

The value of understorey vegetation

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Introduction

Winter is the time of the year when many parts of the Victorian bush are flooded with various shades of yellow from the blooms of wattles. The white flowers of *Cassinia* (Dogwood) are characteristic of the summer period while in spring, the bush is often a mosaic of different colours. It is the various types of understorey plants that help create these familiar impressions of different seasons in the Victorian landscape.

This Note gives a general description of the important role understorey plants play in the natural ecosystem as well as its value to farmers and other private landholders. In addition, the decline of understorey in rural environments is discussed and various methods of protecting and restoring the understorey layer are mentioned.

What is understorey vegetation?

The understorey includes the herbs, grasses, shrubs, mosses, lichens and small trees that occupy the vegetation layers (strata) below the canopy of taller trees. Some habitats have mixtures of these plants, whilst others, such as grassy woodlands, have mostly grasses and no shrubs. There can be an enormous difference in the diversity of species between the understorey and overstorey layers. Valley grassy forests of northeast Victoria may have four species of eucalypts and between 70 to 100 species of plants in the understorey.¹ Thus, understorey vegetation represents over 90% of the biodiversity of the vegetation and a large proportion of the ecosystem.

The disappearing layer

Because they are an obvious feature on the landscape, declines of eucalypts in rural areas of Victoria have received more attention than the loss of any other type of vegetation. Aborigines, followed by Europeans, recognized the value of understorey vegetation as sources of medicinal plants, food, building materials and shelter. This view changed as environments were modified and the 'scrub' stood in the way of change. Vast tracts of vegetation and understorey were cleared in order to establish pastures of introduced grasses. Understoreys had to compete with newly introduced weeds, survive frequent fires, chemicals and withstand the effects of new kinds of hard-hoofed domestic, and feral animals. These changes

also had their effects on the pollinators and animal dispersers of understorey plants. It is not surprising that many bushland remnants on private land that are unfenced have lost their understorey and that roadsides and similar refuges are the remaining haunts of many understorey species.

As farming perspectives and management have shifted to recognise the need for environmentally sustainable development (ESD), and farm enterprises diversified, it is time to recognise the potential role that understorey vegetation can have in contributing to ESD, healthier environments and producer options.



Understorey plants represent some 90% of the plant biodiversity of native vegetation. Their impact on wildlife species is similar in magnitude.

The values of understorey vegetation

Understorey vegetation plays a very important role in maintaining a balance in natural ecosystems. Its value to land managers is often underestimated, as it can contribute to economic, social and environmental goals, both in the short and long term.

Many of the symptoms of dieback, such as leaf loss, increased numbers of aggressive communal birds, such as Noisy Miners, and large populations of pest insects, can be traced to loss of understorey as one potential cause.

Natural pest control

The understorey layer provides habitat for predators which can assist in natural pest control. For example, more than ten wasp species parasitise the larvae of leaf-eating beetles

such as Christmas Beetles. The adult wasps feed on nectar and protein from native trees and shrubs, such as Burgan and wattles. Lack of understorey species has decreased nectar sources and consequently the wasps cannot survive in these cleared areas. The larvae and adults of other beetles and flies also feed on Christmas Beetle grubs but require shelter by day in leaf and bark litter and do not thrive in open cleared pastures.² The understorey layer needs to be composed of a sufficient range of species to allow many different insects to complete all stages of their life cycle: egg, larva, pupa, adult. The reduction of understorey has also reduced the number of insectivorous birds that feed on various insect pests. Thornbills eat small beetles, ants and caterpillars, as do robins and fairy-wrens. Cuckoos are well known predators of hairy caterpillars, including stinging cup-moth larvae and even sawfly larvae. Mammals, such as bandicoots and gliders, also feed on various insects and their larvae.³ Studies in the Mallee have shown that wattles along fencelines harbour predators that significantly reduce pests in wheat crops. A study of Noisy Miners, native birds that band together and exclude small insectivorous birds, indicates that Miner colonies are smaller where there is understorey vegetation present.

Wildlife habitat

Trees provide simple ecosystems supporting relatively few species. Understorey plants add a large variety and diversity of habitats for many of our wildlife species, such as gliders, lizards, small bush birds and invertebrates. Fairy-wrens build their nests in prickly dense shrubs. After the young wrens leave the nest, they spend another week hiding in the dense understorey. Some lizards prey on the insects that live in understorey vegetation. Frogs often hide in leaf debris or on fern fronds whilst tadpoles avoid predators beneath bankside vegetation. Honeyeaters feed on nectar from flowers of understorey species, as do many types of insects such as butterflies, wasps and ants. Even the much maligned bracken provides valuable habitat for birds such as Brown Thornbill and White-browed Scrubwren. Powerful Owls roost by day in tall dense understorey shrubs such as Blackwood *Acacia melanoxylon*. Several thornbill species can co-exist in the same location because they have different feeding patterns. Brown Thornbills feed largely in the understorey whilst related species utilise the tree canopy or ground layer.

Protecting and enriching the soil

The understorey layer is vitally important to the stability of the soil surface. The presence of an understorey, along with leaf debris, softens the impact of rainfall and reduces runoff both by acting as a physical barrier to surface water and by contributing to soil porosity. Understorey plants are a source of organic material that sustains living organisms in the soil. They also act as a thermal insulator and protect the soil from extremes of heat and cold as well as from strong winds.⁴



Trees alone are often insufficient to control streambank erosion

The understorey often includes species, such as wattles and casuarinas, that contribute to soil fertility. These plants support microorganisms, in nodules on their roots, which fix nitrogen from air in the soil, converting it to a form that can be taken up by other plants. Through leaf fall and death of the plants, the nutrients are returned to the soil. The addition of organic material to the soil in the form of humus also provides for a healthier soil.⁵

Biodiversity and genetic resources

Conservation of biological diversity is a foundation of ecologically sustainable development.⁶ Biodiversity enables us to undertake selective breeding programs, for example, to create new medicines and crops. It enables plants and animals to develop natural resistance to disease and to survive environmental change. Biodiversity increases our options - to find solutions to management problems such as increased salinity, to look for new agricultural products and to fight increasing resistance to traditional medicines by infectious diseases. Biodiversity is directly reliant on maintaining the genetic resources of the whole ecosystem and the processes which sustain it, including understorey plants.

The retention of vegetation is imperative if we are to preserve our flora and fauna and attempt to slow down or even halt the processes of human-induced extinction. For a diversity of animals there must be a diversity of vegetation - different foliage types, qualities of light, a range of heights and sizes. A variety of plant forms and species must be present in order that an ecosystem can be sustained. Maintaining the genetic species diversity provides a buffer against climate change, allowing evolution and adaptation to a more rapidly changing environment.

Understorey plants may provide valuable genetic resources that could be used in scientific and technological research and that have the potential to be developed into commercial products such as new crops.

Shade and shelter for stock and crops

Native vegetation can be used to provide shelter to protect stock and crops from exposure to extreme weather. Although most landholders plant trees, more benefits come

from using a variety of vegetation including shrubs and groundcovers. Studies by CSIRO have shown that shelter supplied by vegetation can reduce lambing losses by up to 50% and death by exposure of newly shorn sheep.⁷ Studies have also shown that access to shelter can increase wool production, milk production and liveweight gains. A five year study at Armidale, New South Wales, showed that sheep on sheltered plots produced 35% more wool and 6kg more liveweight than those without shelter.⁷ Many studies have shown that crop yield increases when wind breaks are established. Shrubs should be included in shelterbelts to avoid gaps beneath trees that may cause a large wind tunnel effect (see *Note 20 'Shelterbelts and Wildlife'*).

Other values

As sources of honey and pollen, the understorey plants are often vital to beekeepers. Low trees and shrubs can be important sources of emergency feed for stock. Be aware that some species are poisonous. The potential value of various understorey species as fodder feed has yet to be properly researched. The beauty of understorey species, particularly when in flower, can add to the landscape appeal of the area for social activities, such as picnics, as well as providing a more pleasant working environment. This in turn can be reflected in improved land values and increased tourism⁵. Understorey plants, such as Blackwood *Acacia melanoxylon*, are valued for their timber qualities. They have potential in horticulture because many are attractive, to humans and wildlife, and are at eye level. In cities, shrubs avoid the problems associated with trees, such as branch fall and interference with powerlines.

What you can do to retain or re-establish these values

The re-establishment of the understorey vegetation is an important step in the reinstatement of a healthy ecosystem. Improved management or re-establishment of understorey species may help entice the return of wildlife by providing food, shelter and breeding sites. 'Tidying up' a property by removing these essential habitats will lead to a loss of wildlife.

Conserve what remains

If you are fortunate enough to have understorey still present on your property, then there are a number of ways to conserve it. Identify areas of remaining understorey, such as in paddocks that have a history of low intensity disturbance, along roadside verges, on hilltops and beside creeklines. If stock are present, fencing, to prevent access to areas where understorey is to be retained, should be a high priority. Stock may destroy the understorey by browsing, trampling, soil compaction and via nutrient build up from manure (see *Land for Wildlife Note 29* for details). Weed and pest animal control are important actions. See *LFW Notes 13 'Natural regeneration - principles and practice'* and *31 'Rabbit control in wildlife habitat'*. A detailed leaflet on weed control options is available from *Land for Wildlife*. Occasional burning of small patches

may be appropriate to encourage some species, such as wattles and orchids, to reproduce. Contact your local CNR Fire Officer and Flora, Fauna and Fisheries Coordinator for advice on burning.

Encourage the return of understorey

If the understorey vegetation only recently disappeared from your property, there may still be a seed bank in the soil. Again fencing, an ecologically appropriate burning regime, pest animal and weed control will encourage the return of understorey species. Alternatively, select areas of your property, close to understorey remnants, manage to encourage regeneration, and wait for natural dispersal to occur.

Planting or direct seeding

Direct seeding is easier, cheaper and quicker than planting out (ask for the *Land for Wildlife News* Vol. 1 No. 9 supplement on direct seeding). Hand broadcasting may be appropriate in degraded habitat when use of machinery is inappropriate. Plant local species to avoid non-local natives becoming weeds.

In some circumstances, planting may be the only appropriate method to use. You can grow your own seedlings or ask a local nursery to propagate your local seed.

Further information

A wide range of information and services are available from the Department of Natural Resources and Environment. Funding may be available through various grant schemes. Information sheets referred to in this Note are available from the Department's offices.

References

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- ³ Heatwole, H., and Lowman, M., (1986). *Dieback: Death of an Australian landscape*, Reed.
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- ⁵ Greening Australia (pamphlet) *The Understorey*.
- ⁶ ANZECC Task Force on Biological Diversity, Canberra. *National Strategy for the Conservation of Australia's Biological Diversity*. 80 pp.
- ⁷ Dengate, J., Windbreaks and shade trees help landowners and wildlife, NPWS NSW, *Habitat*, ACF.

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