



Avon  
Wheatbelt lichens



Lichens are often overlooked, but, for those who know where to find them, they are a fascinating feature of the world's environment. Of the 800 species that occur in Western Australia, there is a special concentration in the Avon Wheatbelt region.

by **Raymond Cranfield**

**W**heat fields, grazing sheep and the occasional blaze of colourful wildflowers festoon much of the Avon Wheatbelt region of Western Australia during spring. Nestled in this vista is a significant micro flora that is often seen but overshadowed by the dominant visual display of sweeping farmland vistas and large brightly flowering plants. With an area of 93,520 square kilometres, about 93 per cent of which has been cleared, remnant vegetation consists of heath scrub to woodland, with halophytes (salt-tolerant plants) on saline soils. Closer examination of the remnant native species will usually reveal the presence of a lichen flora growing on the soil surfaces, trunks of shrubs and rock fragments.

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Lichens can flourish on man-made objects.

*Photo - Jiri Lochman*

**Below** *Cladia ferdinandii*, fruticose habit.

*Photo - Raymond Cranfield/DEC*



### Lichens: how and where

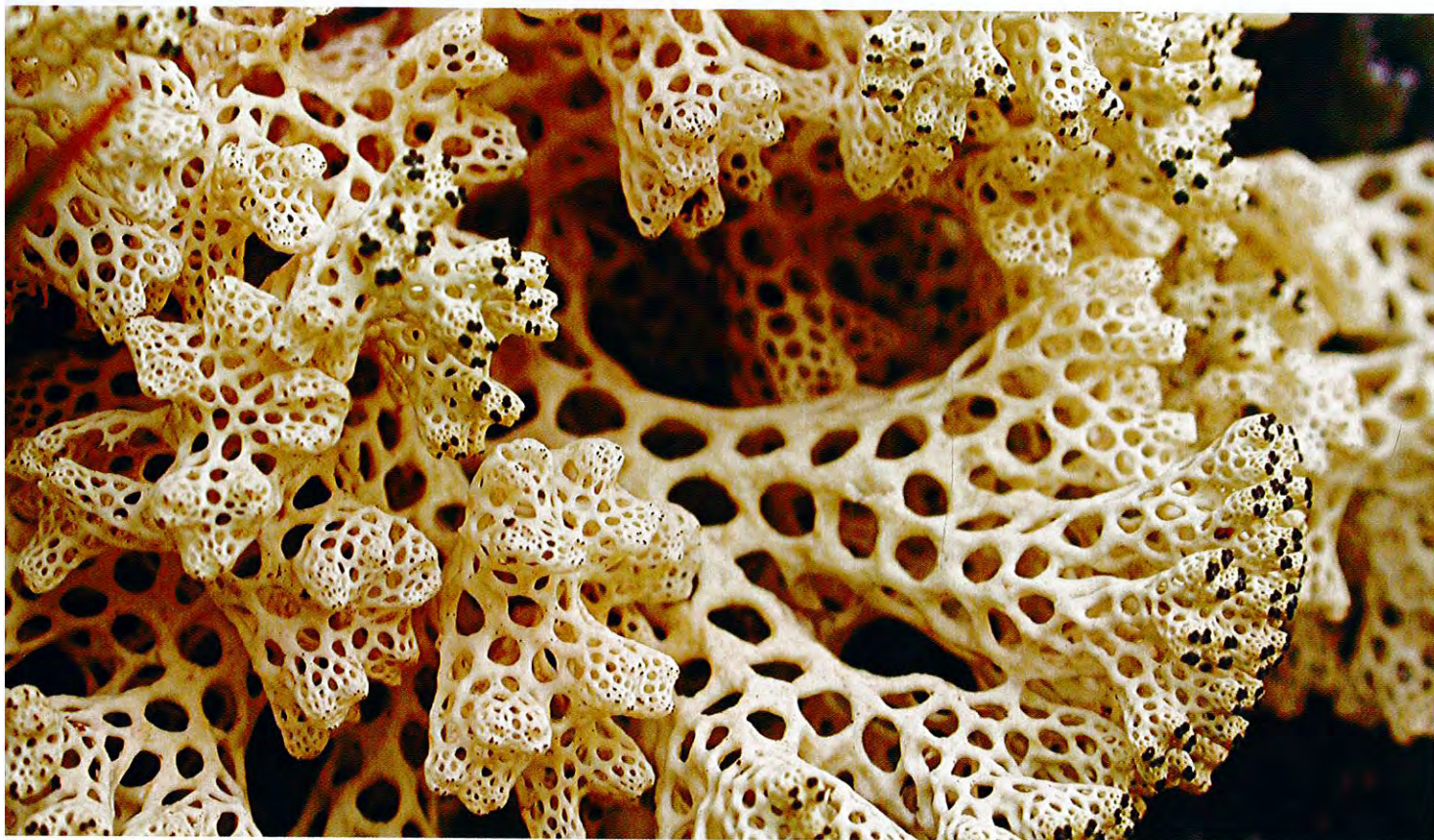
Lichens are a symbiotic partnership between two partners, one a green alga or photosynthetic bacteria, the other a fungus. The two species sometimes live apart but in most cases they coexist. This relationship benefits both parties, with one partner supplying minerals and moisture and the other sugars from photosynthesis. The fungus is the dominant partner (from which the species is named), with the fungus-fruited bodies showy in appearance and the alga less significant. It is this feature that has placed lichens as part of the fungal flora.

Lichens are very varied in form, with several distinct life forms recognised. These life forms can be classified as

foliose (broad thallus), crustose (crusts), squamulose (small scale-like flakes), fruticose (erect fruiting bodies) and filamentous (hair-like strands). There is also a leprose (powdery) group that is unusual and occurs on the soil or in cave entrances or overhangs.

There are about 14,000 lichen species across the world and 800 in WA, including a number of rare species, several of which are known to occur in the Avon Wheatbelt area.

Lichens can be seen all year round as they can totally dry out and then rehydrate rapidly after rain. The Avon Wheatbelt area has an average rainfall of 300 to 650 millimetres per annum with seven to eight dry months each year. The best time to see these organisms is during winter and spring when they are fully hydrated and actively growing. Careful searching is rewarding as a range of unusual structures and forms can be seen—in some cases they are microscopic with a fascinating beauty, in others they are large enough to be observed unaided. The colour and shape of these cryptic species varies from intense yellows and





oranges to grey-greens. They can form large mat-like plants with dish-shaped fruiting bodies to small specks on wood or stone surfaces.

### A vanishing beauty?

Extensive land clearing for agriculture in WA may have resulted in the loss of many lichen populations and impacted on several species. Little is known of the lichen species that occurred in the Wheatbelt before European settlement. Many species are now only found on road verges or reserved areas—remnant areas that tended to be unsuitable for farming—while species that once occurred on the prime soils and lake edges are basically unknown.

Changes to soil nutrient levels, structure and increased salinity, along with foliage reductions, may have resulted in the loss of some species but have provided the opportunity for other species that can thrive in this modified niche. Lichens cannot flourish in areas of high disturbance, such as loose soil, and may become restricted to fence posts and vegetated areas outside of the paddock. However, the removal of the tree and shrub layers during clearing has enabled wind-

**Above** *Diploschistes hensseniae* sp. crustose, habit on soil.

**Above right** Rock lichens.

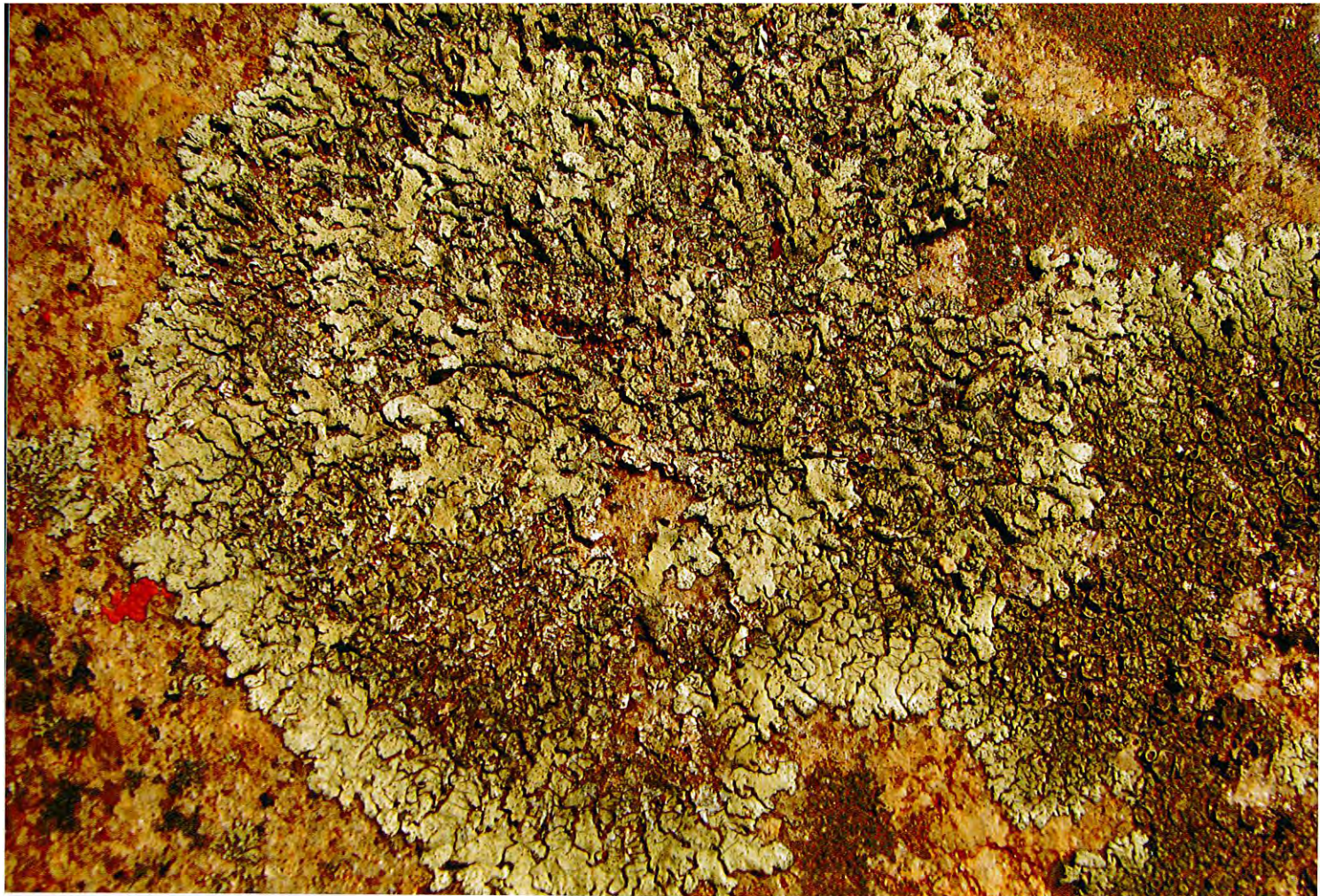
**Right** *Diploschistes* sp. crustose on soil.  
Photos - Raymond Cranfield/DEC

borne particles to abrade the larger foliose lichens in some areas which have been repopulated by smaller robust crustose or squamulose species. In some instances, human activity has created several ideal unnatural substrates for lichen to become established on and they are known to form on items such as old painted surfaces, broken china, glass, leather and cement pillows.

The spread of lichens across the Avon Wheatbelt region is dependent on the type of land systems present and the available rainfall. There is a definite change in lichen life forms and substrate occupied across the region when compared to the wetter southern portion of the south-west. The moister southern section of the Avon Wheatbelt region shows a change of species from those found in the northern part. The presence of several



saline areas and lake systems has also impacted on the species' composition. This has resulted in species such as *Psora crystallifera* and *Psora decipiens*, which can tolerate these semi-saline conditions. In the drier areas, the trees tend to have smooth bark that can be shed regularly and are virtually lichen free. But the shade provided by their canopy is ideal for ground species such as *Heterodea muelleri* and several *Xanthoparmelia* species. The presence of tall shrub areas with non-shedding bark (*Acacia*, *Hakea* and *Allocasuarina* spp.) encourages lichen species to



**Above** *Xanthoparmelia* community on stone.



**Left** Lichens on *Acacia* bark.  
Photos – Raymond Cranfield/DEC

dwell on these plant species. Many of these lichen species are from the tough crustose group which appear to handle climatic extremes. Under tall shrubs, lichens can be found on most firm clay-based soils (*Diploschistes ocellatus*) or *Lecidea* on rock fragments. Granite hills and laterite breakaways form ideal lichen habits where many species of *Xanthoparmelia*, *Caloplaca* species and, in crevices and shallow caverns, the powdery *Lepraria* species can be found. The harshness of the environments and level of protective cover dictates the type of lichens in the area.

In the Wheatbelt area, lichens are known to occur in all of the identified life forms, which includes 102 foliose species recorded with 57 crustose, 24 fruticose, six squamulose, two leprose and one filamentous species. These species have been mainly collected on



**Above left** *Psora crystallifera*, squamulose habit, on soil.

**Above** *Endocarpon simplicatum*, squamulose habitat on soil.

**Below** Woodland habit with soil lichens.  
Photos – Raymond Cranfield/DEC



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soil and rock substrate and, to a lesser degree, bark or wood. The number of species recorded reflects the number of records held at the WA Herbarium. It is expected that as more collections are undertaken and recognition of new species grows these numbers will increase.

### Understanding their value

Are lichens important organisms worthy of study? The answer is definitely yes as they perform important functions in our environment. Lichens are the primary colonisers after fires, floods and natural disasters and they break down rocks to release nutrients, build soils and remove heavy metals and salts. They also retard water erosion by slowing the flow and protect soils against wind erosion. They provide food and shelter for birds, small mammals and invertebrates and are sources of pharmaceuticals and dyes. In addition, lichens are indicators of pollution and environment health.

The process of sampling lichens is, in some ways, easier than collecting vascular plants because most lichens display the majority of features required for identification. However, excessive sampling of these species can greatly

reduce their numbers by reducing fertile fruiting body populations and, in many instances, slow the growth rates of the species.

Lichens contain a complex series of acids which determine both the genera and species. While identifying some species can be difficult, many can be easily recognised and others require just a simple spot test using household chlorine bleach and 10 per cent potassium hydroxide. *Xanthoparmelia*—one of our larger groups of species—requires an analysis of its component chemistry to determine the species.

### Worthy of affection

Irrespective of the complexity of identifying lichens, they have a captivating quality that is intriguing and, for their admirers, can become addictive. Anyone who is new to discovering lichens, or attempting to name them, will find it challenging, as there is a lack of scientific and popular books dealing with this part of the Australian flora.

Fortunately, the WA Herbarium has an extensive WA lichen collection and other state collections are held in most Australian herbaria along with several overseas institutions and herbaria.

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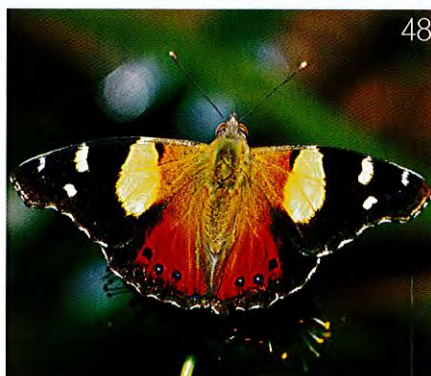
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