

Lichens That Grow on Bark or Wood

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THE following notes and key are designed to facilitate recognition of the genera to which the more common and conspicuous epiphytic lichens belong. Such comprise forest-tree lichens, lichens on trees and shrubs of open places, and those that occur on logs, posts and tree stumps. The determination of the genus of most foliose and fruticose lichens is usually not at all difficult even without recourse to a microscope, though a pocket lens will often prove useful. Determination of the species within the genus is more difficult as keys to the species are rarely available. Most crustose lichens require microscopic examination of the size, colour, shape and septation of the spores, hence these are in the main ignored.

For both amateur and expert, the first step in identification is to determine the genus. When a key to the species of a genus is not available, the simplest method is to compare a specimen with named species in a herbarium, or refer it to a specialist. The lack of relevant literature and suitable keys and the inadequacy of many of the original descriptions have all militated against progress in lichen research in New Zealand, though the situation is slowly improving. In the accompanying key technical terms have been kept to a minimum, and those used will be found adequately defined in "New Zealand Lichens" by Dr J. Murray (pp. 11-15), reprinted from *Tuatara* Vols X and XI.

In the supplementary notes a few of the more common species are referred to, but in genera with from 20 to 50 species such as *Menegazzia*, *Parmelia*, *Pertusaria*, *Pseudocyphellaria*, *Psoroma*, *Ramalina*, *Sticta*, and *Usnea*, adequate treatment is not possible, even though not every species is epiphytic. The following genera demand full sunlight and will not be found within the forest save in open glades — *Anaptychia*, *Haematomma*, *Parmelia*, *Physcia*, *Ramalina*, *Teloschistes*, *Usnea*, and *Xanthoria*. On fence posts, telegraph poles etc. the commonest lichens are *Hypogymnia*, *Parmelia*, *Ramalina*, and *Usnea*. The genus *Cladonia* is often well represented on prostrate logs in the open, and *Pelligera* on damp logs in forest shade.†

KEY TO GENERA OF LICHENS FOUND ON BARK OR WOOD

1. Thallus fruticose; apothecia terminal, covered with loose black spores *Sphaerophorus*
- Thallus various; apothecia not covered with black spores 2
2. Thallus blackish or blackish-green, foliose or squamulose; phycobiont (alga) blue-green 3
- Thallus lighter in colour; phycobiont bright green 10

†For further ecological information see "New Zealand Lichens and their Habitats" by W. Martin, *Tuatara* Vol. 17, pp. 20-26, May 1969—Ed.

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|---|--------------------------|
| 3. Thallus gelatinous or slimy when wet | 4 |
| Thallus not so | 6 |
| 4. Thallus lurid above, whitish below with black rhizines; apothecia on marginal lobes | <i>Pelligera</i> |
| Thallus blackish above and below; apothecia on thallus surface | 5 |
| 5. Thallus without cortex or rhizines | <i>Collema</i> |
| Thallus thin, with cortex; a few rhizines sometimes present | <i>Leptogium</i> |
| 6. Thallus of contiguous squamules | 7 |
| Thallus squamulose or foliose; phycobiont blue-green or bright green | 8 |
| 7. Apothecia small, reddish brown, with crenate thalline margin | <i>Pannaria</i> |
| Apothecia small, somewhat waxy, with no thalline margin | <i>Parmeliella</i> |
| 8. Thallus squamulose, usually brown; apothecia with crenate margin; phycobiont green | <i>Psoroma</i> |
| Thallus foliose, tomentose below; phycobiont blue-green or green | 9 |
| 9. Thallus with cyphellae on lower surface | <i>Sticta</i> |
| Thallus with pseudocyphellae on lower surface | <i>Pseudocyphellaria</i> |
| Thallus without cyphellae or pseudocyphellae | <i>Lobaria</i> |
| 10. Thallus foliose; apothecia usually large with a thalline margin | 11 |
| Thallus foliose or fruticose; apothecia small to medium, with thalline margin | 13 |
| Thallus foliose, fruticose or crustose; apothecia without a thalline margin | 21 |
| 11. Lobes broad or narrow, warts or black rhizines below but no cyphellae | <i>Parmelia</i> |
| Lobes narrow, with felted hyphal cushion on lower surface | <i>Pannoparmelia</i> |
| Free lobes without either rhizines or hyphal cushion below | 12 |
| 12. Thallus lobes hollow with perforations on upper surface; spores large | <i>Menegazzia</i> |
| Thallus lobes hollow or solid, not perforate above; spores small | <i>Hypogymnia</i> |
| 13. Thallus and apothecia yellow or orange-red above, white below | 14 |
| Thallus and apothecia not so | 15 |
| 14. Thallus foliose, closely adhering to the bark, usually large, yellow, circular | <i>Xanthoria</i> |
| Thallus fruticose | <i>Teloschistes</i> |
| 15. Thallus foliose, closely adhering to the bark, usually white | 16 |
| Thallus fruticose | 17 |
| Thallus crustose | 18 |
| 16. Cortex fibrous above or on both surfaces; thallus lobes narrow with rhizines | <i>Anaptychia</i> |
| Cortex cellular; thallus rather small, often circular, appressed to the bark | <i>Physcia</i> |
| 17. Stems cylindric or angular, branched, with firm central axis, yellow or grey-green | <i>Usnea</i> |
| Thallus lobes flat, usually narrow, grey-green; apothecia same colour | <i>Ramalina</i> |
| 18. Apothecia sunk in raised warts or tubercles | 19 |
| Thallus crustose, without surface warts | 20 |

19. Thallus thick or thin, crustose; tubercles with one or more sunken apothecia; soredia often present in small soralia resembling aborted apothecial *Pertusaria*
 Thallus crustose, with crowded crater-like apothecia, one in each semi-globular protuberance *Thelotrema*
20. Thallus thin, often extensive, white, on smooth bark of forest trees; apothecia sunken in thallus *Phlyctella*
 Thallus pale; apothecia orange; on trees in forest *Myxodictyon*
 Thallus white; apothecia numerous, pink or scarlet with white border; on trees and shrubs in the open *Haematomma*
21. Apothecia red-brown, on lower surface of marginal lobes, unbordered; plants yellow-green, resembling the *Stictae* *Nephroma*
 Apothecia on upper surface or on podetia 22
22. Thallus a green mat of felted hyphae without cortex; apothecia small, saffron yellow *Coenogonium*
 Thallus squamose with simple, branched or funnel-shaped podetia; apothecia scarlet or brown; on logs or tree stumps in open spaces *Cladonia*
 Thallus crustose with numerous black linear apothecia; on smooth bark of trees in the open
 various genera allied to *Graphis* or *Opegrapha*

SUPPLEMENTARY NOTES

Sphaerophorus. Two species are common — var. *australis* of *S. melanocarpus* with flat, erect thalli, green on one side, white on the other, and *S. tener* forming a cushion of white or pink cylindrical stems. *S. stereocauloides* is a rather handsome species mainly located in the wetter forests on the western side of the South Island but is known also from the Ruahine Mts in the North Island.

Nephroma. *N. australis* is the largest, finest and commonest species, and the only one in N.Z. with green algae. It much resembles a species of *Sticta*. Two smaller species with blue-green algae — *N. helveticum* and *N. lyallii* — are rare on bark but have been found on manuka.

Pelligera. Species of *Pelligera* are most common on earth but also occur among mosses on damp forest logs. Such include *P. virescens*, *P. polydactyla*, and *P. dolichorhiza*. The first has narrow veins on the lower surface, the veins of the other two being wider and flatter.

Collema and Leptogium. The commonest *Collema* is probably *C. leucocarpum*. The species of *Leptogium* are very difficult to distinguish. All are very dark in colour.

Pannaria and Parmeliella. These are also dark-coloured lichens, apparently crustose but under a hand-lens seen to be finely squamulose. *Pannaria immixta* and *Parmeliella nigro-cincta* are among the commonest species, the latter so named in allusion to a band of black hyphae surrounding the thallus.

Psoroma. This genus is closely related to *Pannaria* but has a green phycobiont. Most of the epiphytic species are brown in colour, much

the commonest being *P. sphinctrina*, *P. crispellum*, *P. leprolosum* (sorediate) and *P. pholidotoides*. *P. asperellum* is common in Westland.

Sticta. Some botanists include all species of *Pseudocyphellaria* in the genus *Sticta*, but we include only the species with true cyphellae. Two abundant species are attached to the bark by a short basal stalk, viz. *S. filix* and *S. latifrons*. The former has a dark brown central area below, gradually growing lighter towards the margin.

Pseudocyphellaria. The fifty species of this genus in New Zealand all have pseudocyphellae on the lower surface. These are distinguished from cyphellae by the absence of a marginal rim and the inclusion of loose hyphae. Pseudocyphellae are variously white or yellow. Three dark brown species with prominent yellow soredia are *P. aurata*, *P. crocata* and *P. mougeotiana*. Two similar species with yellow pseudocyphellae and yellow medulla are *P. coronata* and *P. hirta*, while *P. flavicans* is a brown species with yellow medulla and marginal isidia. *P. episticta* and *P. amphisticta* have pseudocyphellae on the upper surface. *P. carpoloma*, *P. impressa*, *P. fossulata*, *P. foveolata* and several others have more or less dichotomous lobes and a very foveolate surface. Common species with isidia are *P. chloroleuca*, *P. polyschista* and *P. psilophylla*.

Lobaria. The commonest species is *L. adscripta*, more common on logs than on trees.

Parmelia. A majority of some fifty species occur on rocks. One of the commonest epiphytic species is *P. perlata*, a plant with a glaucous grey colour and strongly revolute, sorediate marginal lobes, and black cilia. *P. trichotera* is somewhat similar. Other epiphytic species are *P. laevigata*, *P. perforata*, *P. sulcata* and *P. saxatilis*. All require good light.

Pannoparmelia. Once listed as *Anzia*, *P. angustata* is the sole N.Z. species. It occurs most commonly on the upper branchlets of forest trees. The thallus lobes are very narrow.

Menegazzia. Over 20 N.Z. species are known. One of the largest (*M. pertransita*) is usually studded with raised apothecia and has large perforations, while *M. nothofagi* is quite a small species with tiny perforations. It is not confined to beech trees as the name would suggest but occurs on podocarps as well, and even on rocks. *M. subpertusa* and *M. circumsorediata* are common sorediate species lacking apothecia.

Hypogymnia. *H. subphysodes* is the commonest species at low levels and *H. enteromorpha* on subalpine trees and shrubs. All species require good light.

Ramalina. The largest of some twenty indigenous species is *R.*

ecklonii with flat lobes sometimes over three inches long and half an inch wide. Much smaller are *R. farinacea*, *R. pollinaria*, *R. dilacerata*, *R. geniculata* and *R. linearis*. All ramalinas require good light and are common on fence posts, telegraph poles, shrubs in open spaces etc. but are absent from the forest interior.

Usnea. This genus is recognizable at sight, but the naming of the species frequently presents great difficulty even to the specialist. Among the common N.Z. species we may note *U. arida*, *U. dasypoga*, *U. contexta* (commoner in bogs), *U. rubescens*, *U. simplex* and *U. xanthopoga*, and in the damper climates *U. capillacea* and *U. ciliifera*. The tops of the trees in subalpine forests are often so smothered with *Usnea* as to be visible from a great distance. The apothecia are relatively large on the ends of the stems.

Pertusaria. Many species are restricted to rock but sixteen are usually epiphytic. The apothecia (one or more) are sunk in warts or raised tubercles on the crustose thallus. Two relatively common species are *P. subverrucosa* (also on rocks) and *P. nothofagi*. Sometimes soredia take the place of apothecia.

Lecanora. Here too most species are confined to rock, but a number occur as epiphytes. All have apothecia with a prominent thalline margin. One moderately common is var. *americana* of *L. atra*. This has a black disc with a white border.

Haematomma. This common lichen frequently occurs on the smooth bark of shrubs and of trees exposed to full sunlight, but is absent from the forest interior. The commonest of three species is *H. punicea* with scarlet or pink apothecia, each with a prominent white thalline margin.

Myxodictyon. The sole species is *M. chrysosticta*, recognized by the numerous orange apothecia on a dingy white thallus. It is a common forest species.

Thelotrema. The commonest of several species is *T. lepadinum*. The thallus is rough and dingy with numerous apothecia at first immersed in small surface warts. Each has a double margin, with the proper margin usually concealed by a very thick inarching outer thalline margin which partially covers the disc of the apothecium.

Coenogonium. Five of six indigenous species are epiphytic on the bark of forest trees. The thallus consists of a green felt of hyphae without any cortex. The apothecia are bright yellow but small. All species are similar but the commonest is *C. linkii*.

Graphis, etc. Here the apothecia are carbon black and linear, usually present in large numbers at the centre of the crustose thallus. The numerous related genera are distinguished mainly by the colour and septation of the spores. The genus *Opegrapha* belongs to a

different family but its external appearance is similar. Popularly they are known as "script" lichens from the resemblance of the apothecia to some foreign script.

Cladonia. Some species are common on logs in open stations. Scarlet-fruited species include *C. vacillaris*, *C. macilenta*, *C. floerkeana* and *C. pleurota*, and brown-fruited species include *C. chlorophaea*, *C. cornutoradiata*, *C. pityrea* and *C. scabriuscula*.

Growth of Filmy-fern Fronds in Response to Rainfall

By a fortunate chance I happened to visit some foothill bush east of Levin in late October, 1953, after a long spell of dry weather, and again in mid-November, following heavy rainfall. In the short intervening period, trackside fronds of the filmy ferns *Hymenophyllum dilatatum* and *H. demissum* had undergone a noticeable change. The end segments of the pinnules had made further growth of an elongated form. On the first occasion the fronds appeared fully developed and therefore unlikely to be susceptible to the influence of wetter weather, but the tips of the pinnules must have been still able to continue growing for they subsequently produced narrow straplike segments under the moister conditions. A glance at herbarium specimens of other "filmies" collected in the same general locality in the Tararua foothills showed similar extended new growth on fronds of *Hymenophyllum demissum* (October 1952), *H. flexuosum* and *H. sanguinolentum* (both October 1956), *H. bivalve* (February 1967) and *H. rarum* (May 1966). In each case the point of arrested development made a sharp contrast between the older, more compact growth and the new growth, which was paler and more diffuse. Although late spring seems to be the most common time for such bursts of development, their occurrence on specimens collected in February and May suggests that growth may be renewed at the tips of fronds or pinnules at any time in response to plentiful rain after a dry period.

Conversely, a period of very dry weather during the early growth of *H. revolutum* resulted in many fronds being much reduced in the blade, though by no means lacking in well-grown sori. For instance, in a collection dated September 1966 one frond has seven well-developed two-valved receptacles occupying the upper portion of the rachis, while the lower is furnished with six very meagre, sparingly forked pinnules. A note attached to a sheet containing a number of these specimens states: "The bush suffered a period of desiccation before these were collected. The dead tree-ferns were obvious; the same conditions could be responsible for the meagre fronds of this fern."

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