

Forest Education Foundation

# National Forest Learning Centre

The stories behind our trees

## Eucalypts and Fire



**Fire has been a constant visitor** to Tasmanian forests for millions of years. It has shaped the evolution of many plant species and communities. In fact, many species are not only adapted to fire, but actually have features that help to promote it.



Fire is an essential part of the life cycle of many plant communities, including dry eucalypt forests and wet eucalypt forests. Fire behaves differently, however, in each of these systems.

A key difference between eucalypts and rainforest trees is that eucalypts are adapted to, and take advantage of major, widespread disturbances of the forest canopy, especially those caused by fire.

Individual trees of different species can withstand the effects of fire to varying degrees, but all eucalypt forest types depend on it to some extent for regeneration. Eucalypt seed release is triggered by fire, when tough, woody capsules empty their contents onto a nutrient-rich ash seedbed from which all the understorey competition for light, water and nutrients has been removed. Browsing animals are driven out for a time, and the heat-treatment of soil reduces the numbers of plant-eating insects and soil organisms during the short but crucial early growth period.

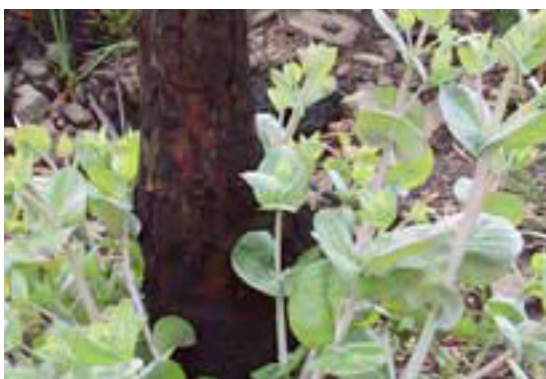
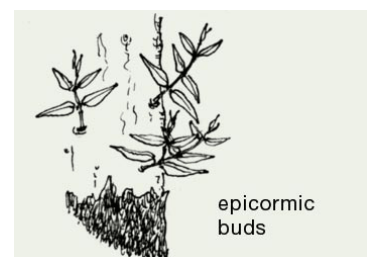
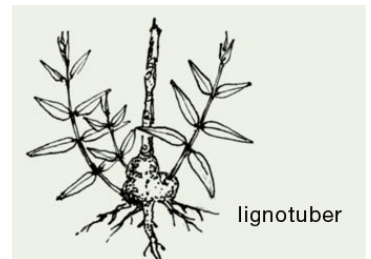


## Adaptations for survival

Whether mature trees are killed or only have their leaves burnt, fire disturbance lets in light and creates spaces for new growth. Fires usually occur in late summer, so seeds take advantage of warm soils and Tasmania's seasonal pattern of autumn and winter rains, to germinate well and get a good growth start.

Adaptations for survival in individual eucalypts, especially those of drier forests such as the peppermints and white gums, relate to features that allow them to live through fire. These include:

- **lignotubers** - swellings that develop at ground level in young eucalypts and where food is stored, allowing new growth to sprout if the tree is damaged. This can be seen even in young seedlings. Lignotubers contain a mass of hidden buds. When the seedling, sapling or tree is damaged by fire or grazing, new shoots rapidly grow from the lignotubers enabling the plant to survive.
- **an extensive root system** which is made even more efficient by mycorrhizal associations, a partnership between tree roots and a fungus, which enhances the tree's absorption of water and nutrients, especially phosphorus.
- **epicormic buds** on the tree's branches and trunk which sprout when triggered by stress, such as wildfire, which can severely damage the crown. These buds, in the outer sapwood, are protected from fire damage by the tree's bark. They quickly sprout if a eucalypt loses its crown. The new shoots (epicormic shoots) produce green foliage that enables the tree to survive.
- **Hard woody capsules** that protect seeds high in the canopy where heat may be intense but lasts for a very short time as the oil-rich leaves burn rapidly.





**Some eucalypt species** such as brown top stringy bark have developed thick, fibrous bark which acts as insulation, allowing the tree to survive moderate fires.



Eucalypts of the wet forest, such as white top stringy bark and swamp gum, do not develop lignotubers but rather put their energy into rapid vertical growth to overtop any developing understorey. It is lack of light that is more of a threat to the eucalypts' survival than regular fires in a wetter environment. The eucalypts of the wet forest also tend to have fewer epicormic buds. This may be a consequence of the extreme heat of fires when wet eucalypt forests burn. This heat usually kills most of the trees, rendering epicormic buds useless. Eucalypts of the wet forest also produce large amounts of seed, most of which are released within a few days of wildfire.

Bark shedding by many species of eucalypt may be a characteristic that helps to promote and extend fires. Shed eucalypt bark is low in nutrient and breaks down very slowly. This provides a significant fuel load for wildfire when it occurs.



The bark of the swamp gum hangs in long ribbons from the branches of the tree. It has been suggested that this is a mechanism to promote the spread of wildfire as these burning firebrands can be carried large distances on the wind associated with wildfire spread in wet eucalypt forests.

**Wet eucalypt understorey** species such as musk, dogwood and blanket bush recolonise burnt forest by spreading seed on the wind from patches of unburnt forest which may be kilometres away. Some low shrubby species such as pinkberry have hard seeds or soil-stored seed which can survive fires.



**Contact:**