Introduction

In the beginning there was *photosynthesis*

A magic moment, from a plant and animal point of view, happened on earth around 8-700 million years ago. This happened when the genes controlling '*photosynthesis*', were transferred from the *Cyanobacteria,* living in the ocean, to an algae growing in the warmer shallow waters near the shore. This animal to plant exchange brought the '*breath of life*' to planet Earth, by enabling the newly chlorophyll saturated green plant cells to turn the 'toxic' carbon dioxide in the air, into food. It also released 'life-giving' oxygen into the air – a moment of magic!

To explain *photosynthesis* in the simplest way, I want you to imagine that the action of chlorophyll in the plant leaf functions almost as a 'knitting machine' 'assembling' the elements fed into it, and then releasing these elements as a new and different product - like the individual stitches that go to make a jumper - the product being the building blocks of the simplest plant sugar - $C_6H_{12}O_6$. The 'genetic knitting machine' however, takes part in the reaction, but is not changed by the reaction. It goes on to make more, and more, and more sugar. (where C = carbon, H = hydrogen, and O= oxygen).

The formula for photosynthesis looks like this:

$6\ CO_2 + 6\ H_2O$ + light energy = $C_6H_{12}O_6 + 6\ O_2$

- **The first magic of *photosynthesis* was in the production of plant sugars - which are the primary foodstuf for all living things.**
- **The second magic of *photosynthesis* is in the production and release of oxygen into the atmosphere -oxygen being the precursor of 'life' for every living thing on this planet.**
- **As a direct result of the boost in plant sugars, further 'genetic knitting' evolved, and with the addition of nitrogen (N_2) - also freely available from the atmosphere - amino acids, and the more complex components for life, such as proteins, became possible.**
- **With the further evolution of plant root associations with mycorrhiza, for example, plants were assisted in the taking up of essential minerals from the soil - another important and essential link for greater forms of diversity.**

So, beginning around 600 million years ago, when the oxygen level in the atmosphere was less than 2%, there was an explosion in the evolution of plants – and the inter-relatedness of these processes began to drive a continuous evolution of new species, and plant life began to evolve into more and more complex forms of life on earth.

In the evolution of all life forms therefore, without plants and photosynthesis, no other life forms would have been possible.

The evolution of Gymnosperms (softwoods)

If we take ourselves foreward in time to around 300 million years ago, we find that all the continents were joined as the supercontinent of Pangaea, and there were still only ferns and lichens, and Australia experienced its last period of glaciation.

Ferns, the understory plants to the Angiosperms, still growing here in the Otway Ranges.

Foreward again to around 240 million years ago, and the first of the Australian Gymnosperms (conifers, or softwoods) evolved in the southern hemisphere of Pangaea. This included 7 members in the Podocarpaceae family, 4 of which are not found on any other continent.

They included:
- *Podocarpus dispermus* (double-seeded brown pine),
- *Podocarpus elatus* (brown pine),
- *Podocarpus grayae* (northern brown pine), and
- *Podocarpus smithii* (Smith's pine) – all rainforests species.

This was closely followed 220 million years ago, by the Araucariaceae family with 3 new genera evolving.

The most significant being:
- *Agathis robusta* (kauri pine),
- *Araucaria cunninghamii* (hoop pine),
- *Araucaria bidwillii* (bunya pine), and
- *Wollemia noblis* (Wollemi pine).

These 2 families are the oldest of the 8 remaining conifer families currently growing on this planet.

These were pivitol events, because the oldest northern hemisphere conifer, which were in the Taxaceae family, evolved 65 million years later – around 175 million years ago.

The conifers brought two major changes:
- **They massively boosted the oxygen levels in the atmosphere, needed for more complex forms of life to evolve, and they fed the first dinasours.**
- **They brought into being an entirely new form of 'wood', which eventually provided humans with the essentials for habitation, both as a fuel for heat and as a structural material for buildings and construction.**

Conifers pre-dated the birds and the bees and were pollinated by the wind. So, essentially Australia's conifers changed the world!

Then around 200 million years ago the supercontinent of Pangaea began its separation into Laurasia—forming the northern land mass—and Gondwana, the southern land mass. Fossil records indicate that the vegetation at that time consisted of ferns, horsetails, cycads and conifers.

Also, on at least two occasions between 200 and 130 million years ago, portions of Australia experienced major innundation when the sea covered up to 60% of Australia and huge quantities of rainforest was buried on the sea floor, resulting in the formation of our coal and gas resources.

The evolution of Angiosperms (hardwoods)

Some time prior to 135 million years ago, a pivitol adaptation took place in the plant world, happening around the time of the evolution of creepy-crawly insects. Plants evolved pollen-producing flowers as the primary reproductive mechanisms to attract insects to gather their pollen and sugar-loaded sap from plants, and therefore transfer this pollen to other flowers, which were then fertilised in the process.

Up until then, the conifers by contrast were pollinated by the wind. So once insects became more specialised and numerous, conifers were almost invariably also visited occasionally by insects in their search for pollen, and therefore also picked up the genes for flowers as an adaptation to the insects presence. Thus began, the evolution of the largest group of tree species that have evolved on this planet, the Angiosperms (hardwoods). It has been estimated, that this began around 135 million years ago, and since that time, they have evolved and adapted to the ever-changing cycles of our insect-world, our climate and environment, and now represent the majority of tree species.

Fossil records indicate that myrtle beech (*Nothofagus cunninghamii*) for example, was the first flowering plant to appear in Australia, and South America around 70 million years ago, and is a sign that the countries were still connected to Antarctica at that time, and that myrtle beech may have been the first in the *Nothofagus* family to evolve flowers. Other possible early families in the evolution of the Angiosperms could have included; *Alloxylon, Banksia, Cardwellea Dryandria, Grevillea, Hakea, Persoona* and *Stenocarpus* families as being early members. Many of these families are found across Australia, indicating that the heavily forested areas of the continent have been through a succession of very productive times.

More recent environmental changes

In the past 30 million years, following the southern continents separated from Antarctica, the Southern Ocean began circling the globe, and these changes also brought continuous evolution in forest cover for the southern continents - but more importantly, it began to redistribute the accumulated heat of the Pacific Ocean, allowing this heat to be drawn into the northern hemisphere via a Thermohaline Circulation (THC) current. This major change in climate which brought warming to the northern continents has resulted in 19 successive cycles of 100 000 years of glaciation interspersed by 10 000 years of warming over the last 2 million years. The massive fluctuations in ice cover has also effected sea levels to the extent that there have been times when the sea level has dropped 100 metres or more - low enough to separate the Indian and Pacific Oceans to the north of Australia - as evidenced by the separate evolution of some fish species - and the seas have risen to their present level only around 6 000 years ago, during this current warming cycle.

Considering that the sea, which covers 70% of the earth's surface, absorbs 60% of the heat delivered by the sun's rays falling on the sea's surface, compared to 5% when in the form of ice, it can soon be realised that the sea has a major control over the distribution of heat - and it therefore controls the earth's climate. Also, the position of the continents in the past 2 million years determines how this great mass of fluid manipulates our weather.

Also because Australia has not experienced glaciation for 300 million years, Australia now boasts around 5 300 tree species, compared to Europe which has 67 and the UK 47 native tree species. Australia has experienced a continuous growth in species diversity, and even today, these original *Cyanobacteria* are still with us, stabalising the desert sands of the 'red centre' and enriching them with nitrogen - as do many other species that share a place in the past and are still with us today. There is a symbiotic magic to the living plants of this planet.

So, from the beginning, the most important factor in evolution has been the inter-dependance between the organisms that created and nourished our diversity within plant families, and those that consumed them and relied on them for their existence. This includes the recycling of nutrients—something we still know far too little about.

Ferns at the bottom overlayed by blackwood (Acacia melanoxylon and mountain ash (Eucalyptus regnans).

The place of trees in our environment

The air we breathe today is rich in oxygen with only traces of carbon dioxide compared with prehistoric levels - although we are now seeing carbon dioxide rise again as we enter the latter stages of this 10 000 year cycle of a warm period. The earth would have warmed more, were it not for the oxygen plus the many aromatic cocktail of chemicals emitted by plants - in particular, trees. Viable bacteria can also be carried in air currents to a height of 12 km.

It turns out that the compounds released from trees modify the 'local' weather day by day and year after year. So, how we modify the tree population will also directly influence our local climate. So from whichever way we look at the current environmental challenge, planting more trees will have a positive influence on our climate. Without the earth's atmosphere, night temperatures would be -20^{o} C, rising to 47^{o} C during the day - so the presence of these elements in the air renders earth liveable. If you don't believe this, then try living in a desert.

If we examine the oxygen levels from the time the earth was formed, 4.6 billion years ago, then up until around 800 million years ago the oxygen levels were less than 1%. Then around 600 million years ago, and following the evolution of *Cyanobacteria,* the first multicellular organisms to use chlorophyll to photosynthesize carbon dioxide and water into sugars with oxygen as a by-product, that process started to have its effect, and the level of oxygen began to rise. Subsequent to, and following the evolution of photosynthetic plankton in the sea, the oxygen levels rose to around 2% and, according to Erik Spirling of Harvard University, the rising oxygen level was the trigger for the Cambrian explosion which around 240 million years ago enabled the evolution of the southern conifers - which we have mentioned earlier - and the subsequent explosion in the succession of plants, especially trees, which raised the oxygen levels to its current level of around 21%. It was not until the oxygen had arrived at these levels that humans could evolve and were able to survive and thrive.

However, oxygen is not the only factor in climate, because large rainforest trees transpire up to 1000 litres of water per day into the atmosphere, and therefore create precipitation within the forest, as well as a rain-shadow down-wind from where they grow.

In thinking about species evolution, I have little doubt that in the evolution of flowering plants 135 million years ago, initially there would have been some flowering plants which were pollinated by the wind, before insects and bees, in particular, which were fairly late on the evolution time scale, following many other polinators. Species that inhabit the periphery of each evolutionary phase, will face different selection pressures, including different temperatures and precipitation, for example. However, in order to survive they must adapt - and their inter-connectedness is the key, and we need to maxamise diversity and therefore enhance the sustainability of all life forms on this planet, because we don't know what the future will bring. And some of these genetic aborrations will have a better chance of adjusting to any future environmental changes. Therefore, our overall efforts need to focus on enhancing the genetic variations that are around each different population of species. And I trust this will become more evident when we come later in the discussion, to look at the extreme genetic variability in the mulga group of the acacia family - because, as the environment changes, this may present opportunity for any of these evolutionary mutations to dominate - given the right conditions.

This was the essence of the Gaia hypothesis proposed by James Lovelock in the early 1960s, but the human factor had not been studied as well as it has been today. Lovelock, however, started the discussion on the role of the biosphere in regulating the environment. However, despite all efforts, we still fail to bridge the gap between science and decision-making. It's time to really accelerate that process as climate change really starts to kick in.

If we look at the big picture in Australia, the reality is that in recent years we have been losing between 1.4 and 2 million hectares of forest every year. And that is probably a pretty small loss compared to many other countries around the world that I have experienced, or reviewed information from recently. Today, there is no doubt that trees play a vital role in our climate system - and this is besides the fact that plants have produced a large portion of the oxygen we breathe, and trees suck up huge quantities of rainwater that would otherwise flow back to the sea. This rainwater that is taken up by the tree through its roots, is eventually transpired into the air - as for example revealed in studies of the Amazon basin, that much of the rainfall is in effect, generated by the trees themselves.

There are other areas of environmental influence. As I mentioned in *Australian Rainforest Woods*, where updrafts within the rainforests lift and propel *Aerobacter* bacteria as well as many volatile plant chemicals, high above the canopy where they act as foci to seed humid air. and form clouds. So, trees create rain, both by their own expiration as well as condensing vapour already in the air.

We lose trees at our own peril!

A stand of mountain ash (Eucalyptus regnans) as discussed in Australian Rainforest Woods in the Otway Ranges of Victoria.

Acacia cambagei
gidyea

A solid canopy form of gidyea.

The deeply furrowed bark of gidyea.

Synonym: *Racosperma cambagei.*
Derivation: *Acacia* from the Greek *akakia* (to sharpen). Dioscorides used the word in the first century AD for the Egyptian thorn tree (*Acacia aranica*) which is prickly. *Cambagei* honours R. H. Cambage (1859–1928), a geologist with a wide knowledge of Australian plants. *A. cambage*i is a member of Group 14 identified by their flowers in globular beads on racemes and flat phyllodes.
Family: Mimosaceae contains 40–60 genera with about 3000 species in Australia, America, Africa, Asia, Melasia, the Pacific Islands and New Guinea. There are 17 genera with over 1100 species in Australia. Of these, 12 genera and around 48 species are found in rainforests. *Acacia* is the largest genus, containing more than 1000 species. They generally form a lower layer of trees or shrubs and are found in rainforests as well as open forests. It is a modern genus known to be around 25 million years old.
Other names: Gidyea may be spelled gidya or gidgee. It is sometimes known as stinking wattle. It's considered that gidyea is the closest to the Aboriginal pronunciation for the tree which they also call wangarrah.
Distribution: Gidyea occurs over a wide area mostly on cracking clay soils but also on lighter soils covering more than 1.5 million square kilometres in the drier areas of eastern Australia. Often the dominant species in dense or more open scrubs on sandy or loamy red earths, it occurs on open plains, along watercourses in association with coolabah (*Eucalyptus coolabah*), blackbutt (*E. pilularis)*, napunyah (*E. thozetiana*), or yellow jacket (*Corymbia bloxsomei*), and poplar box (*E. populnea*), around claypans and canegrass swamps on clay soils.
The tree: The tree grows to 10 m or more high, with a solid canopy and brownish deeply furrowed bark. It is generally irregular in shape, with only very occasional straight barrels (trunks). The leaves are 3–14 cm long, 4–10 mm broad, lanceolate, often curved, and with a small bent point at the tip. The silvery-grey leaf colour is readily distinguished and is due to a white scurfy covering. The leaves (phyllodes) are striated with many fine veins, one or two more prominent than the others and emit a strong rather offensive odour during humid or wet weather. The yellow flowers are in globular heads 3–4 mm in diameter which are borne on stalks about 4 mm long in clusters of 2–10, often on a short common stalk, in the leaf axils, each head composed of 12–20 minute individual flowers. Flowering in late autumn-spring. Pods are to 7 cm long, 8 mm broad, flattish, hairless and almost straight-edged. Believe it or not, gidyea knows when it's going to rain – reliably, three days before rain it commences to give off a pungent odour as the humidity rises, and fully deserves the name stinking wattle – an odour that is readily picked up from miles away.

The leaves (phyllodes) have fine veins, with one or two more prominent, and give off a rather offensive smell during humid or wet weather.

A gidyea platter turned by Ken Jackson.

Wood of *Acacia cambagei*

The wood is characterised by a creamy sapwood and dark brown or coffee-coloured heartwood, which is hard and durable. A paler wood is found in northern New South Wales, possibly due to different soil types. Ring gidyea is a special fiddleback wood where the usual straight fibres run in tight waves. This feature is highly sought after and is selected for in the manufacture of ornaments. The wood is extremely hard being one of the hardest and heaviest timbers in the world with an air dried density at 12% moisture of 1345 kg/m^3**.** This wood is tough on any woodworking or turning tool and is almost impossible to plane; it usually has to be cut as close to size as possible and then hand-worked for finish. It is also inclined to chip, especially with ringed or figured wood. Shrinkage is 2.3% tangentially and 1.5% radially, so it is incredibly stable. Fixing characteristics are relatively unknown.

Care should be taken when working with gidyea because the sawdust can cause dermatitis, and for some, even contact with the tree causes gidyae itch, which involves the skin swelling with some eruption on exposed skin. The sawdust resembles coffee grounds.

Traditionally it has been used for fence posts and other rough work around the properties on which it grows – principally because it's there and it lasts a long time – although good sound lengths are often hard to obtain. Gidyea is favoured for whip handles, walking sticks, the sounding blocks for xylophones and music boxes, and is turned into many items, particularly ring gidgea items, which are much prized. The timber can be polished to a very high lustre.

Gidyea is a good fuel, burning to leave a small residue of white ash (90% lime). In the era of steam-driven engines, the heat generated by gidyea caused the fire bars to buckle, so it was always mixed with other timbers when used by engine drivers.

See macrophotographs of Acacia cambagei *on page 183.*

In times of drought stock will eat the leaves of gidyea if the tree is cut down or lopped, but large quantities may cause impaction of the rumen and intestines because of its low protein content, and the inability of the fodder to be broken down by rumen microflora, so it needs to complement other sources of fodder. Both the timber and bark contain large amounts of calcium oxalate and the white ash can therefore be used to clear impurities from water which can then be used for drinking and washing.

Aboriginal tribes in the sandhill area of the Channel Country blended gidyea ash, and sandhill wattle ash (*Acacia ligulata*) with the dried leaves and stem of pituri (*Duboisia hopwoodii*) which they chewed to dull hunger pain or to produce a trance-like state. It was traded widely and they also used it in waterholes to drug emus to make them easier to catch. Pituri has a very high nicotine content and the alkaline ash releases the nicotine, enhancing its uptake by the body when chewed, so its not surprising that Aboriginal women used to smoke the leaves and experience a sensation when they would 'see music'. Aboriginals also used gidyea for spears and boomerangs, partly because of the abundance of gidyea, but chiefly because of the beauty and durability of the timber. It's destined to become more widely recognised for high-value musical instruments and small furniture.

These figured gidyea turnings by Ken Jackson are rare specimens of figured gidyea – with ripple as well as bird's-eye figure.

Acacia cana
boree

Rather gnarled examples of boree.

Synonyms: *Racosperma canum, Acacia eremea*.

Derivation: *Acacia* from the Greek *akakia* (to sharpen). Dioscorides used the word in the first century AD for the Egyptian thorn tree (*Acacia aranica*) which is prickly. *Cana* means hoary and refers to the overall appearance of the stem and tree as very grey and dark.

Family: Mimosaceae contains 40–60 genera with about 3000 species in Australia, America, Africa, Asia, Melasia, the Pacific Islands and New Guinea. There are 17 genera with over 1100 species in Australia. Of these, 12 genera and around 48 species are found in rainforests. *Acacia* is the largest genus, containing more than 1000 species. They generally form a lower layer of trees or shrubs and are found in rainforests as well as open forests. It is a modern genus known to be around 25 million years old.

Other names: Cabbage-tree wattle and broad-leaved nealie.

Distribution: It grows in the western plains of New South Wales and central Queensland on mostly sandy soils and gibber plains. It often grows in association with mulga (*Acacia aneura*).

The tree: It is usually a dense shrub or tree which spreads as it grows to 6 m in height. It is often quite gnarled and deformed in shape and has dark grey bark. It has quite a long lifespan but doesn't produce a lot of seed. It does however produce bright yellow or golden flowers in Spring. It is a very economic tree with its long spindly branches. The phyllodes (leaves) are covered in fine silver hairs, and are thin and long. The seed pods are slightly curved but also thin and covered by fine hairs.

The seeds, roots and gum, produced by a basal gland are Aboriginal bush tucker and are very nutritious food sources. The seeds have a chocolate-like taste and the roots were roasted before being eaten. The gum was collected and either eaten, or dissolved in water as a flavoured drink.

Dark grey bark.

The thin, long phyllodes (leaves) are covered in fine silver hairs.

A vase turned from an old branch leaving the sapwood intact.

See macrophotographs of Acacia cana *on page 184.*

Wood of *Acacia cana*

The heartwood is dark brown and the sapwood is lighter in colour. The wood is rated as very hard with an air dry density at 12% moisture of 1150 kg/m^3. Not much is known about this wood as it has never been put under test, however with such a high density it surely has some uses and I would expect that from the interwoven characteristics of the bark, the wood grain may be interlocked, giving it some strength.

Acacia catenulata
bendee

Bendee is a tall slender tree.

Synonym: *Racosperma catenulatum*.

Derivation: *Acacia* from the Greek *akakia* (to sharpen). Dioscorides used the word in the first century AD for the Egyptian thorn tree (*Acacia aranica*) which is prickly. *Catenuata* (chain-like) referring to the constricted seed pods. It is a member of Group 18 for its flowers on spikes and has flat, wide phyllodes.

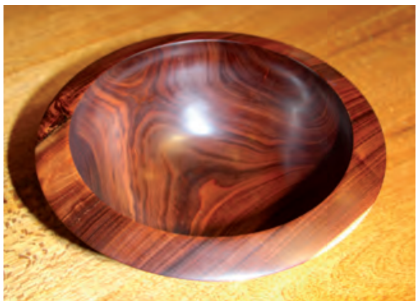
Family: Mimosaceae contains 40–60 genera with about 3000 species in Australia, America, Africa, Asia, Melasia, the Pacific Islands and New Guinea. There are 17 genera with over 1100 species in Australia. Of these, 12 genera and around 48 species are found in rainforests. *Acacia* is the largest genus, containing more than 1000 species. They generally form a lower layer of trees or shrubs and are found in rainforests as well as open forests. It is a modern genus known to be around 25 million years old.

Distribution: Bendee grows in pure stands on shallow soils derived from deeply weathered sandstone and is found from east of Surat in Queensland to the Grey Ranges and to the Belyando River basin. Prior to its recognition as a distinct species, bendee had been the source of some confusion with other acacias, especially Kemp's or wanderrie wattle (*Acacia kempeana*) and slender or Townsville wattle (*A. leptostachya*) which, though usually a shrub, may grow to 5 m. In the Grey Range it's found in the middle of a calcareous sequence on deeply weathered sediments. Bendee grows in association with eucalypt species in the weathered stony ridges from north-west of Augathella to St George, south of Roma. In the northern part of its range it sometimes adjoins stands of lancewood (*A. shirleyi*), although the two species do not mix. The photograph (left) was taken in the northern area of its range on a sandstone ridge beside a dense stand of lancewood. The ground flora in country associated with bendee is usually sparse and of little grazing value although graziers report that it is a fodder tree.

The tree: Bendee is a slender tree growing to 15 m tall. The trunk is deeply fluted and dark in colour, and the branches are often short and horizontal, with angular 'scruffy' branchlets covered with scattered hairs. The dull green-grey leaves (phyllodes) are tough and pliable, straight or curved, and are covered with silvery hairs. The bright yellow flowers form in a rod 1–3 cm long in the upper branches. The brown seed pods are flat and thin, up to 8 cm long, somewhat wrinkled longitudinally, and constricted between the seeds. Flowers appear throughout the year whenever soil moisture is high.

A dark, fluted trunk.

The dull green-grey leaves (phyllodes) are straight or curved, and covered with silvery hairs.



A turned bendee bowl.

See macrophotograph of Acacia catenulata *on page 184.*

Wood of *Acacia catenluata*

The wood is reddish-brown with a contrasting narrow band of sapwood. It has a straight grain and fine texture. It's rated as very hard with an air dry density at 12% moisture of 1200 kg/m^3. This timber is considered as worth promoting for commercial use. The wood is very good for turning and is easy to finish. It is another of the acacia species which when polished has a translucent surface characteristic with the grain becoming silky. The tree has value as a fodder tree and the wood has been used for fencing material, wood turning and in the production of bush furniture.

Acacia microsperma
bowyakka

A mature bowyakka.

Synonym: *Racosperma microspermum.*

Derivation: *Acacia* from the Greek *akakia* (to sharpen). Dioscorides used the word in the first century AD for the Egyptian thorn tree (*Acacia aranica*) which is prickly. *Microsperma* from the Greek *micra* (small) and *sperma* (seeds). *A. microsperma* is a member of Group 8 identified by their flowers in globular heads on simple stalks, and flat, wide phyllodes.

Family: Mimosaceae contains 40–60 genera with about 3000 species in Australia, America, Africa, Asia, Melasia, the Pacific Islands and New Guinea. There are 17 genera with over 1100 species in Australia. Of these, 12 genera and around 48 species are found in rainforests. *Acacia* is the largest genus, containing more than 1000 species. They generally form a lower layer of trees or shrubs and are found in rainforests as well as open forests. It is a modern genus known to be around 25 million years old.

Other name: Bowyakka wattle.

Distribution: The species is scattered in southern Queensland growing in sandy clay loams usually over weathered rock, and is found from Adavale stretching south-east to Talwood near the New South Wales border. It is often found in dense stands along or with gidyea (*Acacia cambagei*) and/or napunyah (*Eucalyptus thozetiana*).

The tree: A slender tree to 10 m high. The bark is hard, fissured and dark grey with lighter patches. It has a leafy, rounded canopy. The branches are often scurfy and the leaves (phyllodes) are fairly straight, mostly 7–14 cm long and 1.5–4 mm wide. They are green to grey-green, with numerous closely parallel, obscure nerves. The 1–4-headed racemes are sometimes reduced to clusters of heads of 20–30 golden flowers. The pods are straight, to 6 cm long, 2–3 mm wide. The brown seeds are narrowly elliptic, 2.5–4 mm long, with an aril that is fleshy and repeatedly folded. Cattle and sheep will eat the leaves readily in times of drought, however it should only be a small part of their diet to avoid rumen impaction.

Bowyakka trunk.

Narrow, grey-green leaves.

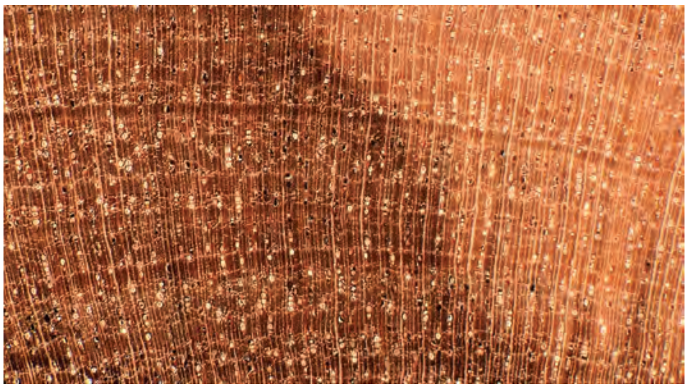
See macrophotographs of Acacia microsperma *on page 186.*

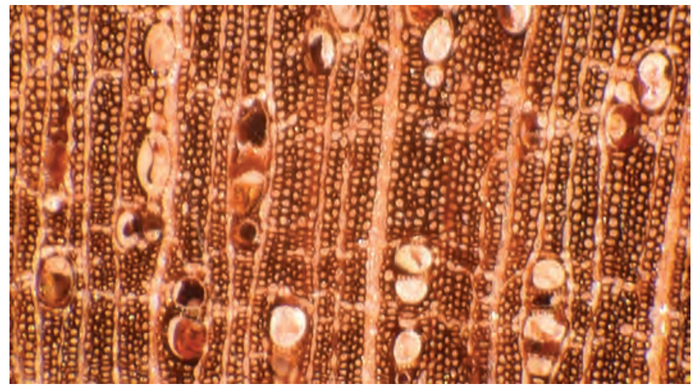
Wood of *Acacia microsperma*

The heartwood is a rich red-brown with a fine texture. The wood is hard with an air dry density at 12% moisture of 1320 kg/m^3. Bowyakka has been used for posts and rails. There is not much information available on this wood, however it is very stable and despite its hardness planes reasonably easily and finishes with a beautiful surface, revealing the translucent sheen of many of the high density acacias and has a pleasant grain. It should be ideal for small turnings and small furnishings.

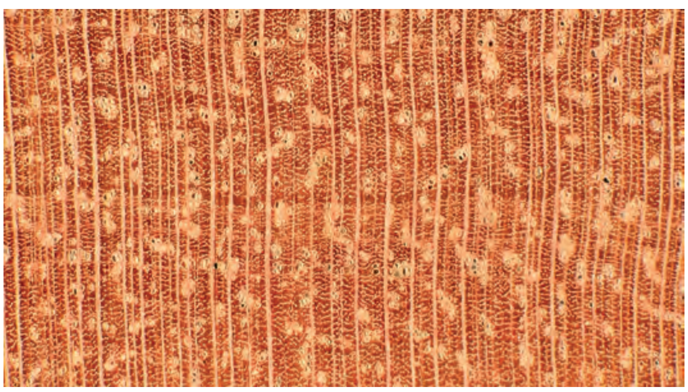
Subdivision Angiospermae

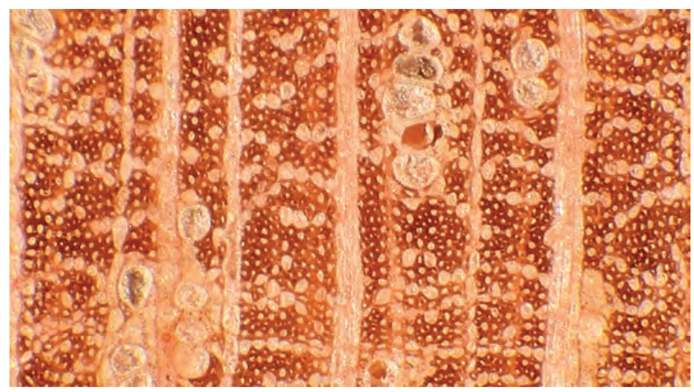
Family Apocynaceae *Alstonia constricta* quinine bush *Description page 43.*



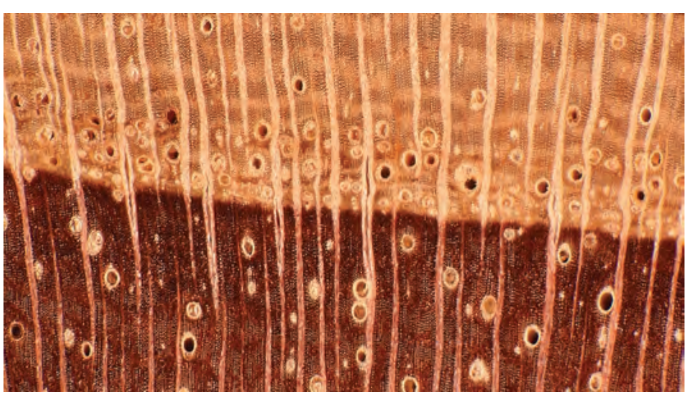


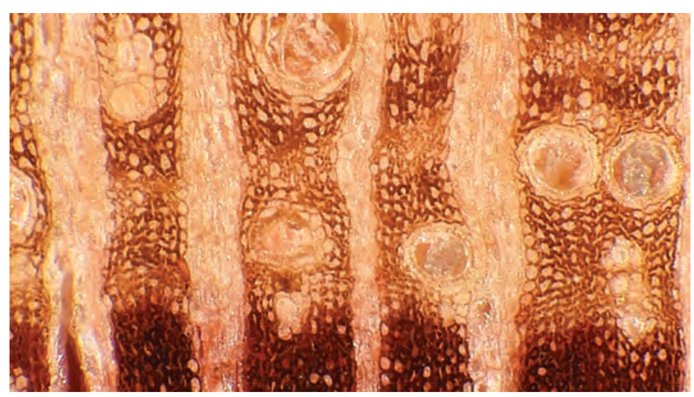
Family Boraginaceae *Ehretia membranifolia* peach bush *Description page 79.*



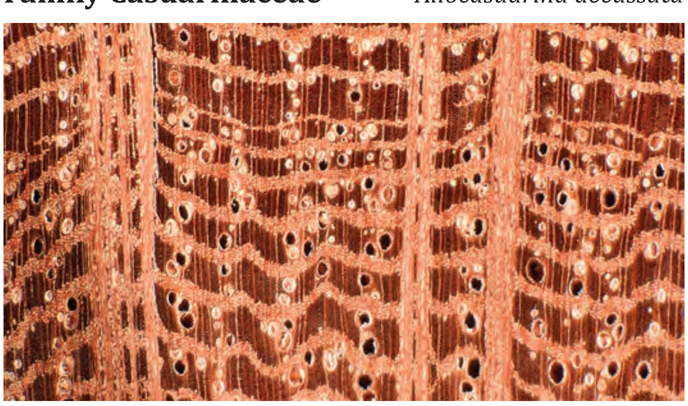


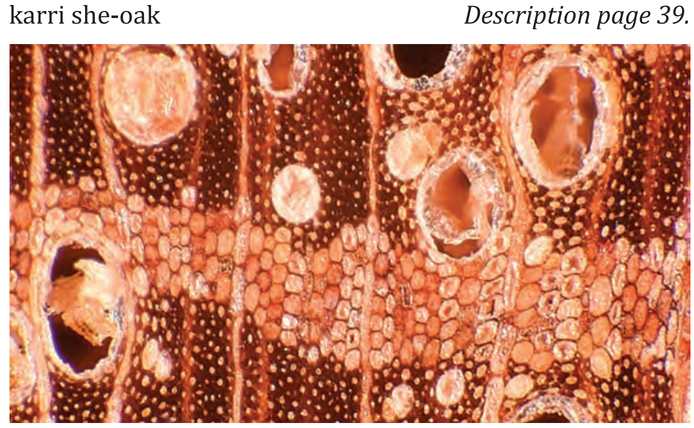
Family Capparaceae *Capparis mitchellii* wild orange *Description page 59.*





Family Casuarinaceae *Allocasuarina decussata* karri she-oak *Description page 39.*



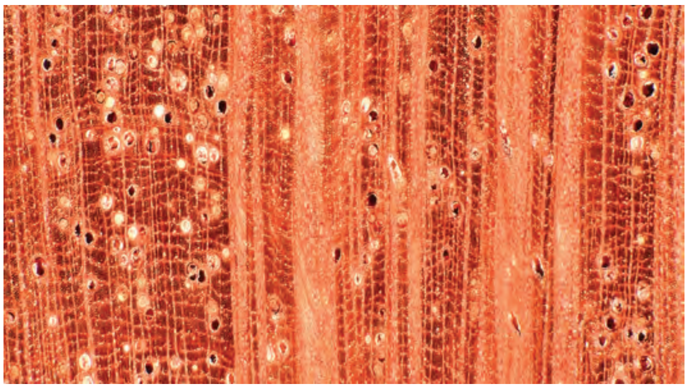


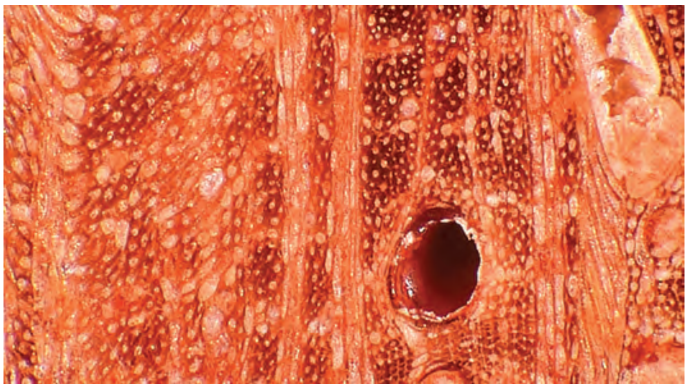
Magnification x 15.

Magnification x 90.

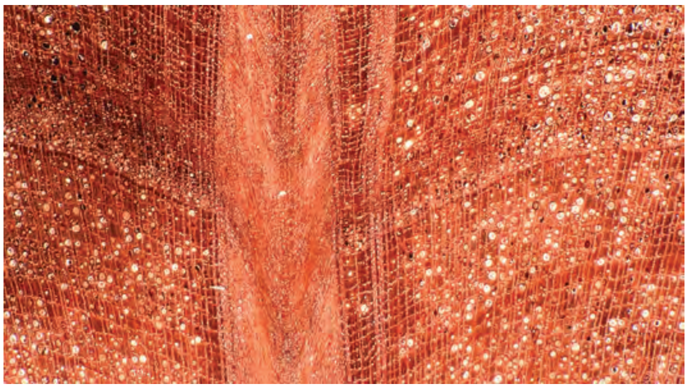
Subdivision Angiospermae

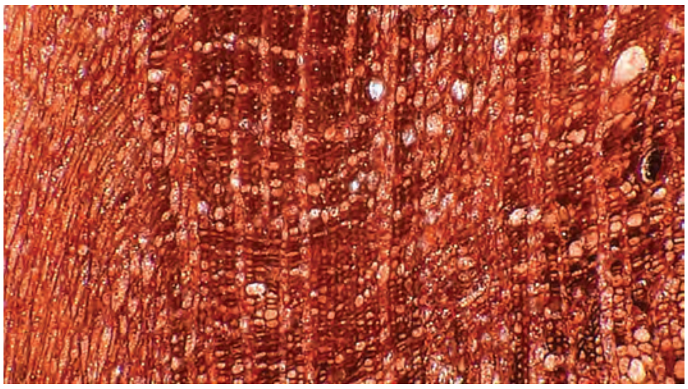
Family Casuarinaceae *Allocasuarina fraseriana* Western Australian sheoak *Description page 40.*



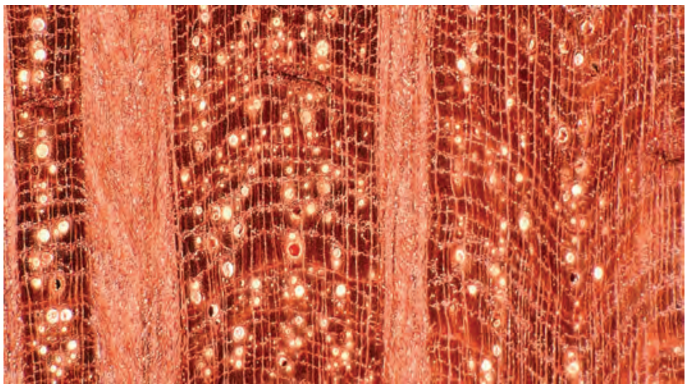


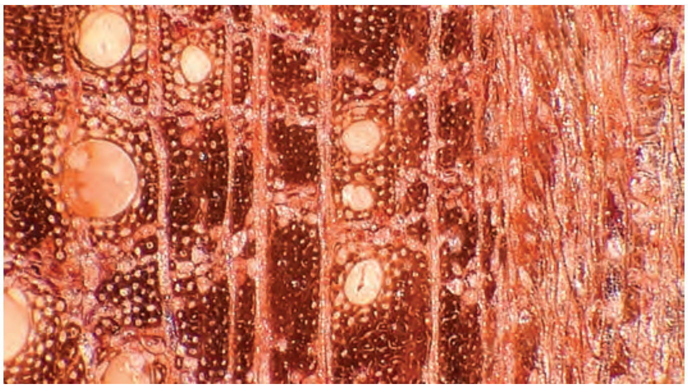
Family Casuarinaceae *Allocasuarina inophloia* hairy oak *Description page 41.*



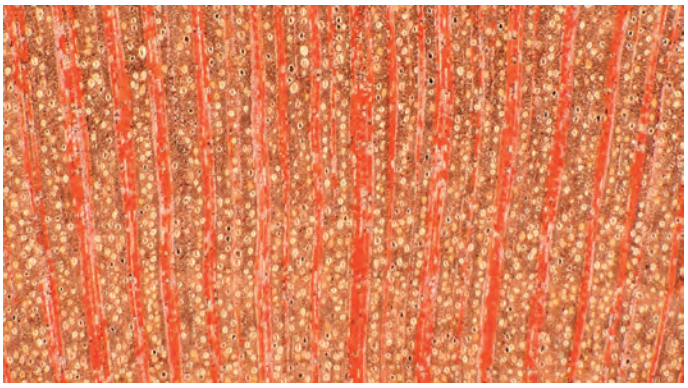


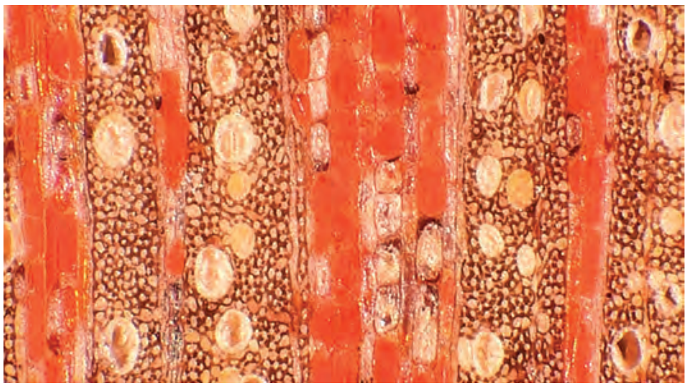
Family Casuarinaceae *Allocasuarina luehmannii* buloke *Description page 42.*





Family Celastraceae *Denhamia cunninghamii* yellowberry bush *Description page 76.*





Magnification x 15.

Magnification x 90.