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# TREES OF WESTERN AUSTRALIA

## 1—KARRI AND JARRAH

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By C. A. GARDNER, Government Botanist

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DEPARTMENT OF AGRICULTURE OF WESTERN AUSTRALIA

# TREES OF WESTERN AUSTRALIA

## I—KARRI AND JARRAH

By C. A. GARDNER, (Government Botanist)

**I**N commencing this series, in which a large number of trees will be dealt with, first place must be given to the species of *Eucalyptus* which include, besides the gum-trees, the various shrubs and mallees which make up a considerable part of the woody flora of South-Western Australia.

It is hoped that these articles may prove of interest and value, for apart from the trees which provide us with our local timber, some species of *Eucalyptus* yield valuable tannins, and a number, especially the mallees, are valuable for the oil which they contain in their leaves, and for their pollen and nectar which are of primary importance to the apiarist.

### DESCRIPTION

And so, in the first place, it is as well to consider just what constitutes a *Eucalyptus*. They are all woody plants—that is they are trees or shrubs—and all have simple entire leaves of more or less leathery texture. The leaf has a single midrib or central nerve, and typically what are termed lateral nerves which arise and diverge from this midrib usually to terminate in what is termed an intramarginal nerve which may be close to, or remote from the leaf-margin. In some tropical species there are two intramarginal nerves.

The lateral nerves may be more or less parallel, or *anastomose*, with one another, forming a network of nerves, sometimes distinct, sometimes obscure, and sometimes the intramarginal nerve may be so close to the leaf-margin as to be contiguous with it. The leaf consists typically of a leaf blade or *lamina* attached to the branchlet by a special stalk or *petiole*, frequently twisted, so that the leaf assumes a vertical pendulous position; at other times the leaf is stalkless or *sessile*, and in a few

species two opposite leaves may be joined at their bases (*connate*) to resemble a single leaf pierced by the branchlet. The position of the leaves is usually *alternate*, i.e., on opposite sides of the branchlet but placed one above the other; at other times they are strictly *opposite* to each other.

The presence of oil in the fresh leaves may be detected by holding them up to the light, when the oil cavities will appear as translucent dots. In the dried leaves this character is not usually evident, but there may be some indication of oil as dark spots, or minute depressions on the leaf-surfaces.

The leaves are usually of the same colour on both surfaces, when they are said to be *concolorous*, or they may be dark above and paler underneath. They are typically smooth and without hairs (*glabrous*), or they may have a sparse covering of short rigid hairs.

### Flowers.

The arrangement of the flowers is usually constant in any given species, and the terms used may be understood with reference to the plates accompanying the articles; usually the flowers are arranged at the top of a stalk which arises from the point of junction of the leaf and branchlet (the leaf *axil*). This stalk is termed the *peduncle*. The flowers may each possess their own special stalk (*pedicel*), or may be stalkless, when they are said to be *sessile*. The pedicels, or the sessile flowers in most cases are clustered at the top of

the peduncle; when pedicellate, the group (*inflorescence*) is an *umbel*; when sessile, the flowers are in a head, and termed *capitate*.

The *Eucalyptus* flower is a simple structure, for there are no sepals and petals. The lower part of the bud, which becomes the cup of the flower, and enlarges or hardens to form the fruit is termed the *calyx-tube*, and is usually *truncate* or flat at the summit. Occasionally the sepals are represented by four small teeth close to or at the summit of the calyx-tube, and these are always four in number. They may be seen to advantage on a number of tropical species, and on the Tallerack of the southern sand-heaths between Albany and Esperance, or again on the Illyarrie (*Eucalyptus erythrocorys*). The petals are quite absent, but their place is taken by a bud-cap, called the *operculum*, and this is probably derived from the hardened and concrete petals. It is indeed this *operculum* that is the most characteristic feature of *Eucalyptus*, and from which the genus derives its name—*eu* = well, and *kalyptos* = covered.

When the bud cap falls off at *anthesis* (flowering time) the stamens expand. These consist of a stalk or *filament*, and at the top an *anther* which contains the pollen. The anther opens by two cells, or by circular or elliptical pores; most frequently these are longitudinally parallel to each other. Sometimes by upward confluence they appear as a single curved slit. The filament is attached to the anther at the base of the latter, when the anther is said to be *basifixed*, or it may be attached at the back, when it is *dorsifixed*, or *versatile*, and moves freely on its pivot. There is a large or small gland on the back of the anther.

#### Fruits or Seeds.

After pollination and fertilisation the stamens wither or fall off, and the calyx-tube undergoes some modification to form the fruit—popularly called the “gum-nut.” This contains the capsule which in turn contains the seeds. The space at the top between the place occupied by the stamens and the edge of the capsule is termed the “disc,” and this

varies considerably in the different species, being sometimes flat as in the Tuart, domed, as in the Bullich, or it may extend vertically down to the capsule lining the calyx-tube, as in the Karri, or the Yorrel and Morrel. The seeds vary considerably both in size and in shape; often they are minute, but sometimes as in the Marri and the Red-Flowered Gum, for example, they are large, and sometimes winged.

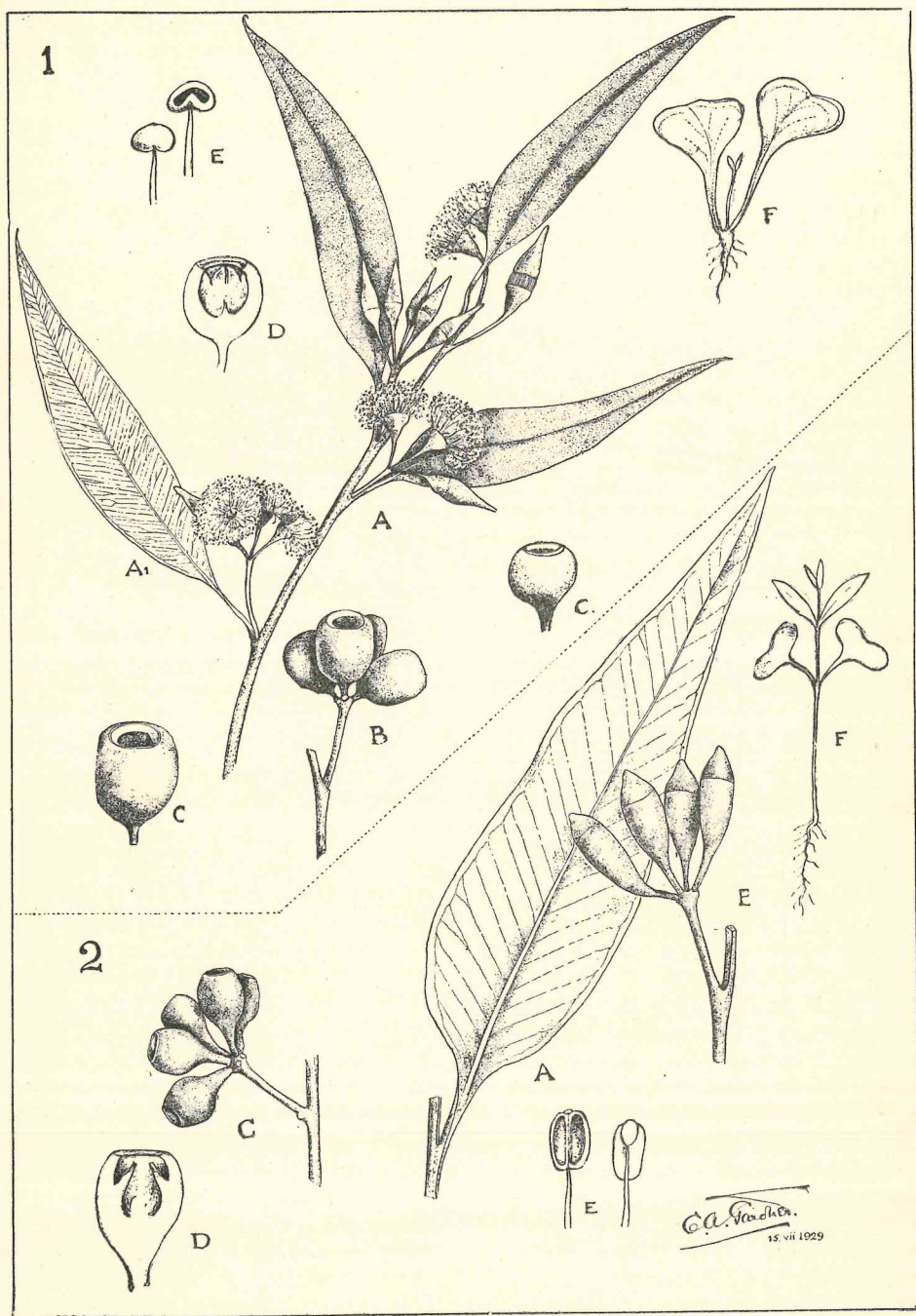
In addition to the fertile seeds, usually found in the lower part of the capsule, there are a number of sterile seeds, differing considerably from the fertile seeds and usually narrow. These form what is called the “packing” in the upper part of the capsule, and are the first to be shed when the capsule opens its valves.

The shape of the seed-leaves—those embryonic leaves which are the first to expand when the seed germinates—is of importance in respect to the relationships of species. There are two main types: the broad cotyledons of the Jarrah and Marri, for example, and the Y-shaped or forked cotyledons of the Mallets and a large number of the inland trees and mallees.

#### Trees and Shrubs.

The *Eucalyptus* species can be conveniently classified according to their growth form into trees and shrubs, the latter branching at or near the base, and without any distinct trunk. Of the shrubby forms we recognise *mallees* and *marlocks*; the former with a subterranean somewhat bulbous stock capable of putting forth new stems at intervals (as for example after bush-fires) and repeating this performance indefinitely, in some cases for over a century. Those shrubby forms which do not possess a bulbous base are termed *marlocks*, examples being *Eucalyptus macrocarpa*, and many others. Sometimes, however, a mallee may be a *marlock*, and sometimes some of the inland trees may become mallees under certain conditions, as for example injury to the trunk from termites, or from bushfires.

In Western Australia we use the term gum-tree in a very wide sense. In the Eastern States, especially in Queens-



1. JARRAH (*Eucalyptus marginata* Sm.). A—Flowering twig; A1—Leaf-venation; B—Fructing umbel; C—Fruits; D—Section through fruit; E—Anthers; F—Seedling, showing expanded cotyledons.

2. KARRI (*Eucalyptus diversicolor* F. Muell.). A—Leaf; B—Umbel showing buds; C—Umbel of fruits; D—Longitudinal section of fruit; E—Anthers; F—Seedling showing expanded cotyledons and two subsequent pairs of young leaves.

land and New South Wales, and also in the Kimberley district of Western Australia such terms as "gum," "box," "stringy-bark," "messmate," "half-box," etc., are in common use. The "gum tree" properly is a tree like a Karri, that is, with a perfectly smooth bark, of which the outermost layers are shed annually. The Marri or Redgum is really a bloodwood, a tree with a friable rough bark, and usually kino or resin in the wood or bark; the Tuart is a "box-tree," and the York-gum a half-box, i.e., it has a rough or "box" bark on the trunk, the branches being smooth. These terms will be explained under the various trees discussed.

## JARRAH

(*Eucalyptus marginata* Sm.)

This tree, the principal timber tree of Western Australia occurs in South-Western Australia, and its boundary inland is determined by the winter isohyet of 30 inches.

It thus extends as far inland as Mooliabeenie, Clackline, Narrogin, thence west of the Great Southern Railway, to extend eastwards again in the vicinity of Tenterden, and embracing the Stirling Range, finally terminating near the Warriup Hills. Its northern limits are on Mount Peron, near Jurien Bay. It is typically associated with the ironstone soils of the Darling Range in the northern portion of its range, and indeed, it is found everywhere within its area of distribution where ironstone is present. In addition it grows in the sandy soils of the coastal plain between Gingin and southwards to the Albany district.

It is a stringybark, i.e., it has a fibrous, stringy, longitudinally-fissured bark which is strong. The timber is a deep red, and on this account it earned for the tree the early name of "Swan River mahogany." In certain places mallee forms are to be observed, particularly on the southern slopes of Mount Lesueur, and on the slopes of the Stirling Range. Otherwise, it is a tree, and the largest forms are to be found in the southern parts of its range as a forest tree attaining a height of 135 feet.

## VALUABLE TIMBER

Jarrah timber has long been a popular article of commerce. It is hard, dense and easily worked and has a high degree of resistance to attacks of fungi and termites.

Prior to the development of concrete and asphalt road surfaces, many famous thoroughfares throughout the world were paved with Jarrah blocks, and its durability has led to its extensive use as railway sleepers.

Used as a general purpose timber in this State, owing to our lack of indigenous softwoods, Jarrah is highly regarded in other States and countries where it is favoured for cabinet making, panelling and ornamental woodwork. The possession of a Jarrah-floored house is a matter for pride in other countries and of late years there has been an increasing overseas demand for Jarrah flooring boards.

Jarrah is not highly regarded as a honey-yielding tree. It would appear that very little nectar is available in the Jarrah forests but the coastal stands yield fairly large quantities of a somewhat dark-coloured and strongly-flavoured honey. This honey is more suitable for blending than for use in its natural state.

## DESCRIPTION OF PLANT

The leaves are alternate, stalked, and narrowly lance-shaped, somewhat dull green above and paler underneath, the midrib prominent, the lateral nerves spreading, and the intramarginal nerve extending within the leaf margin and distinct from this margin.

The flowers are arranged in umbels of from four to eight flowers on slender pedicels thickening gradually upwards into the calyx-tube. The calyx-tube is obconical (i.e., reversed-conical), and the operculum narrow-conical and acute and longer than the calyx-tube. The stamens are numerous, in a continuous series, with white filaments sharply kinked when in the bud; the anthers are heart-shaped, and the two slits are contiguous at the summit, making as it were one crescent-shaped slit. The attachment of the anther to



*Typical Jarrah Forest*  
NOTE FIBROUS BARK

the filament is close above the base, and there is a small gland at the top of the anther. The fruit is stalked (pedicellate) and more or less spherical, up to three-quarters of an inch in diameter, contracted at the top, with a narrow, usually flat, disc, and the valves of the capsule are enclosed. The seed-leaves are kidney-shaped and taper at their bases into the petiole.

## KARRI

(*Eucalyptus diversicolor* F. Muell.)

The Karri tree is the largest, or more strictly the tallest tree of Western Australia, attaining a height of 250 feet. It is a true gum tree, having a smooth bark, the outer layer of which sheds annually in rather large thick plates. It received the name "diversicolor" because of the varying colours of the bark at the time of the year when the older bark is shed. At this time the new bark, a bright orange-yellow in colour contrasts strongly with the newly exposed bark, while underneath the shedding plates, the bark is white. Karri bark is thick, rich in tannin, and yellow in fracture.

The heartwood is red, and closely resembles that of the Jarrah. Indeed the resemblance is so close that the two timbers are difficult to distinguish one from the other, and the bushman's test of a burning splinter (leaving a white ash for karri, and a black or grey ash for jarrah) is frequently employed to distinguish between them.

### FOR LONG, STRONG BEAMS

Although it lacks the high degree of termite-resistance which has made Jarrah famous, Karri timber is a valuable hardwood for superstructural work.

It is slightly more dense than Jarrah and considerably stronger. Its strength and rigidity and the extraordinarily long clean lengths which may be obtained have earned it the title of "The Beam Timber."

It is widely used for flooring and in recent years, "peeler logs" of Karri have been sliced for veneers and plywood.

Karri honey is a high-grade product widely recognised as the best honey produced in this State. It is a light-

coloured clear honey with a delicate flavour and excellent consistency and the Karri forests usually contribute about 25 per cent. of all the table honey produced in Western Australia.

The main honey flows occur about every four or five years and records show that an extra heavy flow occurs about every 15 years. Averages of five cwt. of excellent honey per hive are fairly common during these heavy flow periods.

### DESCRIPTION OF PLANT

The leaves of the Karri are alternate and petiolate, rather broadly lanceolate, dark green above and paler underneath, and more spreading than pendulous—an unusual character in South-Western Australian trees.

The lateral nerves are fine, spread at a rather wide angle from the midrib, and the intramarginal nerve is removed from the leaf margin. The umbels consist of from three to six flowers arranged at the summit of a terete (round in section) or compressed peduncle, and the flowers are pedicellate.

The calyx-tube is narrow—almost cylindrical—and tapers gradually at the base into the pedicel. The operculum is almost hemispherical or shortly and broadly ovoid-conical, much shorter than the calyx-tube. The numerous stamens are in a continuous ring, the white filaments being inflected inwards when in the bud.

The anthers are almost oblong in outline and attached near the middle of the back (dorsal insertion), and open in distinct parallel longitudinal slits, and there is a large dorsal gland.

The fruit is pear-shaped (pyriform) and contracted at the summit, slightly more than half an inch in diameter, with a narrow rim. The capsule is deeply enclosed within the fruiting calyx and the valves are also included. The cotyledons (seed-leaves), upon expansion after germination, are broadly kidney-shaped and taper into short stalks. The foliage of the young leaves is broad and delicate, and persists on the young trees until they are many feet in height.