RAINFOREST PLANT ADAPTATIONS

Special characteristics

Some rainforest trees have special characteristics which are signs of adaptation to their environment. These are generally to do with obtaining nutrient, obtaining maximum sunlight, encouraging water run-off from leaves or avoiding being eaten by insects or animals.

Root and trunk characteristics

Rainforest plants have shallow root systems which enable them to obtain moisture and tap into the rich supply of nutrients available from rotting plant and animal materials in the upper soil layer.

Buttressing is a common feature of the larger rainforest trees. Buttresses are flanges at the lower part of the trunk. Buttresses provide anchorage for large trees in shallow rainforest soils and that help obtain oxygen from the air to compensate for a lack of it in the soil, due to the decay of leaf litter. A good example of buttressing is seen on the strangler figs at 87 L

Shallow roots

Buttresses

Birdsnest fern

Large, waxy leaf with drip tip

Distinctive leaves

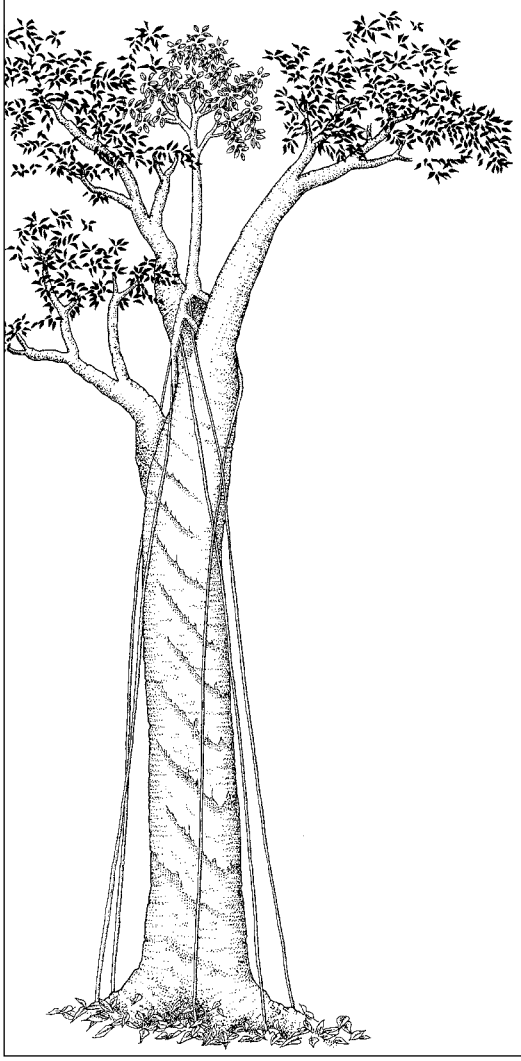
The leaves of rainforest trees have special adaptations and are noticeably different from eucalyptus leaves. Most of the leaves are soft, with little fibrous tissue, and they face horizontally towards the sun to capture more light for photosynthesis. Many rainforest plant leaves have waxy surfaces and "drip tips" where each leaf apex is extended or pointed. These features quickly shed excess water so that the process of photosynthesis is not affected and fungal growth is reduced. The large, waxy leaves of the birdsnest fern funnels water directly into the root system. Maiden's blush and white bolly gum both have large waxy leaves with drip tips.

Compare these adaptations with those of leathery, narrow eucalypt leaves which hang down vertically to reduce moisture loss through evaporation.

Sun seeking strategies

1. Strangler fig

Strangler figs are adapted to use other trees for support in reaching sunlight for photosynthesis. They are the largest trees in Sea Acres National Park, growing taller and broader than other trees. They often emerge above the canopy layer and are usually covered in vines, birdsnest ferns and elkhorns and other epiphytic plants. They provide food and shelter for a variety of birds and animals, including pigeons, bowerbirds, catbirds, sugar gliders and diamond pythons.



Life cycle of the strangler fig

◄ Stage 1

Fruit-eating birds, such as pigeons, are attracted to the edible, succulent fruit and drop the seed in their faeces into a crevice in another tree. Here, in the moist rainforest conditions, seed germination and growth is aided by decaying leaf litter. Aerial roots of the Strangler Fig grow slowly to the ground.

Stage 2 ►

The roots enclose the trunk of the support tree and eventually strangle and kill it. What appears to be the trunk of a fig tree is really its aerial roots. These usually become buttressed, providing structural support for the tree. Strangler Figs may grow for hundreds of years.

New strangler fig growing from host tree crevice

Strangler fig roots almost enclosing host tree trunk

2. Epiphytes

epi = upon, phyte = plant,
i.e. plants which grow on other plants.

Epiphytes can be seen throughout the rainforest. These plants grow on other plants for support as a way of getting a share of the light and rain which falls through the canopy. Most epiphytes grow on rough-barked trees, where it is easier for them to hold on. They do not use living tissue of their support plant for nutrient, but instead obtain their nutrients by collecting falling leaves and moisture. Caught debris forms a growing medium for the root system of the plant. Examples of epiphytes are the birdsnest fern, elkhorn and king orchid.

Elkhorn fern

Water vine leaves

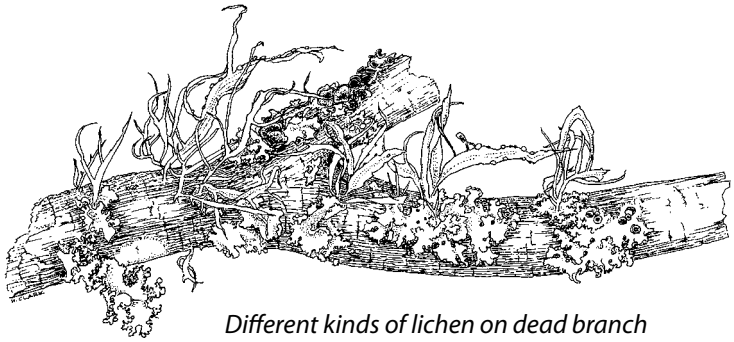
Vine stems and birdsnest fern both using a tree for support.

3. Vines and lianas

Vines and lianas grow from the ground and use other plants at ground level for anchorage as they climb into the forest canopy towards the light. Their leaves and flowers grow among the highest branches and can make up to 40% of the canopy layer. Vines are often found in clearings, along roads and beside rivers, where there is more sunlight than under the forest canopy. Large woody lianas are found in subtropical and dry rainforests while wiry vines are common in warm temperate and cool temperate rainforests.

Moss

Lichen



Different kinds of lichen on dead branch

Shade lovers of the forest floor

Mosses and lichens

Mosses and lichens are well adapted to life in moist shady places. They have adapted to photosynthesize under extremely low light conditions. They are both usually found growing on tree trunks, and logs, and they both use these other plants to help them survive, making them epiphytes.

Most mosses either have short upright stems and grow close together forming extensive cushions, or have creeping, branching stems which form mats.

Lichen is a particularly interesting epiphyte as it is made up of algae and fungi, working together to survive. Algae gives lichen its green appearance and manufactures food. Fungi absorb water, which algae use to manufacture the food. It looks pale green and flaky and can be found growing mainly on tree trunks.

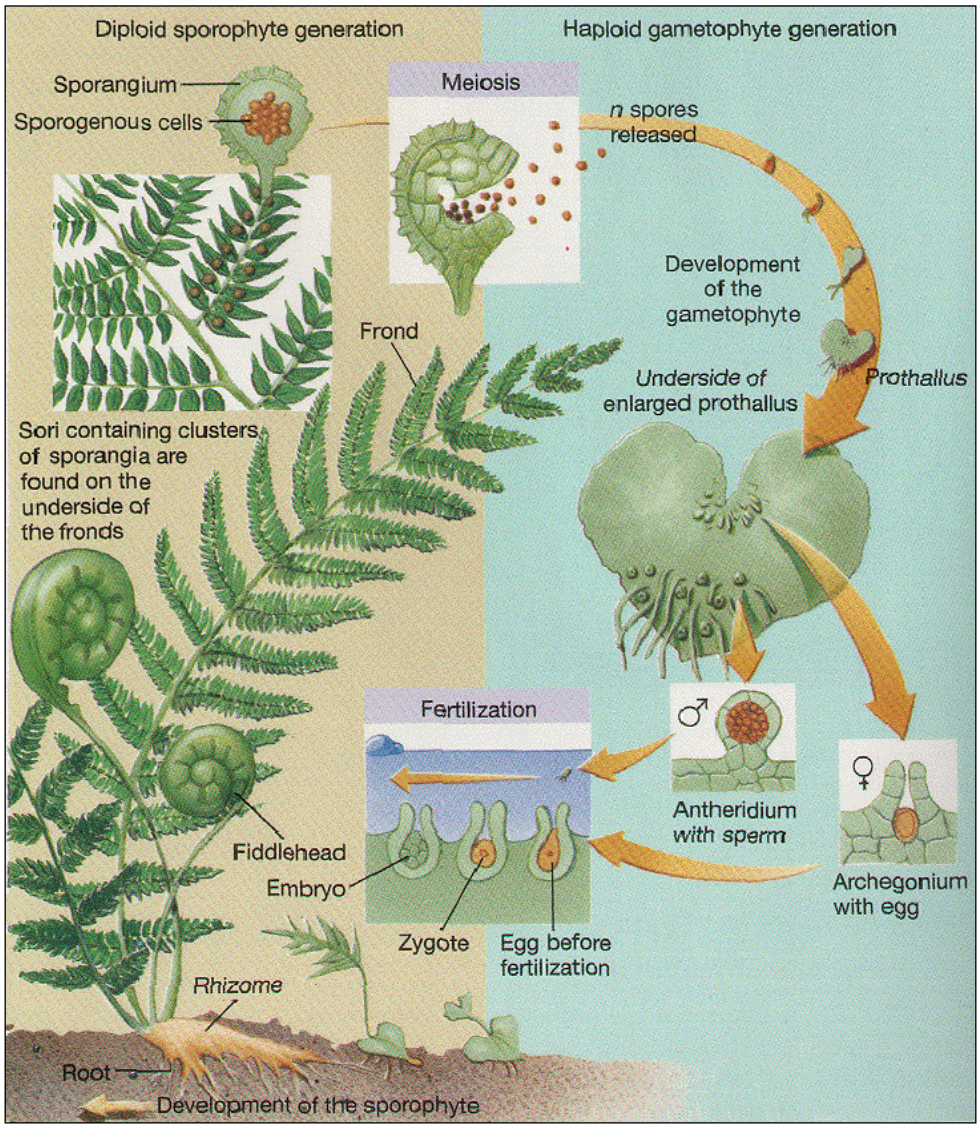
Ferns in the rainforest

A great variety of ferns grow in moist, shady places at Sea Acres. Two thirds of the fern species in NSW may be found here. Some, such as ribbon fern, birdsnest fern and elkhorn grow as epiphytes on trees. Others, such as rasp fern and shield fern grow in the soil.

Life cycle of a fern

In order to reproduce, ferns produce spores. These are minute and are produced in millions, forming a brown, powder-like rain, which would leave a shadow on a piece of paper. Spores are produced on the under surface of the fern fronds, a different pattern for each species of fern. Some fronds are fertile and others are not. In some ferns, fertile fronds are a different shape; e.g. in the felt fern, sterile fronds are rhomboidal (diamond shaped) and fertile fronds are elongated.

Ferns need water to reproduce. In wet conditions, spores may germinate from a small green leaf-like structure called the "prothallus". The male and female parts are formed on the prothallus. Male gametes have a head and a tail. They need water to swim across the surface of the prothallus to fertilise the female gametes (ova). The adult fern then grows out of the prothallus. Ferns like the shady conditions on the forest floor, provided there is enough moisture. Prothalli are most likely to be found on wet rocks near the creek.



Some ground ferns found at Sea Acres


Shield fern


Rough maidenhair fern


Felt fern


Rasp fern