. in height compared with 1 or 2 ft. in height off the ashbed.

Vigorous sapling stands such as these can then completely dominate the site and attain 80 to 90 ft. in height growth in 20 years. For this reason the "regeneration burn" should be as hot as possible to produce ashbeds without severely damaging the seed trees.

Following the opening autumn rain, karri seedlings germinate and the bare mineral soil and ashbed become carpeted with seedlings.

Unburnt leaf mould and ground vegetation hinder the establishment of the seedlings.

In cut-over stands of karri, three dominant trees per acre will provide the 120,000 seeds per acre required for satisfactory germination. These trees are left standing until after seedling establishment, and then usually felled for their excellent timber—being select trees in form and vigour.

Successful karri regeneration usually produces up to 30,000 seedlings per acre in the initial stages. Competition sets in almost immediately after seedling establishment and consequent deaths steadily reduce the number of seedlings per acre from year to year.

Although numbers vary according to topographical conditions, 1,000 trees at 10 years and 500 trees at 20 years could be the expected stems per acre at these ages.

Karri establishes dominance quickly and permanently, and competition between the seedlings in an unthinned stand must take its toll of growth of dominant or final crop trees in these early stages. On the assumption that early thinnings could have a beneficial result on the growth rates of the final crop trees, Forests Department research officers initiated experiments to examine two avenues to achieve a breakaway by these selected trees: (1) Thinning young regrowth aged about one and two years by using a foliar spray on unwanted stems; (2) The use of various fertilisers to promote growth in both thinned and unthinned stands.

It is too early to assess fully the results of these investigations, but it has already been shown that spraying must be done during the spring following germination (i.e. at age six to eight months). At this age both karri seedlings and scrub are at a height of 6 to 12 in.

No significant response to fertilisers has yet been noted in the thinned and unthinned regrowth, but where used in planting holes for artificially planted karri seedlings, growth has increased one and a half to two times normal.

The oldest stands resulting from controlled regeneration work date from 1929, however, valuable information has been obtained from areas of natural regeneration at Karridale, now aged 60 to 70 years, and also from old farm properties, one of which dates back to 1872.

Measurement of sample plots laid down in these areas indicates that karri will produce from 75 to 150 c. ft. of wood per acre per annum on favourable sites.

Judicious use of controlled fire in sapling stands does not appear to have any adverse effect on tree growth. The critical bark thickness to insulate the cambium from the fire's radiant heat is $\cdot 4$ to $\cdot 7$ of an inch.

This critical point usually occurs where the stem is at least 3 in. in diameter.

Vigorous dominants develop a thick fire resistant bark near the butt and can survive all but the hottest fires.

Karri soils generally are acidic in reaction, with texture varying from fine sands to loams derived from under-lying granitic rocks. Such soils are very low in nutritive value by recognised agricultural standards.

They have also been proven deficient in trace elements such as zinc, copper and cobalt. (See distribution map on page 6.)



Karri beams in a home at Carmel



Karri felling sequence: Feller removes wedge of wood from scarf



Commencing the "backing down" cut



On its way down. This tree measured 24 ft. 9 in. at the saw-cut



Seed tree retained for karri regeneration (note man at base).