

County Offaly

# ***THE STATE OF THE WILD*** **2007**

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John Feehan



Offaly County Council  
in association with  
the School of Biology and Environmental Science at UCD  
and the Heritage Council

SUPPORTED BY THE HERITAGE COUNCIL



LE CUIDIÚ AN CHOMHAIRLE OIDHREACHTA

ISBN -13: 978-1-905254-21-7

*Compiled by*  
**John Feehan**



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# Foreword

If we are to be effective custodians of our heritage of wild nature, we need to know what plants and animals share the county with us, and where they live. This report attempts to provide an outline sketch of that diversity – or, more accurately, of what we *know* about it. It is written as an introductory overview for a general readership of Offaly people who have an interest in and concern for the wild life and wild places of the county. It is not really intended for those who would describe themselves as specialists.

I have included *checklists* of species in different groups of plants and animals recorded for the county where they could be compiled with some confidence. For many readers these lists will be mysterious-looking assemblages of Latin binomials before which the eyes inevitably lose focus. But just remember that every one of these names stands for a unique species, whose structure has been carefully and meticulously described and published according to rigid internationally agreed guidelines. Each is a creature of immense complexity, and every one of them occupies a unique corner of the natural world. All of these species live out their lives in our midst, all enriching our human world on some level.

In most cases the checklists are little more informative than records of attendance. With the exception of a very few groups such as flowering plants, birds and mammals, we know little about the detailed distribution and status in the county of the different species – or their individual lives. Very often the record of a species is based on nothing more than one or a few specimens captured on a few occasions in just a few places. Read what one of the greatest of entomologists had to say about how little even he knew about the insects he studied so assiduously:

I have made it my business for some years to hunt out the larvae of our common Insects. I have searched the waters, both stagnant and flowing, and have pried into all accumulations of decaying organic matter that I have come across. I have particularly attended to the early stages of the Diptera [flies]. But I have to confess that nineteen-twentieths of the Diptera now buzzing about in my garden are known to me, if at all, only as items in a catalogue. No doubt a large proportion have been reared close

at hand. But they are so well hidden, and the naturalist is so blind, that it is only when he sees the swarms of winged Insects that he becomes conscious of the multitude of larvae and pupae which he has overlooked.<sup>1</sup>

What we know is only a fraction of what remains to be discovered. This highlights the endless scope there is for further exploration. We need to know an awful lot more if we are to ensure proper conservation of the flora and fauna of the county.

It has been hard to keep track of all the people who have provided information or helped in other ways in the preparation of the Report. I hope I can remember them all: Annette Anderson, Roy Anderson, Barry Cregg, Jim Curry, Jane Feehan, Garth Foster, Hubert Fuller, Jeremy Gray, Alvin Helden, Fran Igoe, Daniel Kelly, Ferdia Marnell, Roland McHugh, Barry McMahon, Brian Nelson, Mary O'Connell, Rita O'Shea, John Prior, Gordon Purvis, Colm Ronayne, Olaf Schmidt, Mark Seaward, Michael Sheehy, Helen Sheridan, John Smith, Martin Speight, Niall Sweeney, Val Trodd, Wayne Trodd, John Whelan. The photographs on the front cover are by Tom Egan and Gordon Purvis, that on the back cover by Eddie Dunne.

The Report owes more to the enthusiasm and efficiency of Amanda Pedlow, Heritage Officer for Offaly, than it does to anybody else, myself included.

We hope this overview will help to inspire a new generation of Offaly field naturalists to take up the study of the wild creatures of the county, and begin to experience for themselves at first hand the endless fascination and sense of fulfillment their study can bring to people of every age and background.

John Feehan

<sup>1</sup> L.C. Miall (1896). *Round the Year. A Series of Short Nature-Studies*.

# Introduction

## Wild places

Offaly has many wild places, which are home to a tremendous variety of different plant and animal species. Some of these wild places, such as the bogs of Slieve Bloom and the Shannon Basin, cover large areas. Woods are among the most important places for wild plants and animals. At one time native woods covered much of the county, but these disappeared gradually over the course of history; today we have a large number of much smaller deciduous woods, all the more precious because of their small size and number. Hedgerows are like narrow strips of woodland, weaving a green web over the entire county that provides a place to live for countless species, many of them one-time woodland species. Waterways and



other wetlands – of all sizes and shapes from the Shannon to the smallest pond – are inhabited by a great variety of wild plants and animals. In fact every part of the county has its own unique mixture of places where wild species live.

Some of these wild species are large and familiar, such as birds and mammals, trees and flowers, but the vast majority are small creatures of which the most numerous are insects. What these lack in size they make up for in the amazing complexity of their structure and habits. There is more to amaze – make no mistake about it, there is truly more to wonder at, more to bring us to our knees, than our short lifetimes can ever encompass, in the lives of the wild things found in the local pond, and along the fringe of the bog, and in the last bit of woodland in the parish.

## Offaly's Wild World Web

When people first settled in Offaly over 9,000 years ago everywhere was wild. Only very gradually did we begin to make any serious inroads on Nature's rule. At first our impact was little more than that of the animals with which we shared this world, but this impact increased greatly with the advent of farming 6,000 years or so ago, when we started to make fields for our crops and herds at the expense of natural woodland. Long before modern times nearly all the land that could be made productive or developed to carry our infrastructure had been taken from Nature. So few natural places are left to us now that we need to treasure those that remain and do what we can to extend their hold.

All through our long prehistory and history, Nature

has been on our doorstep – no longer it is true the untamed wilderness that was there before we started to farm, but the experience of trees and flowers, birds and wind and stars, rocks and the sight and sound of rivers and the sea – that satisfied a deep psychological need in us. The places where Nature still breathes awake in us memories of that deeper childhood of our human species. The flowers and trees in every hedgerow awake them, the singing of the birds,

every rock outcrop shaped by time and the elements, every stream that follows the form of the land.

Some of the most significant places in the county, some of those richest in species, have already been designated as such and receive statutory protection (see map on pages 6-7). These however are relatively few and far between, and except for the National Nature Reserve in Slieve Bloom cover a tiny area. But alongside these is a much larger number of places that, although they are not considered to be of sufficient importance to merit formal designation, are important reservoirs of natural diversity. They include all the woods and bogs in the county – especially the vast area of bog in production by Bord na Móna, which has the potential to become the most extensive and important reservoir of natural diversity in Offaly once production ceases.



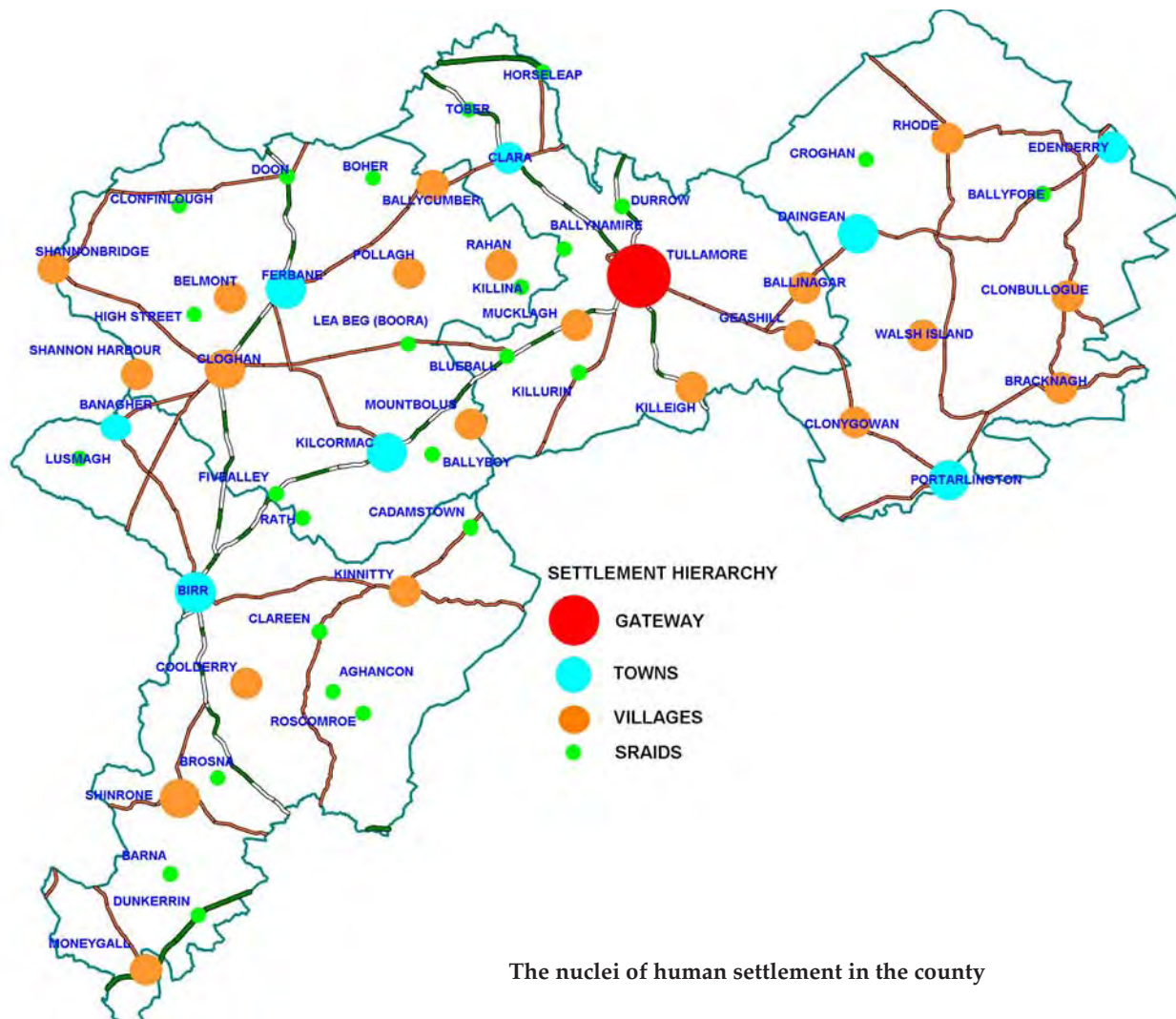
## INTRODUCTION

The infrastructure of our human world is spread across the county like a net. It is made up of dense hubs – towns and villages – all linked together by a trellis of roads of different sizes, interspersed among the smaller nodes of individual houses and the occasional factory. Surrounding this infrastructure is all the land whose produce supports our lives: farmland under grass or other agricultural crops, plantations of trees, bogs from which peat is being harvested, hills from which sand and gravel are being extracted.

But ramifying through this artificial world is an ecological network or **EcoNet** that interlocks and interweaves its way through our artificial network of cement and stone and steel. Within this network a vast concourse of plant, animal and other living species find their homes and make their own living. They often perform functions that are important or even essential to our human well-being; but over and above their usefulness they enrich our human existence by their presence.

On the map on pages 6-7 you can see what this web of wild places might look from a great distance. What you cannot see on this scale is the cobweb of fine threads linking all these geographically distinct areas. The finest of these threads are the hedgerows and streams. Not only are these important habitats in their own right, but they also provide routeways along which wild plants and animals can move with greater security – in their everyday lives or more slowly over time.

Wild plants and animals are largely – though by no means entirely – confined to those habitats that appear on the EcoNet map. The scale of the map is too small to show everything of course. Every single tree is an important habitat for wild things. Even a single rock in your garden is a micro-habitat: turn it over and you will see the menagerie of small creatures it shelters. We can define habitat in its broadest sense as any place where natural processes and species predominate.



The nuclei of human settlement in the county



Hedges and field walls are the finest threads in the web of wild places that extends throughout the county. This is a small section of the first edition of the Ordnance Survey six-inch map (1838), showing the hedged landscape south of Tullamore.

And Nature reaches out from its strongholds into our human world: occasionally to our annoyance, as when 'weeds' invade our gardens and fields or mice enter our homes: but almost invariably to enrich and diversify our lives. When we withdraw our hold altogether it takes over entirely.

### The sixth extinction

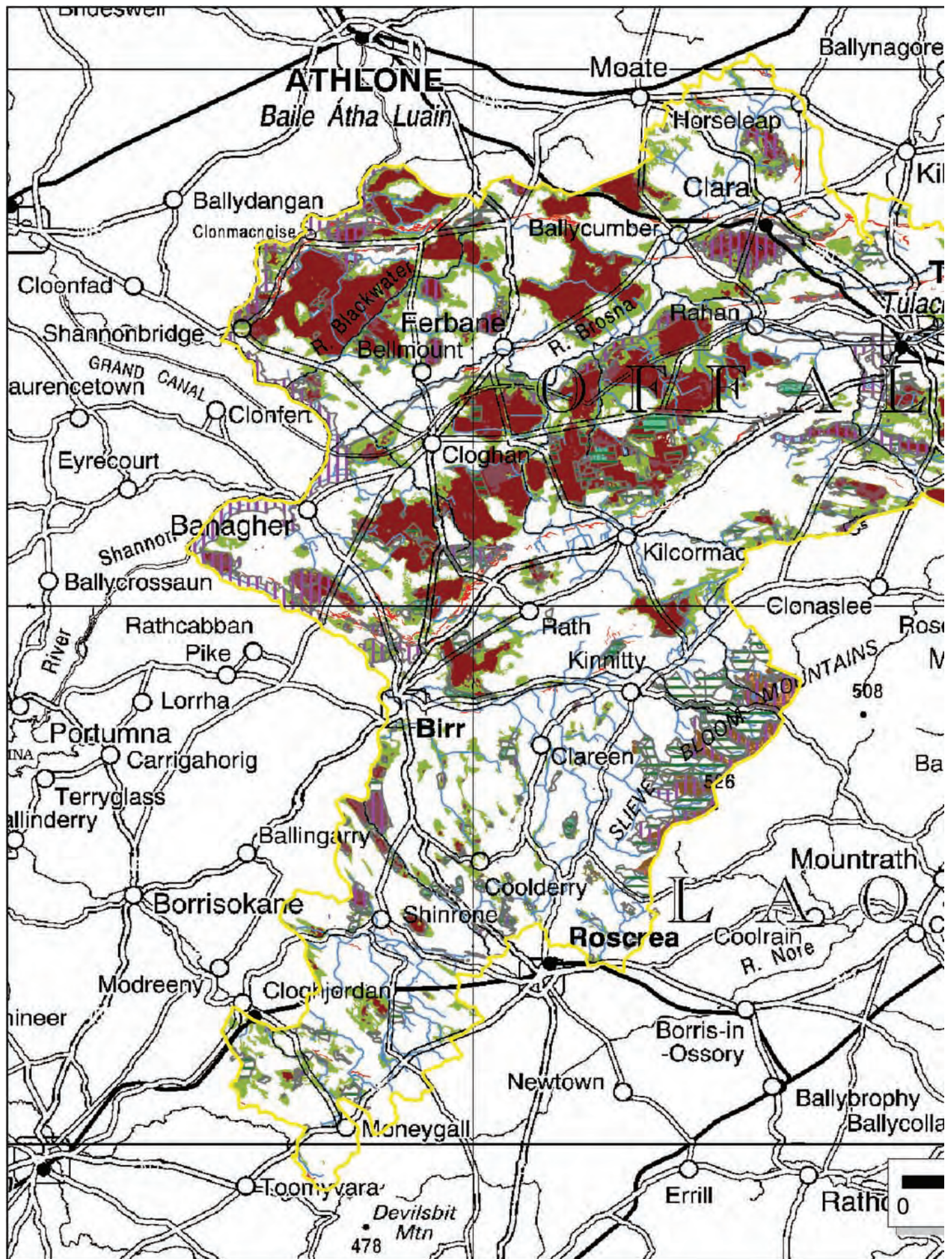
We are enmeshed in biodiversity on a scale really beyond our comprehension. Our best guesses put the number of species on earth today at somewhere between 3 and 100 million: different kinds of living things, different species (the most popular estimate being somewhere around 13 million), of which less than 2 million have actually been identified and described and given proper names (75% are insects). Equally incomprehensible is its sheer abundance. It has been calculated that in every square kilometre of land there are as many as 10 billion living organisms.

In our lifetime we are experiencing – indeed, we are *causing* – the greatest mass extinction of living species there has ever been on the earth. Plant and animal species are disappearing at an unprecedented rate. Some botanists calculate that 2,000 species a year are becoming extinct in tropical forests – and extinct means gone for ever. Estimates of total global species loss range from 4,000 to 300,000 species a year, the vast majority of which we don't even have names for. Much of this loss results from the destruction of tropical rain forests, which are disappearing at a rate of perhaps 150,000 km<sup>2</sup> a year, which is around 2% of the standing cover. If we continue the way we are half the species of plants and animals on earth could be gone by the end of the century.

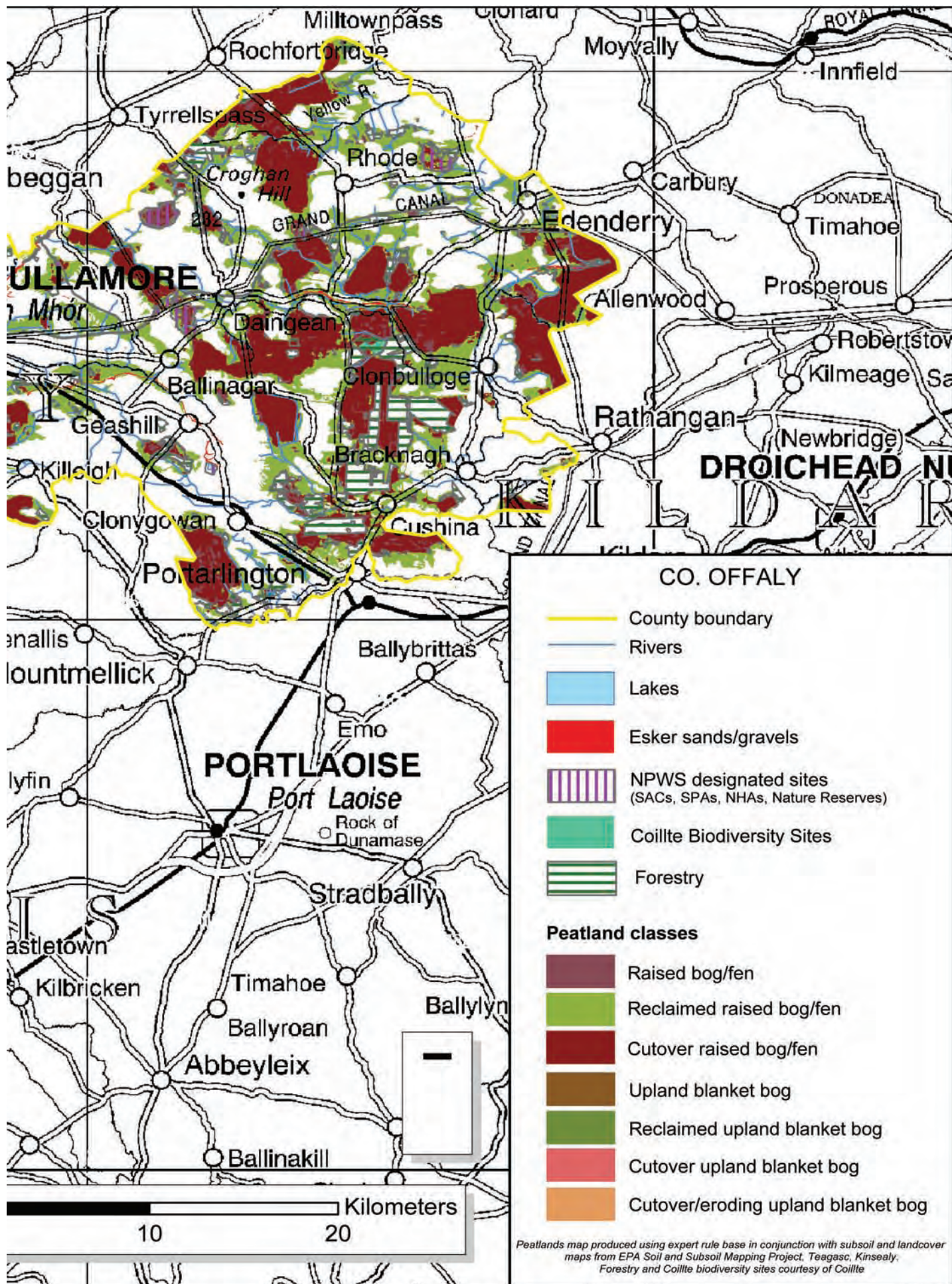
It was concern over this appalling loss that led to the Convention on Biological Diversity at Rio de Janeiro in 1992, to which Ireland signed up in 1996. In signing the Convention we took upon ourselves the



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obligation to halt the loss of biological diversity in Ireland, and to work to regain lost biodiversity: and further afield, beyond our shores, to do what we can to address the global loss. Allied to this, the EU has now set itself the target of halting habitat loss by 2010. Ireland produced its National Biodiversity Plan in 2002, and as part of that each local area is now required to draft its own Biodiversity Action Plan

### Why is it so important?

There are many reasons why the haemorrhaging of biodiversity from the earth is so serious. There are economic reasons that have to do with its practical importance in our lives, such as regulation of climate and rainfall. And there is the fact that as yet undiscovered species are a genetic treasure chest from which medicine, farming and human welfare generally may benefit in all sorts of ways, when they are discovered and their genetic potential is tapped by means of the incredibly sophisticated tools increasingly available to us. There is the increased understanding of how the living world works that science derives from the study of new species. But over and above all of this there is the sheer wonder of it, the awesome complexity and diversity that indeed is the deepest reason most of the people who study these creatures do so in the first place. It is experience of Nature's transformative value that is the real, the deepest, reason most ecologists study biodiversity.

And beyond this again, there is another reason why we need to be concerned about the dimming of life's rainbow which we are witnessing. It is wrong. Most of us are religious people at some level, some of us deeply so. If you believe in God, whatever your faith may be, you have to see the living creation as the first, the most fundamental Book of Revelation. There is a profound *ethical imperative* to care for the diversity of life: first of all because it is that primary revelation, through which God expressed himself for unimaginable epochs of time before our species appeared on the evolutionary scene. And secondly, because we are its custodians and its kin.

### The loss of Nature's diversity in Offaly

Although it is nothing like that seen in tropical rain forests, there has over the last fifty years been a considerable decline in Offaly's biological diversity, mainly because of the decrease in the total area of *habitat* available to wild species. Nearly all of the raised bogs have been exploited on a large scale for peat extraction, and much of the blanket bog on Slieve Bloom has been planted with conifers. Farm improvements

since we joined the EU have seen the replacement of traditional pastureland with species-poor swards of ryegrass and white clover, the drainage of species-diverse wetlands, and the removal of hedges in order to make fields bigger and more suited to machinery. The greatly increased use of fertilisers, herbicides and pesticides has contributed to the decline of countless species.

But on the other hand, the cutaway that remains where Bord na Móna has removed the economic reserves of peat from their great bogs has enormous potential for regeneration of biodiversity. Many farms now participate in the Rural Environment Protection Scheme (REPS), one of the obligations of which is looking after and improving natural habitats on the farm. Coillte now sets aside the 15% of its forest land with the highest biodiversity and manages this primarily to that end. And as important as all these positive developments is the fact that we as a community now have a much greater *awareness* of why it is so important to maintain biodiversity and the wild places which support it.

### How little we know

The Biodiversity Convention places upon us the obligation to protect our wild biological heritage. What makes this so challenging is that we have no inventory, no list of all the species we have or where they live or how well they are doing. We do know a great deal about birds, mammals and flowering plants: the species we have and their distribution, and what their status is in the county – the ones we imagine Noah ticking off his list as they paraded two by two into the Ark in the most familiar early example of conservation in action! But in fact these large plants and animals account for only a small percentage of total biodiversity. There are enormous gaps in our knowledge of invertebrates, which account for the overwhelmingly greater part of biodiversity, and of non-flowering plants, fungi and lichens (to say nothing of bacteria). When you begin to look *really closely* at any habitat, a whole kaleidoscope of hitherto unseen biological diversity springs into focus.

Certainly dozens of studies have been carried out over the years that have looked at other groups in a very localized and uncoordinated way. Stephen Heery has brought these studies together and they can be reviewed on Offaly County Council's website: but there may be other studies we don't know about, and certainly there will be many others in the years ahead; these will be added to the list as they come to our notice. (If you spot any omissions, or if you know

of ongoing studies that add to our knowledge, we would really like to hear from you). But whatever about our knowledge of all these creatures globally, we know next to nothing about their status or distribution in Offaly, and for many of them it will be a long time before we find out. It will take lifetimes of exploration.

One of the first challenges in our county biodiversity strategy must be to ascertain what we do know, and then try to fill the gaps as time goes by, so that we can plan for the sustaining of biodiversity in Offaly: to make sure in the first instance that we can meet the challenge of halting habitat loss by 2010 – and to move beyond that to *restore* what we can of what has been lost.

But what we *do* know is that nearly all these creatures, whether known or as yet undiscovered in our midst, live within the habitats of the EcoNet. Which is why looking after the EcoNet is so very important. We should do everything we can: not only as a society by designating places for Nature and putting protective measures in place, but perhaps even more importantly as local communities, as families and individuals. Get to know the wild places that surround you: where they are and what lives in them. Look for ways to extend and bring them closer to you.

So little is known about the detailed distribution of most invertebrate groups in Offaly in particular that anyone undertaking a special study of any particular group is something of a pioneer. Even for better-known groups of invertebrates what we have are little more than lists of species. Such lists are very useful though, because the ecology of many of the species on the lists has been studied elsewhere, and we can draw conclusions about their ways of life in Offaly from these studies. On the other hand, very little is known anywhere about countless smaller species, so there is endless scope for original research by young and old. A good example of what can be discovered is the elucidation by Jane Feehan (then at St Brendan's Community School in Birr) of the detailed and hitherto unknown life history of the tiny case-carrying leaf-mining moth *Coleophora pyrhuipennella*, a study which won her the Aer Lingus (now ESAT) Young Scientist of the Year title in 1994, and first prize in the European Youth Science Contest.



## ***It could be YOU!***

### Finding out more

Species lists can be compiled for a number of groups of insects such as butterflies and dragonflies, but they are little more than lists, so limited at present is our knowledge of the status and distribution of different species within the county.

The National Biological Records Centre has set about the task of compiling all existing data on the different groups of plants and animals in the country. But while such lists are an important starting point, a more adequate understanding will require further study of all groups of wild plants and animals in the county in the future. Some of this study may be carried out by professional experts from outside the county, and where resources are available they should be targeted at groups of particular significance on which our knowledge is currently very limited. There is much debate in ecological circles as to which groups are especially significant in this respect: especially as indicators of biodiversity in general. It can be argued that *plants* are the most fundamental indicator group,



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**Mundy (Birr)**  
Rock star

*We all need to escape sometimes. This Plan is about taking care of those special places here in Offaly that we all like to escape to - those wild places that are such an important part of what makes Offaly home.*

*Quiet churches are houses of God filled with his silent presence. So too can people find a silence in the natural world in which they may sense God's presence, even when they do not know how to pray.*

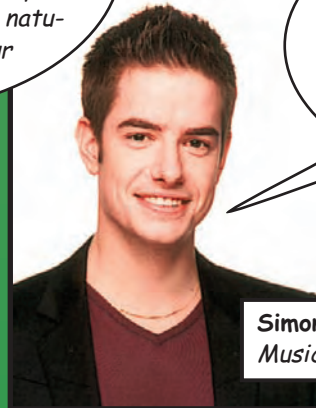


**Bishop Michael Smith**  
Catholic Bishop of Meath



**Brian Cowan T.D. (Clara)**  
Minister for Finance

*Once upon a time 'bogman' was a term of abuse. Nowadays we in Offaly are proud to be one of the counties with the most bogland, because we value the enrichment that experience and appreciation of the natural world can bring to our lives.*



**Simon Casey (Ballycumber)**  
Music star

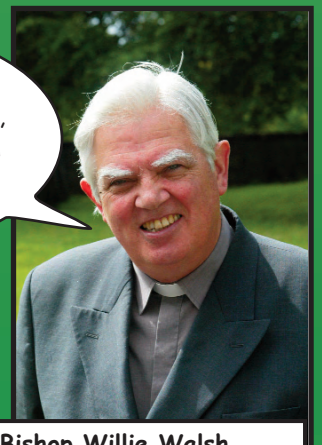
*It is the direct experience of wild places and things at local level that brings the greatest enrichment. This is why it is so important to establish and make accessible the local places where wild things are within each and every community in the county.*

*I often hear the phrase 'Think global, act local'. That's what this Plan is about: looking in a new way at the special places and wildlife in our local area, and valuing them in a new way. What we have in our area is an important part of the national and the European picture. More importantly, our local biodiversity makes this a beautiful and interesting place to live, and to come home to.*



**Jane Feehan (Birr)**  
Aer Lingus Young Scientist of the Year  
European Union Youth Scientist

*If you wish to know God, learn about his creation (St Columban).*



**Bishop Willie Walsh**  
Catholic Bishop of Killaloe

*Offaly County Council has formulated a strategy for the protection and enhancement of the Council's natural heritage for the enjoyment of our own and future generations of Offaly people.*

There is a web of wild places spread all over the county. This *EcoNet* is shown on the map on pages 6-7. The lives of all of us who live or work in Offaly can be enriched by experience of the wild

places and things that make the world around us more diverse, more interesting, more beautiful, more inspiring.

*The Council will be formulating a succession of action plans in the years and decades ahead as part of its Biodiversity Action Strategy. These will have practical, achievable aims and outcomes.*



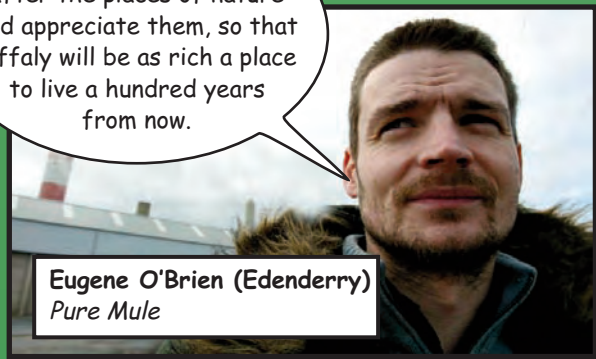
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My home is the farmland of Coolderry, where the fields are framed by hedges, woods and bog, with all their great variety of wild plants and animals. Places like that make Offaly a richer and better place to live. They matter most of all to the people whose homes and farms are surrounded by these wild places.



**Tom Parlon T.D. (Coolderry)**  
Minister for State  
at the Department of Finance

We need to look after the places of nature and appreciate them, so that Offaly will be as rich a place to live a hundred years from now.



**Eugene O'Brien (Edenderry)**  
Pure Mule

Offaly's Biodiversity Action Plan will make a difference to people right across the community, and it will have the capacity to enrich everyday life in Offaly. Our local biodiversity is an integral part of our local quality of life, and it's something to be proud of and to protect.



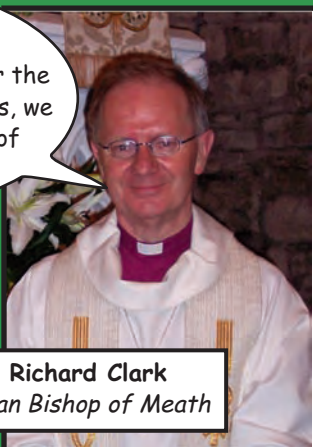
**Olwyn Enright T.D. (Birr)**  
Dáil Deputy for Laois-Offaly

**Joe Dooley (Coolderry)**  
Offaly hurling star



If we lost the wild places of Offaly as a result of progress we would be paying a price that is too high. The better off we are the more we realise how much richer the special places of nature make our lives. More than ever, we have the resources and the education to come to know them better, and to look after them better.

If we do not make small sacrifices today for the protection of eco-systems, we are the executioners of tomorrow.



**Bishop Richard Clark**  
Anglican Bishop of Meath

The better off we are the more we realise how much richer the special places of nature make our lives. Maybe for the first time in history we have the resources and the education to come to know them better, and to look after them properly.



**Miriam O'Callaghan (Tullamore)**  
Camogie

Our lives, the lives of all of us in Offaly, now and in the future can be enriched by experience of the wild things that make the world about us more diverse, more interesting, more beautiful, more inspiring.



**Colin Gracey**  
Methodist Moderator

In the years to come a series of special access points to the county EcoNet (*EcoNodes*) will be developed. These are places where you will be able to see and feel what it is all about.

*You can follow the development of the County Biodiversity Strategy – and of Offaly's EcoNet development – on the WildWeb section of the County Council website ...*

***www.offalycoco.ie***

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because ultimately all animal species depend on them directly or indirectly. *Birds* are also an important indicator group. Among the *invertebrates* arguments are made for the particular value of many different groups, among them ground beetles, hoverflies, bees, moths and butterflies, and the tiny parasitic wasps that prey on other invertebrates. An attempt will be made in the years ahead to target these groups in particular in order to reach a better understanding of their status in the county, and to suggest ways in which that understanding can be deepened.

Professional experts are not the only ones who can increase our understanding of Offaly's biodiversity however. Most of what we know of the status of different groups comes from the investigation of *amateurs*. Amateur is a word that has come to have somewhat derogatory undertones. We speak of people who are less than truly competent as 'mere amateurs': but the definition of an amateur is somebody who is in love with his or her subject. Amateurs are people who have come to see and appreciate the beauty and fascination of a particular group to such an extent that its study has become an important part of their lives. *Any* group of plants and animals has the capacity to evoke this wonder and interest and dedication if only you can find the opportunity to enter and catch a glimpse of its fascinating otherworld. It is easier to do this with groups like flowers and birds because they are our size and we can see them without the help of a microscope or hand lens. But that is

all it takes. Look at a moss or beetle through a hand lens and you could be hooked for life!

The great 18<sup>th</sup> century Swedish biologist Carl Linnaeus – the man who devised the binomial Latin system of scientific nomenclature we still use to formally name all plant and animals species – had a marvellous metaphor for biodiversity and the way in which the microscope provides access to the world of smaller creatures.

*The museum of nature, like a palace, has an enormous number of connected chambers, filled with the stupendous contrivances and wonders of the Creator, to each of which a place is assigned according to its kind; to the greatest amphitheatres of nature the first entry is open to every one, but the smaller ones are usually shut; here there is need of skill to unclothe by slow degrees the doorway of each chamber, within which a new world, as it were, displays itself before our eyes ... The chief key for unfastening the bars of this palace that has been for all the ages closed is afforded by the microscope, which gives us the same help in examining minute bodies that are close to us as astronomers get from the telescope in the investigation of distant bodies in the heavens.*

For many of us the opportunity to have this experience of Nature's diversity is limited. We need a forum where it can be provided more easily. For this reason it has been decided (as part of the Offaly Biodiversity Strategy) to set about the establishment of an Offaly Naturalists Field Club.

# Domain Procaryota (procaryotes)

## Bacteria

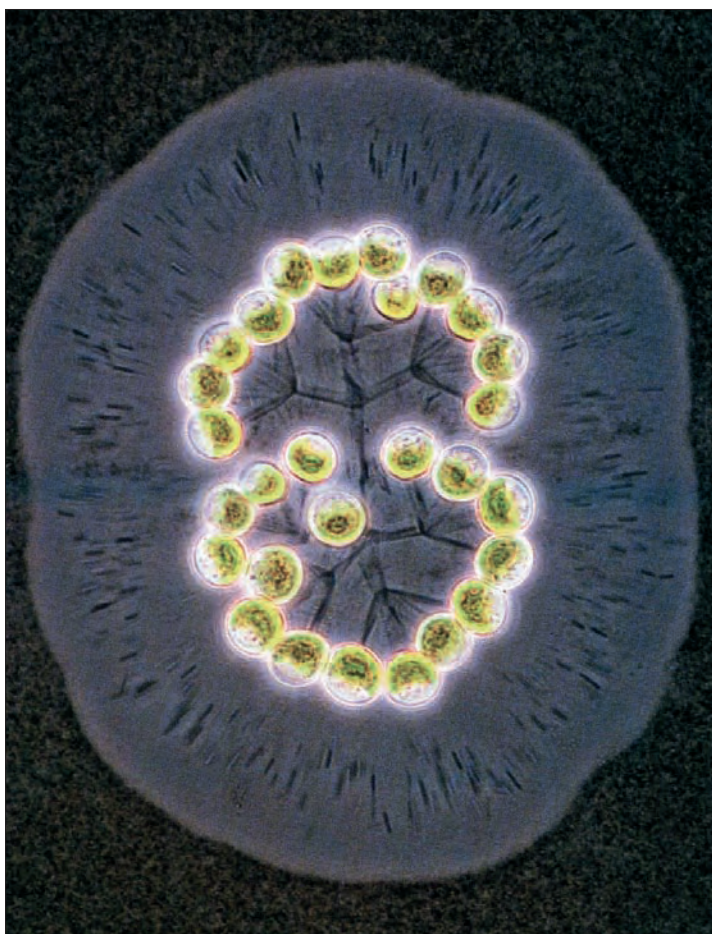
Meagre though our knowledge of the smaller animals and plants that live in the county may be, it is encyclopaedic compared with what we know about the bacteria of Offaly. Yet no group of living things is more ubiquitous or pervasive, or influences our living on so many levels. Indeed, life would not be possible without bacteria. We know so little about them simply because they are so small, and it is only in recent decades the techniques that enable us to get a clear picture of their complexity – and more recently still of their diversity – have become available. It now appears likely that the genetic diversity of bacteria surpasses that of all other living things together.

Most of us think of bacteria in negative terms, but the ‘bugs’ that cause so many of the diseases that plague us are a tiny minority. On the positive side, our bodies can almost be described as a network of bacterial ecosystems. Agriculture would be very different without the well-nigh miraculous ability of certain bacteria to package the elemental nitrogen that makes up four-fifths of the atmosphere (and which is beyond the chemical reach of plants in a form they can make use of and in turn pass on to animals). These bacteria occur in nodules on the roots of plants in the pea family (and a few others), and they play a vital role in the maintenance of soil fertility and in supplying the nitrogen that is essential for protein manufacture in plants and animals. These nitrogen fixers are one special component of an immensely complex bacterial ecosystem in soils, of which we currently know next to nothing with specific regard to Offaly – or indeed anywhere else.

Bacteria are invisible without the help of a powerful microscope, but we are surrounded on all sides by their macroscopic expression: indications – *field marks* as they are sometimes called by ecologists – of the ubiquitous presence and activity of bacteria. Every farmer knows and loves the smell of newly ploughed earth, which is largely a by-product of the activity of filamentous bacteria (actinomycetes). Around the edges of many cutaway bogs Bord na Móna people will have noticed spreads of

ochre, a product of the past activity of amazing bacteria that obtain their energy by oxidizing iron salts in the peat. Two other processes vital to our well-being that are dependent on bacterial ecosystems are the formation of compost and sewage decomposition.

It is probably safe to say that whereas it will take many years or decades before we have a good picture of the many currently obscure groups of plants and animals that occur in Offaly, it could be centuries before we have a good understanding of bacterial ecosystems and biodiversity in the county. The first step is just *knowing* this exciting challenge lies ahead of us, and being aware the techniques that make it possible to tackle are becoming more widely accessible. After that, every ecological study that takes some account of bacterial biodiversity is a further step in the right direction.





## DOMAIN PROCARYOTA (PROCARYOTES)



Rhizopods are amoeba-like organisms that surround themselves with shells. Many species live in carpets of sphagnum. *Chlamydomorphys labyrinthuloides* is one of the most extraordinary.

# Domain Eucaryota (eucaryotes)

A eucaryote is an organism with a complex cell or cells, in which the genetic material is organised into a nucleus or nuclei enclosed by a membrane. Eucaryotes comprise animals, plants and fungi – which are mostly multicellular – as well as various other groups that are collectively classified as protists (many of which are also multicellular). In contrast, *procaryotes* are organisms (mostly bacteria) that are without nuclei and other complex cell structures. All eucaryotes share a common origin, and are often treated formally as a *domain*. The name comes from the Greek words *eu* (meaning good) and *karyon* (meaning nut, in reference to the cell nucleus).

Adapted from Wikipedia, the free online encyclopedia.

*"In these narrow Engines there is more curious Mathematicks; and the civility of these little Citizens more neatly sets forth the Wisdom of their Maker"*

Sir Thomas Browne

## The nearly invisible wild world

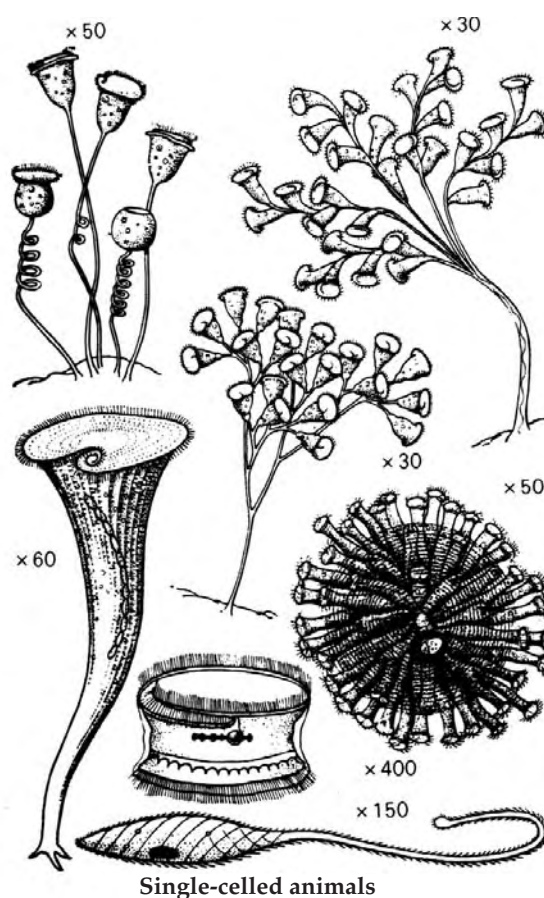
This report explores the extent of our knowledge of wild life in Offaly. For many of us 'wildlife' means birds and mammals – but the term also embraces all the smaller animals (especially insects, which account for three-quarters of all described species): as well as plants and fungi. But apart from all these more-or-less visible creatures there is an unseen world of biodiversity that comprises an enormously varied assemblage of single-celled creatures of varied ancestry collectively referred to as *protists* or *protoctists*.

Most protists are single-celled, but their complexity brings home at a glance just what an amazingly sophisticated piece of machinery the living cell is! Some are more animal-like than others: these are the *protozoa*; others have plant affinities (these are assigned to several phyla of algae), and yet others are closer to fungi (the slime moulds and water moulds). Bacteria were at one time lumped in with the protists, but now that we know more about them they are in a domain of their own.

### PROTOCTISTS

*Nucleated micro-organisms (excluding plants, animals and fungi) that evolved by symbiotic integration of at least two different kinds of former free-living bacteria.*

We will have little to say – in this first report anyway – about these amazing little creatures: simply because we know next to nothing about their status in Offaly at present – even though they are everywhere. If you examine some of the water from a moss-choked roof gutter with a compound microscope, you will be astonished at what lives there: water bears and ro-



tifers, nematodes, and other animalcules of many kinds, some of the most fascinating animals on earth, yet so tiny the unaided human eye sees them as mere specks, if at all. And along with these extraordinary animals is an immensely busy traffic of various green protists whizzing about their business. And there are lots and lots of desmids and other small algae. We know next to nothing about the life of Offaly on this scale, and yet there is probably not a neglected rain gutter in the county that does not have water bears and all the many tiny plants and animals that people the miniature ecosystem that is their world.



## DOMAIN EUCARYOTA (EUCARYOTES)



Slime moulds (from Ernst Haeckel's *Kunstformen der Natur*, 1904). It gives a vivid glimpse of the extraordinary beauty and variety of these strange organisms.



The exciting thing is that this hidden mini-universe still awaits its first Offaly explorers: minds young or old (you can never be too much of one or the other). To gain access to this world you need to wear glasses: in this case the glasses of the compound microscope. Which maybe costs €1000, around the price of an average computer: and there is as much or more to stimulate the mind and spirit in personal use of the microscope as any computer can offer. No school should be without one, and the ancillary projection equipment that enables its discoveries to be shared with a class. It is one of the great privileges of our age – up there along with the wonder of the internet – that such equipment is now available and not beyond the budget of any school that understands how much is has to give: understands enough to *want* it and make it happen.

## Phylum Amoebozoa

### Class Mycetozoa (slime moulds)

Slime moulds were traditionally regarded as fungi but are now recognised as a distinct phylum of protists. The slime moulds likely to attract attention are colourful jelly-like blobs on vegetation (two common species are bright yellow in one species, pink in the other). The blob is composed of an aggregate of individual amoebae, which have up to this been living apparently independent and separate lives, typically in soil or on tree bark. They feed by engulfing bacteria, fungi and decaying organic particles. But then, when they sense stressful change in their surroundings they all come together to form the blob, which over a period of days develops into a differentiated fruiting body that produces spores. These germinate to form new amoebae.

The drawing of slime moulds on the left is from a book published at the beginning of the last century.

### The slime moulds of Offaly<sup>1</sup>

#### CERATIOMYXALES

*Ceratiomyxa (Famintzinia) fruticulosa*

#### ECHINOSTELIALES

*Echinostelium minutum*

#### LICEALES

*Cribraria argillacea*

*C. aurantiaca*

*C. cancellata*

*Dictydiaethalium plumbeum*

*Enteridium (Reticularia) lycoperdon*

*E. splendens*

*Licea clarkii*

*L. denudescens*

*L. marginata*

*L. microscopica*

*L. nannengae*

*L. parasitica*

*L. pygmaea*

*Lycogala epidendrum sensu lato*

*L. exiguum*

*Tubifera ferruginosa (Tubulifera arachnoidea)*

#### TRICHIALES

*Arcyria cinerea*

*A. denudata*

*A. ferruginea*

*A. incarnata*

*A. nutans*

*A. pomiformis*

*Calomyxa metallica*

*Hemitrichia (Hyporhamma) abietina*

*H. calyculata*

*H. pardina*

*Metatrichia floriformis*

*Perichaena chrysosperma*

*P. corticalis*

*P. depressa*

*Trichia botrytis*

*T. decipiens*

*T. affinis*

*T. persimilis*

*T. munda*

*T. scabra*

*T. varia*

#### STEMONITALES

*Amaurochaete (Lachnobolus) atra*

*Collaria arcyronema*

*Comatricha nigra*

*C. pulchella*

*C. tenerima*

*Enerthenema papillatum*

*Lamproderma columbinum*

*L. scintillans*

*Macbrideola cornea*

*Paradiacheopsis solitaria*

*Stemonitis axifera*

*S. flavogenita*

*S. fusca*

*S. nigrescens* (placed by Lado in

*S. fusca*)

*S. virginiensis*

*Stemonitopsis typhina*

#### PHYSARALES

*Badhamia affinis*

*B. lilacina*

*B. panacea*

*Craterium minutum*

*Diderma chondrioderma*

*D. deplanatum*

*D. floriforme*

*D. hemisphaericum*

*D. simplex*

*D. spumarioides*

*Didymium difforme*

*D. melanospermum*

*D. nigripes*

*D. squamulosum*

*Fuligo septica* v. *flava*

*Leocarpus fragilis*

*Mucilago crustaceum*

*Physarum cinereum*

*P. leucophaeum*

*P. nutans* (*P. album*)

*P. psittacinum*

*P. pusillum*

*P. viride* v. *viride*

<sup>1</sup> Compiled by Roland McHugh.



## DOMAIN EUCARYOTA (EUCARYOTES)

Only a few experts have collected and studied slime moulds in Offaly: most of what we know is due to research carried out by Roland McHugh in recent

years. One of the species he found in Offaly (*Licea nennengae*) has not been recorded anywhere else in Britain or Ireland.



# Kingdom Plantae: plants

## Vascular plants: flowering plants, ferns and their relatives



Bee orchid

The vegetation of today's earth is dominated by flowering plants. They are the cornerstone of biodiversity because the communities they constitute provide the habitats for the myriad animal species that, directly or indirectly, all ultimately depend on them for food and shelter. The variety of wild flowers, trees and shrubs is one of the most enriching things in our environment not only because of this key role in the maintenance of biodiversity overall, but because it *enhances* it as a place to live and grow up in.

The total number of flowering plants and ferns recorded for Offaly is 718, and this is not that different from what it was fifty or a hundred years ago. The only plant known to have disappeared from the county (and in doing so from Ireland as a whole) is rannock rush, which was growing in Turraun Bog before Bord na Móna began work there. What has changed dramatically though is the abundance of many of these species, and therefore the contribution they make to the enhancement of our own lives. The two main reasons for this decline are *loss of habitat* (especially of bogland), and *nutrient enrichment*. Most plants are adapted to live in conditions of moderate to

low nutrient availability – because this is the natural state of things – so that when an abundance of nitrate or phosphate is supplied they are smothered by the small handful of species that are able to take advantage of this nutrient affluence. Among the plants that have suffered most in this regard are those that grew in the grasslands that were at the heart of Offaly farming until fifty or so years ago: essentially semi-natural communities which received little in the way of fertilisers.

Our priorities now with regard to the biodiversity of these habitats should be to identify and retain the few that are left to us; and to seek for opportunities to restore them, especially in contexts that make economic as well as ecological sense. The current REPS, and the agri-environmental schemes that will evolve from it in coming decades, can make a critical contribution in this regard.

## What we know

Diligent observation by a small number of dedicated botanists over many years has resulted in a picture of the geographical distribution of flowering (and other vascular) plants in the county (and indeed every other county) that is more detailed than for any other group in the flora. This information is summarised in the splendid *Atlas of the British and Irish Flora* produced in 2002, which is based on the records of the County Recorders of the Botanical Society of the British Isles and other workers. There is still much to discover about the detailed distribution of wild plants in the county however, and this is something to which *everyone* with an interest can contribute. But recording the occurrence of a species is really only a first step. Every species – even the most common – has a story unique to itself to tell. Each species lives a life different from all the others, and is equipped in all sorts of special ways for this particular role. Exploring the lives of flowers is an adventure that lasts a lifetime. Knowing what names to call them is only the start. This is the reason Offaly County Council will publish in 2008 *The Wildflowers of Offaly*: a book that will be not just a guide to their names, but an introduction to the fascinating lives they lead for anybody who is interested.

## DOMAIN EUCARYOTA (EUCARYOTES)

### The vascular plants of Offaly<sup>1</sup>

<i>Acer campestre</i> Field maple	<i>Arrhenatherum elatius</i> False oat-grass
<i>Acer pseudoplatanus</i> Sycamore	<i>Artemisia vulgaris</i> Mugwort
<i>Achillea millefolium</i> Yarrow	<i>Arum maculatum</i> Lords-and-Ladies
<i>Achillea ptarmica</i> Sneezewort	<i>Asplenium adiantum-nigrum</i> Black spleenwort
<i>Acinos arvensis</i> Basil thyme (1991)	<i>Asplenium ruta-muraria</i> Wall-rue
<i>Aconitum napellus</i> sens. lat. Monk's-hood	<i>Asplenium trichomanes</i> subsp. <i>quadrivalen</i> Maidenhair spleenwort
<i>Adiantum capillus-veneris</i> Maidenhair fern	<i>Aster</i> (alien N. American taxa) Michaelmas-daisies
<i>Aegopodium podagraria</i> Ground-elder	<i>Athyrium filix-femina</i> Lady-fern
<i>Aesculus hippocastanum</i> Horse-chestnut	<i>Atriplex patula</i> Common orache
<i>Aethusa cynapium</i> Fool's parsley	<i>Atriplex prostrata</i> Spear-leaved orache
<i>Agrimonia eupatoria</i> Agrimony	<i>Atropa belladonna</i> Deadly nightshade
<i>Agrimonia procera</i> Fragrant agrimony	<i>Avena fatua</i> Wild-oat
<i>Agrostis canina</i> Velvet bent	<i>Avenula sativa</i> Oat
<i>Agrostis capillaris</i> Common bent	<i>Avena strigosa</i> Bristle oat
<i>Agrostis gigantea</i> Black bent	<i>Baldellia ranunculoides</i> Lesser Water-plantain
<i>Agrostis stolonifera</i> Creeping bent	<i>Ballota nigra</i> Black Horehound
<i>Aira caryophyllea</i> Silver Hair-grass	<i>Barbarea intermedia</i> Medium-flowered Winter-cress
<i>Aira praecox</i> Early Hair-grass	<i>Barbarea vulgaris</i> Winter-cress
<i>Ajuga reptans</i> Bugle	<i>Bellis perennis</i> Daisy
<i>Alchemilla filicaulis</i> subsp. <i>vestita</i> Ladie's-mantle	<i>Berula erecta</i> Lesser Water-parsnip
<i>Alchemilla xanthochlora</i> Ladie's-mantle	<i>Beta vulgaris</i> subsp. <i>vulgaris</i> Root beet
<i>Alisma lanceolatum</i> Narrow-leaved Water-plantain	<i>Betula pendula</i> Silver birch
<i>Alisma plantago-aquatica</i> Water-plantain	<i>Betula pubescens</i> Downy birch
<i>Alliaria petiolata</i> Garlic mustard	<i>Bidens cernua</i> Nodding bur-marigold
<i>Allium ursinum</i> Ramsons	<i>Bidens tripartita</i> Trifid bur-marigold
<i>Allium vineale</i> Wild onion	<i>Blackstonia perfoliata</i> Yellow-wort
<i>Alnus glutinosa</i> Alder	<i>Blechnum spicant</i> Hard-fern
<i>Alnus incana</i> Grey alder	<i>Botrychium lunaria</i> Moonwort
<i>Alopecurus geniculatus</i> Marsh foxtail	<i>Brachypodium pinnatum</i> Tor-grass
<i>Alopecurus pratensis</i> Meadow foxtail	<i>Brachypodium sylvaticum</i> False brome
<i>Amaranthus retroflexus</i> Common amaranth	<i>Brassica napus</i> Rape
<i>Ambrosia artemisifolia</i> Ragweed	<i>Brassica rapa</i> Turnip
<i>Anacamptis pyramidalis</i> Pyramidal orchid	<i>Briza media</i> Quaking-grass
<i>Anagallis arvensis</i> Scarlet pimpernel	<i>Bromopsis erecta</i> Upright brome
<i>Anagallis minima</i> Chaffweed	<i>Bromopsis ramosa</i> Hairy-brome
<i>Anagallis tenella</i> Bog pimpernel	<i>Bromus commutatus</i> Meadow brome
<i>Anchusa arvensis</i> Bugloss	<i>Bromus hordeaceus</i> Soft-brome
<i>Andromeda polifolia</i> Bog-rosemary	<i>Bromus lepidus</i> Slender Soft-brome
<i>Anemone nemorosa</i> Wood anemone	<i>Buddleja davidii</i> Butterfly-bush
<i>Anemone ranunculoides</i> Yellow anemone	<i>Butomus umbellatus</i> Flowering-rush
<i>Angelica sylvestris</i> Wild angelica	<i>Buxus sempervirens</i> Box
<i>Anisantha sterilis</i> Barren brome	<i>Calendula officinalis</i> Pot marigold
<i>Antennaria dioica</i> Mountain everlasting	<i>Callitriche obtusangula</i> Blunt-fruited water-starwort
<i>Anthemis cotula</i> Stinking chamomile	<i>Callitriche stagnalis</i> Common water-starwort
<i>Anthoxanthum odoratum</i> Sweet Vernal-grass	<i>Calluna vulgaris</i> Heather
<i>Anthriscus caucalis</i> Bur chervil	<i>Caltha palustris</i> Marsh-marigold
<i>Anthriscus sylvestris</i> Cow parsley	<i>Calystegia pulchra</i> Hairy bindweed
<i>Anthyllis vulneraria</i> Kidney Vetch	<i>Calystegia sepium</i> Hedge bindweed
<i>Antirrhinum majus</i> Snapdragon	<i>Calystegia silvatica</i> Large bindweed
<i>Aphanes arvensis</i> Parsley-piert	<i>Campanula rotundifolia</i> Harebell
<i>Aphanes australis</i> Slender Parsley-piert	<i>Campanula trachelium</i> Nettle-leaved bellflower
<i>Apium inundatum</i> Lesser Marshwort	<i>Capsella bursa-pastoris</i> Shepherd's-purse
<i>Apium inundatum</i> x <i>A. nodiflorum</i>	<i>Cardamine flexuosa</i> Wavy bitter-cress
<i>Apium nodiflorum</i> Fool's-water-cress	<i>Cardamine hirsuta</i> Hairy bitter-cress
<i>Aquilegia vulgaris</i> Columbine	<i>Cardamine pratensis</i> Cuckooflower
<i>Arabidopsis thaliana</i> Thale cress	<i>Carduus crispus</i> Welled thistle
<i>Arabis hirsuta</i> Hairy rock-cress	<i>Carduus tenuiflorus</i> Slender thistle
<i>Arctium minus</i> Lesser burdock	<i>Carex acuta</i> Slender tufted-sedge
<i>Arenaria serpyllifolia</i> Thyme-leaved sandwort	<i>Carex acutiformis</i> Lesser pond-sedge
<i>Arenaria serpyllifolia</i> subsp. <i>serpylli</i>	<i>Carex appropinquata</i> Fibrous tussock-sedge
<i>Arenaria serpyllifolia</i> subsp. <i>leptoclad</i>	<i>Carex binervis</i> Green-ribbed sedge
<i>Armoracia rusticana</i> Horse-radish	

Species in red are protected by law. The date in brackets is the most recent record of these species.



## DOMAIN EUCARYOTA (EUCARYOTES)

<i>Carex caryophyllea</i> Spring-sedge	<i>Cirsium palustre</i> Marsh Thistle
<i>Carex curta</i> White sedge	<i>Cirsium vulgare</i> Spear Thistle
<i>Carex diandra</i> Lesser tussock-sedge	<i>Cladium mariscus</i> Great fen-sedge
<i>Carex dioica</i> Dioecious sedge	<i>Clematis vitalba</i> Traveller's-joy
<i>Carex disticha</i> Brown sedge	<i>Clinopodium acinos</i> Basil thyme
<i>Carex divulsa</i> Grey Sedge	<i>Coeloglossum viride</i> Frog orchid
<i>Carex echinata</i> Star sedge	<i>Conium maculatum</i> Hemlock
<i>Carex elata</i> Tufted-sedge	<i>Conopodium majus</i> Pignut
<i>Carex flacca</i> Glaucous sedge	<i>Convolvulus arvensis</i> Field bindweed
<i>Carex hirta</i> Hairy sedge	<i>Conyza canadensis</i> Canadian fleabane
<i>Carex hostiana</i> Tawny sedge	<i>Cornus sanguinea</i> Dogwood
<i>Carex hostiana</i> x <i>C. viridula</i>	<i>Corylus avellana</i> Hazel
<i>Carex laevigata</i> Smooth-stalked sedge	<i>Cotoneaster horizontalis</i> Wall cotoneaster
<i>Carex lasiocarpa</i> Slender sedge	<i>Cotoneaster microphyllus</i> Small-leaved cotoneasters
<i>Carex limosa</i> Bog-sedge	<i>Cotoneaster simonsii</i> Himalayan cotoneaster
<i>Carex nigra</i> Common sedge	<i>Crataegus laevigata</i> x <i>C. monogyna</i>
<i>Carex otrubae</i> False fox-sedge	<i>Crataegus monogyna</i> Hawthorn
<i>Carex otrubae</i> x <i>remota</i>	<i>Crepis biennis</i> Rough Hawk's-beard
<i>Carex ovalis</i> Oval sedge	<i>Crepis capillaris</i> Smooth Hawk's-beard
<i>Carex pallescens</i> Pale sedge	<i>Crepis paludosa</i> Marsh Hawk's-beard
<i>Carex panicea</i> Carnation sedge	<i>Crepis vesicaria</i> Beaked Hawk's-beard
<i>Carex paniculata</i> Greater tussock-sedge	<i>Crocasmia aurea</i> x <i>C. pottsii</i> Montbretia
<i>Carex pendula</i> Pendulous sedge	<i>Cymbalaria muralis</i> Ivy-leaved toadflax
<i>Carex pilulifera</i> Pill Sedge	<i>Cynosurus cristatus</i> Crested dog's-tail
<i>Carex pseudocyperus</i> Cyperus sedge	<i>Cytisus scoparius</i> Broom
<i>Carex pulicaris</i> Flea sedge	<i>Dactylis glomerata</i> Cock's-foot
<i>Carex remota</i> Remote sedge	<i>Dactylorhiza fuchsii</i> Common spotted-orchid
<i>Carex riparia</i> Greater pond-sedge	<i>Dactylorhiza incarnata</i> Early marsh-orchid
<i>Carex rostrata</i> Bottle sedge	<i>Dactylorhiza maculata</i> Heath spotted-orchid
<i>Carex spicata</i> Spiked sedge	<i>Dactylorhiza majalis</i> Western marsh-orchid
<i>Carex strigosa</i> Thin-spiked wood-sedge	<i>Dactylorhiza traunsteineri</i> Narrow-leaved marsh-orchid
<i>Carex sylvatica</i> Wood-sedge	<i>Danthonia decumbens</i> Heath-grass
<i>Carex vesicaria</i> Bladder-sedge	<i>Datura stramonium</i> Thorn-apple
<i>Carex viridula</i> subsp. <i>brachyrhyncha</i>	<i>Daucus carota</i> Wild carrot
<i>Carex viridula</i> subsp. <i>oedocarpa</i>	<i>Deschampsia cespitosa</i> Tufted hair-grass
<i>Carex viridula</i> subsp. <i>viridula</i>	<i>Deschampsia flexuosa</i> Wavy hair-grass
<i>Carlina vulgaris</i> Carlina thistle	<i>Descurainia sophia</i> Flixweed
<i>Carpinus betulus</i> Hornbeam	<i>Digitalis purpurea</i> Foxglove
<i>Carum carvi</i> Caraway	<i>Diplotaxis muralis</i> Annual wall-rocket
<i>Castanea sativa</i> Sweet chestnut	<i>Draba muralis</i> Wall whitlowgrass
<i>Catabrosa aquatica</i> Whorl-grass	<i>Drosera anglica</i> Great sundew
<i>Catapodium rigidum</i> Fern-grass	<i>Drosera anglica</i> x <i>D. rotundifolia</i>
<i>Centaurea nigra</i> Common knapweed	<i>Drosera intermedia</i> Oblong-leaved sundew
<i>Centaurea scabiosa</i> Greater knapweed	<i>Drosera rotundifolia</i> Round-leaved sundew
<i>Centaureum erythraea</i> Common centaury	<i>Dryopteris aemula</i> Hay-scented buckler-fern
<i>Centranthus ruber</i> Red valerian	<i>Dryopteris affinis</i> Scalp male-fern
<i>Cerastium diffusum</i> Sea mouse-ear	<i>Dryopteris carthusiana</i> Narrow buckler-fern
<i>Cerastium fontanum</i> Common mouse-ear	<i>Dryopteris dilatata</i> Broad buckler-fern
<i>Cerastium glomeratum</i> Sticky mouse-ear	<i>Dryopteris filix-mas</i> Male-fern
<i>Cerastium tomentosum</i> Snow-in-summer	<i>Eleocharis acicularis</i> Needle Spike-rush
<i>Ceterach officinarum</i> Rustyback	<i>Eleocharis multicaulis</i> Many-stalked Spike-rush
<i>Chaenorhinum minus</i> Small toadflax	<i>Eleocharis palustris</i> Common Spike-rush
<i>Chaerophyllum temulum</i> Rough chervil	<i>Eleocharis quinqueflora</i> Few-flowered Spike-rush
<i>Chelidonium majus</i> Greater celandine	<i>Eleocharis uniglumis</i> Slender spike-rush
<i>Chenopodium album</i> agg. Fat-hen	<i>Eleogiton fluitans</i> Floating club-rush
<i>Chenopodium bonus-henricus</i> Good-King-Henry	<i>Elodea canadensis</i> Canadian waterweed
<i>Chenopodium rubrum</i> Red goosefoot	<i>Elymus caninus</i> Bearded couch
<i>Chrysanthemum segetum</i> Corn marigold	<i>Elytrigia repens</i> Common couch
<i>Chrysosplenium oppositifolium</i> Opposite-leaved golden-saxifrage	<i>Empetrum nigrum</i> Crowberry
<i>Cicerbita macrophylla</i> Common blue-sow-thistle	<i>Epilobium angustifolium</i> Rosebay willowherb
<i>Cichorium intybus</i> Chicory	<i>Epilobium brunnescens</i> New Zealand willowherb
<i>Circaea lutetiana</i> Enchanter's-nightshade	<i>Epilobium ciliatum</i> American willowherb
<i>Cirsium arvense</i> Creeping thistle	<i>Epilobium hirsutum</i> Great willowherb
<i>Cirsium dissectum</i> Meadow thistle	<i>Epilobium montanum</i> Broad-leaved willowherb
<i>Cirsium dissectum</i> x <i>C. palustre</i>	<i>Epilobium obscurum</i> Short-fruited willowherb
	<i>Epilobium palustre</i> Marsh willowherb

## DOMAIN EUCARYOTA (EUCARYOTES)

<i>Epilobium parviflorum</i>	Hoary willowherb	<i>Galeopsis speciosa</i>	Large-flowered hemp-nettle
<i>Epipactis helleborine</i>	Broad-leaved helleborine	<i>Galeopsis tetrahit</i>	Common hemp-nettle
<i>Epipactis palustris</i>	Marsh helleborine	<i>Galium aparine</i>	Cleavers
<i>Epipactis phyllanthes</i>	Green-flowered helleborine	<i>Galium mollugo</i>	Hedge bedstraw
<i>Equisetum arvense</i>	Field horsetail	<i>Galium odoratum</i>	Woodruff
<i>Equisetum arvense</i> x <i>E. fluviatile</i>	Shore horsetail	<i>Galium palustre</i>	Common marsh-bedstraw
<i>Equisetum fluviatile</i>	Water horsetail	<i>Galium saxatile</i>	Heath bedstraw
<i>Equisetum hyemale</i>	Rough horsetail	<i>Galium uliginosum</i>	Fen bedstraw
<i>Equisetum palustre</i>	Marsh horsetail	<i>Galium verum</i>	Lady's bedstraw
<i>Equisetum sylvaticum</i>	Wood horsetail	<i>Gentianella amarella</i>	Autumn gentian
<i>Equisetum telmateia</i>	Great horsetail	<i>Gentianella campestris</i>	Field gentian
<i>Equisetum variegatum</i>	Variegated horsetail	<i>Geranium dissectum</i>	Cut-leaved crane's-bill
<i>Erica cinerea</i>	Bell heather	<i>Geranium lucidum</i>	Shining crane's-bill
<i>Erica tetralix</i>	Cross-leaved heath	<i>Geranium molle</i>	Dove's-foot crane's-bill
<i>Erigeron acer</i>	Blue fleabane	<i>Geranium pratense</i>	Meadow crane's-bill
<i>Erigeron karvinskianus</i>	Mexican fleabane	<i>Geranium pyrenaicum</i>	Hedgerow crane's-bill
<i>Erinus alpinus</i>	Fairy foxglove	<i>Geranium robertianum</i>	Herb-Robert
<i>Eriophorum angustifolium</i>	Common cottongrass	<i>Geranium sanguineum</i>	Bloody crane's-bill
<i>Eriophorum gracile</i>	Slender cottongrass (1997)	<i>Geum rivale</i>	Water avens
<i>Eriophorum latifolium</i>	Broad-leaved cottongrass	<i>Geum rivale</i> x <i>G. urbanum</i>	Hybrid avens
<i>Eriophorum vaginatum</i>	Hare's-tail cottongrass	<i>Geum urbanum</i>	Wood avens
<i>Erodium moschatum</i>	Musk stork's-bill	<i>Glechoma hederacea</i>	Ground-ivy
<i>Erophila glabrescens</i>	Glabrous whitlowgrass	<i>Glyceria declinata</i>	Small sweet-grass
<i>Erophila verna</i> agg.	Common whitlowgrasses	<i>Glyceria fluitans</i>	Floating sweet-grass
<i>Erucastrum gallicum</i>	Hairy rocket	<i>Glyceria fluitans</i> x <i>G. notata</i>	Hybrid sweet-grass
<i>Erysimum cheiranthoides</i>	Treacle-mustard	<i>Glyceria maxima</i>	Reed sweet-grass
<i>Erysimum cheiri</i>	Wallflower	<i>Glyceria notata</i>	Plicate sweet-grass
<i>Euonymus europaeus</i>	Spindle	<i>Gnaphalium sylvaticum</i>	Heath cudweed
<i>Eupatorium cannabinum</i>	Hemp-agrimony	<i>Gnaphalium uliginosum</i>	Marsh cudweed
<i>Euphorbia cyparissias</i>	Cypress spurge	<i>Groenlandia densa</i>	Opposite-leaved pondweed (1993)
<i>Euphorbia exigua</i>	Dwarf spurge	<i>Gymnadenia conopsea</i>	Fragrant orchid
<i>Euphorbia helioscopia</i>	Sun spurge	<i>Gymnadenia conopsea</i> subsp. <i>conopsea</i>	
<i>Euphorbia lathyris</i>	Caper spurge	<i>Hedera helix</i>	Ivy
<i>Euphorbia peplus</i>	Petty spurge	<i>Helianthus annuus</i>	Sunflower
<i>Euphrasia arctica</i> subsp. <i>borealis</i>		<i>Helictotrichon pubescens</i>	Downy oat-grass
<i>Euphrasia micrantha</i>		<i>Heracleum mantegazzianum</i>	Giant hogweed
<i>Euphrasia nemorosa</i>		<i>Heracleum sphondylium</i>	Hogweed
<i>Euphrasia officinalis</i>	Eyebrights	<i>Hesperis matronalis</i>	Dame's-violet
<i>Euphrasia rostkoviana</i> subsp. <i>rostkoviana</i>		<i>Hieracium</i> agg.	Hawkweeds
<i>Euphrasia scottica</i>		<i>Hippuris vulgaris</i>	Mare's-tail
<i>Fagus sylvatica</i>	Beech	<i>Holcus lanatus</i>	Yorkshire-fog
<i>Fallopia convolvulus</i>	Black-bindweed	<i>Holcus mollis</i>	Creeping soft-grass
<i>Fallopia japonica</i>	Japanese knotweed	<i>Hordeum secalinum</i>	Meadow barley (1998)
<i>Fallopia sachalinensis</i>	Giant knotweed	<i>Humulus lupulus</i>	Hop
<i>Festuca arundinacea</i>	Tall fescue	<i>Huperzia selago</i>	Fir clubmoss
<i>Festuca filiformis</i>	Fine-leaved sheep's-fescue	<i>Hyacinthoides hispanica</i>	Spanish bluebell
<i>Festuca gigantea</i>	Giant fescue	<i>Hyacinthoides non-scripta</i>	Bluebell
<i>Festuca ovina</i>	Sheep's-fescue	<i>Hydrocharis morsus-ranae</i>	Frogbit
<i>Festuca pratensis</i>	Meadow fescue	<i>Hydrocotyle vulgaris</i>	Marsh pennywort
<i>Festuca pratensis</i> x <i>Lolium perenne</i>	Hybrid fescue	<i>Hymenophyllum wilsonii</i>	Wilson's filmy-fern
<i>Festuca rubra</i>	Red fescues	<i>Hyoscyamus niger</i>	Henbane
<i>Filipendula ulmaria</i>	Meadowsweet	<i>Hypericum androsaemum</i>	Tutsan
<i>Foeniculum vulgare</i>	Fennel	<i>Hypericum humifusum</i>	Trailing St John's-wort
<i>Forsythia suspensa</i> x <i>F. viridissima</i>	Forsythia	<i>Hypericum maculatum</i>	Imperforate St John's-wort
<i>Fragaria vesca</i>	Wild strawberry	<i>Hypericum perforatum</i>	Perforate St John's-wort
<i>Fragaria x ananassa</i>	Garden strawberry	<i>Hypericum pulchrum</i>	Slender St John's-wort
<i>Frangula alnus</i>	Alder buckthorn	<i>Hypericum tetrapterum</i>	Square-stalked St John's-wort
<i>Fraxinus excelsior</i>	Ash	<i>Hypochaeris radicata</i>	Cat's-ear
<i>Fuchsia magellanica</i>	Fuchsia	<i>Ilex aquifolium</i>	Holly
<i>Fumaria bastardii</i>	Tall ramping-fumitory	<i>Impatiens glandulifera</i>	Indian balsam
<i>Fumaria capreolata</i>	White ramping-fumitory	<i>Iris foetidissima</i>	Stinking iris
<i>Fumaria muralis</i>	Common ramping-fumitory	<i>Iris pseudacorus</i>	Yellow iris
<i>Fumaria officinalis</i>	Common fumitory	<i>Isolepis setacea</i>	Bristle club-rush
<i>Galanthus nivalis</i>	Snowdrop	<i>Jasione montana</i>	Sheep's-bit
<i>Galeopsis angustifolia</i>	Red hemp-nettle (1991)	<i>Juncus acutiflorus</i>	Sharp-flowered rush
<i>Galeopsis bifida</i>	Bifid hemp-nettle	<i>Juncus articulatus</i>	Jointed rush



## DOMAIN EUCARYOTA (EUCARYOTES)

<i>Juncus bulbosus</i> Bulbous rush	<i>Malus sylvestris</i> Apples
<i>Juncus conglomeratus</i> Compact rush	<i>Malva sylvestris</i> Common mallow
<i>Juncus effusus</i> Soft-rush	<i>Matricaria discoidea</i> Pineappleweed
<i>Juncus effusus</i> x <i>J. inflexus</i>	<i>Meconopsis cambrica</i> Welsh poppy
<i>Juncus inflexus</i> Hard rush	<i>Medicago lupulina</i> Black medick
<i>Juncus squarrosus</i> Heath rush	<i>Melampyrum pratense</i> Common cow-wheat
<i>Juncus subnodulosus</i> Blunt-flowered rush	<i>Melica uniflora</i> Wood melick
<i>Juncus tenuis</i> Slender rush	<i>Melissa officinalis</i> Balm
<i>Juniperus communis</i> Common juniper	<i>Mentha aquatica</i> Water mint
<i>Knautia arvensis</i> Field scabious	<i>Mentha aquatica</i> x <i>M. arvensis</i> Whorled mint
<i>Koeleria macrantha</i> Crested hair-grass	<i>Mentha aquatica</i> x <i>M. spicata</i> Peppermint
<i>Lamium album</i> White dead-nettle	<i>Mentha arvensis</i> Corn mint
<i>Lamium amplexicaule</i> Henbit dead-nettle	<i>Mentha arvensis</i> x <i>M. spicata</i> Bushy mint
<i>Lamium hybridum</i> Cut-leaved dead-nettle	<i>Mentha spicata</i> Spear mint
<i>Lamium purpureum</i> Red dead-nettle	<i>Mentha suaveolens</i> Round-leaved mint
<i>Lapsana communis</i> Nipplewort	<i>Menyanthes trifoliata</i> Bogbean
<i>Larix decidua</i> European larch	<i>Mercurialis perennis</i> Dog's mercury
<i>Larix decidua</i> x <i>L. kaempferi</i> Hybrid larch	<i>Millium effusum</i> Wood millet
<i>Larix kaempferi</i> Japanese larch	<i>Minuartia hybrida</i> Fine-leaved sandwort
<i>Lathraea squamaria</i> Toothwort	<i>Moeblingia trinervia</i> Three-nerved sandwort
<i>Lathyrus linifolius</i> Bitter-vetch	<i>Molinia caerulea</i> Purple moor-grass
<i>Lathyrus palustris</i> Marsh pea	<i>Monotropa hypopitys</i> Yellow bird's-nest
<i>Lathyrus pratensis</i> Meadow vetchling	<i>Montia fontana</i> Blinks
<i>Lemna gibba</i> Fat duckweed	<i>Mycelis muralis</i> Wall lettuce
<i>Lemna minor</i> Common duckweed	<i>Myosotis arvensis</i> Field forget-me-not
<i>Lemna trisulca</i> Ivy-leaved duckweed	<i>Myosotis discolor</i> Changing forget-me-not
<i>Lens culinaris</i> Lentil	<i>Myosotis laxa</i> Tufted forget-me-not
<i>Leontodon autumnalis</i> Autumn hawkbit	<i>Myosotis scorpioides</i> Water forget-me-not
<i>Leontodon hispidus</i> Rough hawkbit	<i>Myosotis secunda</i> Creeping forget-me-not
<i>Leontodon saxatilis</i> Lesser hawkbit	<i>Myrica gale</i> Bog-myrtle
<i>Leucanthemum vulgare</i> Oxeye daisy	<i>Myriophyllum alterniflorum</i> Alternate water-milfoil
<i>Leucojum aestivum</i> Summer snowflake	<i>Myriophyllum spicatum</i> Spiked water-milfoil
<i>Ligustrum ovalifolium</i> Garden privet	<i>Myriophyllum verticillatum</i> Whorled water-milfoil
<i>Ligustrum vulgare</i> Wild privet	<i>Nardus stricta</i> Mat-grass
<i>Linaria purpurea</i> Purple toadflax	<i>Narthecium ossifragum</i> Bog asphodel
<i>Linaria vulgaris</i> Common toadflax	<i>Neotinea maculata</i> Dense-flowered orchid
<i>Linum catharticum</i> Fairy flax	<i>Neottia nidus-avis</i> Bird's-nest orchid
<i>Linum usitatissimum</i> Flax	<i>Nuphar lutea</i> Yellow water-lily
<i>Listera cordata</i> Lesser twayblade	<i>Nymphaea alba</i> White water-lily
<i>Listera ovata</i> Common twayblade	<i>Odontites vernus</i> Red bartsia
<i>Lithospermum arvense</i> Field gromwell	<i>Oenanthe aquatica</i> Fine-leaved water-dropwort
<i>Lithospermum officinale</i> Common gromwell	<i>Oenanthe crocata</i> Hemlock water-dropwort
<i>Littorella uniflora</i> Shoreweed	<i>Oenanthe fistulosa</i> Tubular water-dropwort
<i>Lolium multiflorum</i> Italian rye-grass	<i>Oenanthe fluviatilis</i> River water-dropwort
<i>Lolium multiflorum</i> x <i>L. perenne</i>	<i>Oenothera glazioviana</i> Large-flowered evening-primrose
<i>Lolium perenne</i> Perennial rye-grass	<i>Omalotheca sylvatica</i> Heath cudweed (1900)
<i>Lonicera nitida</i> Wilson's honeysuckle	<i>Ononis repens</i> Common restharrow
<i>Lonicera periclymenum</i> Honeysuckle	<i>Ophioglossum vulgatum</i> Adder's-tongue
<i>Lotus corniculatus</i> Common bird's-foot-trefoil	<i>Ophrys apifera</i> Bee orchid
<i>Lotus pedunculatus</i> Greater bird's-foot-trefoil	<i>Ophrys insectifera</i> Fly orchid
<i>Luzula campestris</i> Field wood-rush	<i>Orchis mascula</i> Early-purple orchid
<i>Luzula multiflora</i> Heath wood-rush	<i>Orchis morio</i> Green-winged orchid
<i>Luzula pilosa</i> Hairy wood-rush	<i>Oreopteris limbosperma</i> Lemon-scented fern
<i>Luzula sylvatica</i> Great wood-rush	<i>Origanum vulgare</i> Wild marjoram
<i>Lychnis flos-cuculi</i> Ragged-robin	<i>Orobancha hederaceae</i> Ivy broomrape
<i>Lycopersicon esculentum</i> Tomato	<i>Orobancha minor</i> Common broomrape
<i>Lycopodiella inundata</i> Marsh clubmoss (c.1988)	<i>Orthilia secunda</i> Serrated wintergreen
<i>Lycopodium clavatum</i> Stag's-horn clubmoss	<i>Osmunda regalis</i> Royal fern
<i>Lycopus europaeus</i> Gipsywort	<i>Oxalis acetosella</i> Wood-sorrel
<i>Lysimachia nemorum</i> Yellow pimpernel	<i>Papaver argemone</i> Prickly poppy
<i>Lysimachia nummularia</i> Creeping-Jenny	<i>Papaver dubium</i> Long-headed poppy
<i>Lysimachia vulgaris</i> Yellow loosestrife	<i>Papaver dubium</i> subsp. <i>dubium</i>
<i>Lythrum portula</i> Water-purslane	<i>Papaver dubium</i> subsp. <i>lecoqii</i>
<i>Lythrum salicaria</i> Purple-loosestrife	<i>Papaver hybridum</i> Rough poppy (1900)
	<i>Papaver rhoeas</i> Common poppy

## DOMAIN EUCARYOTA (EUCARYOTES)

<i>Papaver somniferum</i> Opium poppy	<i>Potamogeton natans</i> Broad-leaved pondweed
<i>Parietaria judaica</i> Pellitory-of-the-wall	<i>Potamogeton obtusifolius</i> Blunt-leaved pondweed
<i>Parnassia palustris</i> Grass-of-Parnassus	<i>Potamogeton pectinatus</i> Fennel pondweed
<i>Pastinaca sativa</i> Wild parsnip	<i>Potamogeton perfoliatus</i> Perfoliate pondweed
<i>Pedicularis palustris</i> Marsh lousewort	<i>Potamogeton polygonifolius</i> Bog pondweed
<i>Pedicularis sylvatica</i> Lousewort	<i>Potentilla anglica</i> Trailing tormentil
<i>Pentaglottis sempervirens</i> Green alkanet	<i>Potentilla anglica</i> x <i>P. reptans</i> & <i>P. e.</i> Hybrid cinquefoils
<i>Persicaria amphibia</i> Amphibious bistort	<i>Potentilla anserina</i> Silverweed
<i>Persicaria hydropiper</i> Water-pepper	<i>Potentilla erecta</i> Tormentil
<i>Persicaria lapathifolia</i> Pale persicaria	<i>Potentilla palustris</i> Marsh cinquefoil
<i>Persicaria maculosa</i> Redshank	<i>Potentilla reptans</i> Creeping cinquefoil
<i>Persicaria minor</i> Small Water-pepper	<i>Potentilla sterilis</i> Barren strawberry
<i>Petasites fragrans</i> Winter heliotrope	<i>Primula veris</i> Cowslip
<i>Petasites hybridus</i> Butterbur	<i>Primula veris</i> x <i>P. vulgaris</i>
<i>Petroselinum crispum</i> Garden parsley	<i>Primula vulgaris</i> Primrose
<i>Phalaris arundinacea</i> Reed canary-grass	<i>Prunella vulgaris</i> Selfheal
<i>Phegopteris connectilis</i> Beech fern	<i>Prunus avium</i> Wild cherry
<i>Phleum bertolonii</i> Smaller cat's-tail	<i>Prunus cerasus</i> Dwarf cherry
<i>Phleum pratense</i> Timothy	<i>Prunus domestica</i> Wild plum
<i>Phragmites australis</i> Common reed	<i>Prunus laurocerasus</i> Cherry laurel
<i>Phyllitis scolopendrium</i> Hart's-tongue	<i>Prunus padus</i> Bird cherry
<i>Picea abies</i> Norway spruce	<i>Prunus spinosa</i> Blackthorn
<i>Picea sitchensis</i> Sitka spruce	<i>Pseudorchis albida</i> Small-white orchid
<i>Picris hieracioides</i> Hawkweed oxtongue	<i>Pseudotsuga menziesii</i> Douglas fir
<i>Pilosella officinarum</i> Mouse-ear-hawkweed	<i>Pteridium aquilinum</i> Bracken
<i>Pimpinella saxifraga</i> Burnet-saxifrage	<i>Pulicaria dysenterica</i> Common fleabane
<i>Pinguicula lusitanica</i> Pale vutterwort	<i>Pyrola minor</i> Common wintergreen
<i>Pinguicula vulgaris</i> Common vutterwort	<i>Pyrola rotundifolia</i> Round-leaved wintergreen
<i>Pinus contorta</i> Lodgepole pine	<i>Quercus petraea</i> Sessile oak
<i>Pinus sylvestris</i> Scots pine	<i>Quercus petraea</i> x <i>Q. robur</i>
<i>Plantago lanceolata</i> Ribwort plantain	<i>Quercus robur</i> Pedunculate oak
<i>Plantago major</i> Greater plantain	<i>Ranunculus acris</i> Meadow buttercup
<i>Plantago media</i> Hoary plantain	<i>Ranunculus aquatilis</i> Common water-crowfoot
<i>Platanthera bifolia</i> Lesser butterfly-orchid	<i>Ranunculus auricomus</i> Goldilocks buttercup
<i>Platanthera chlorantha</i> Greater butterfly-orchid	<i>Ranunculus bulbosus</i> Bulbous buttercup
<i>Poa annua</i> Annual meadow-grass	<i>Ranunculus circinatus</i> Fan-leaved water-crowfoot
<i>Poa compressa</i> Flattened meadow-grass	<i>Ranunculus ficaria</i> Lesser celandine
<i>Poa humilis</i> Spreading meadow-grass	<i>Ranunculus ficaria</i> subsp. <i>bulbilifer</i>
<i>Poa nemoralis</i> Wood meadow-grass	<i>Ranunculus ficaria</i> subsp. <i>ficaria</i>
<i>Poa pratensis</i> Smooth meadow-grass	<i>Ranunculus flammula</i> Lesser spearwort
<i>Poa trivialis</i> Rough meadow-grass	<i>Ranunculus hederaceus</i> Ivy-leaved crowfoot
<i>Polygala serpyllifolia</i> Heath milkwort	<i>Ranunculus lingua</i> Greater spearwort
<i>Polygala vulgaris</i> Common milkwort	<i>Ranunculus peltatus</i> Pond water-crowfoot
<i>Polygonum arenastrum</i> Equal-leaved knotgrass	<i>Ranunculus penicillatus</i> Stream water-crowfoot
<i>Polygonum aviculare</i> Knotgrass	<i>Ranunculus penicillatus</i> subsp. <i>penicil.</i>
<i>Polypodium cambricum</i> Southern polypody	<i>Ranunculus repens</i> Creeping buttercup
<i>Polypodium interjectum</i> Intermediate polypody	<i>Ranunculus sceleratus</i> Celery-leaved buttercup
<i>Polypodium vulgare</i> Polypody	<i>Ranunculus trichophyllus</i> Thread-leaved water-crowfoot
<i>Polystichum aculeatum</i> Hard shield-fern	<i>Raphanus raphanistrum</i> subsp. <i>raphanistrum</i> Wild radish
<i>Polystichum setiferum</i> Soft shield-fern	<i>Reseda lutea</i> Wild mignonette
<i>Populus alba</i> White poplar	<i>Reseda luteola</i> Weld
<i>Populus alba</i> x <i>P. tremula</i> Grey poplar	<i>Rhamnus cathartica</i> Buckthorn
<i>Populus deltoides</i> x <i>P. nigra</i> Hybrid black-poplar	<i>Rhinanthus minor</i> Yellow-rattle
<i>Populus nigra</i> subsp. <i>betulifolia</i> Black-poplar	<i>Rhododendron ponticum</i> Rhododendron
<i>Populus tremula</i> Aspen	<i>Rhynchospora alba</i> White beak-sedge
<i>Potamogeton alpinus</i> Red pondweed	<i>Rhynchospora fusca</i> Brown beak-sedge
<i>Potamogeton berchtoldii</i> Small pondweed	<i>Ribes nigrum</i> Black currant
<i>Potamogeton coloratus</i> Fen pondweed	<i>Ribes rubrum</i> Red currant
<i>Potamogeton crispus</i> Curled pondweed	<i>Ribes sanguineum</i> Flowering currant
<i>Potamogeton friesii</i> Flat-stalked pondweed	<i>Ribes uva-crispa</i> Gooseberry
<i>Potamogeton gramineus</i> Various-leaved pondweed	<i>Rorippa amphibia</i> Great yellow-cress
<i>Potamogeton gramineus</i> x <i>P. lucens</i> Long-leaved pondweed	<i>Rorippa amphibia</i> x <i>R. sylvestris</i> Hybrid yellow-cress
<i>Potamogeton gramineus</i> x <i>P. perfoliatus</i> Bright-leaved Pondweed	<i>Rorippa microphylla</i> Narrow-fruited water-cress
<i>Potamogeton lucens</i> Shining pondweed	<i>Rorippa microphylla</i> x <i>R. nasturtium-aq.</i> Hybrid water-cress
	<i>Rorippa nasturtium-aquaticum</i> Water-cress



## DOMAIN EUCARYOTA (EUCARYOTES)

<i>Rorippa palustris</i> Marsh yellow-cress	<i>Sedum acre</i> Biting stonecrop
<i>Rorippa sylvestris</i> Creeping yellow-cress	<i>Sedum album</i> White stonecrop
<i>Rosa agrestis</i> Small-leaved sweet-briar	<i>Sedum rupestre</i> Reflexed stonecrop
<i>Rosa arvensis</i> Field-rose	<i>Selaginella selaginoides</i> Lesser clubmoss
<i>Rosa arvensis</i> x <i>R. canina</i>	<i>Sempervivum tectorum</i> House-leek
<i>Rosa caesia</i> x <i>R. canina</i> ( <i>R. x dumalis</i> )	<i>Senecio aquaticus</i> Marsh ragwort
<i>Rosa canina</i> Dog-rose	<i>Senecio aquaticus</i> x <i>S. jacobaea</i>
<i>Rosa canina</i> x <i>R. obtusifolia</i>	<i>Senecio jacobaea</i> Common ragwort
<i>Rosa canina</i> x <i>R. sherardii</i>	<i>Senecio sylvaticus</i> Heath groundsel
<i>Rosa canina</i> x <i>R. stylosa</i>	<i>Senecio viscosus</i> Sticky groundsel
<i>Rosa canina</i> x <i>Rosa tomentosa</i>	<i>Senecio vulgaris</i> Groundsel
<i>Rosa pimpinellifolia</i> Burnet rose	<i>Sesleria caerulea</i> Blue moor-grass
<i>Rosa rubiginosa</i> Sweet-briar	<i>Setaria viridis</i> Green bristle-grass
<i>Rosa sherardii</i> Sherard's downy-rose	<i>Sherardia arvensis</i> Field madder
<i>Rosa stylosa</i> Short-styled field-rose	<i>Silene dioica</i> Red campion
<i>Rosa tomentosa</i> Harsh downy-rose	<i>Silene dioica</i> x <i>S. latifolia</i>
<i>Rubia peregrina</i> Wild madder	<i>Silene latifolia</i> White campion
<i>Rubus caesius</i> Dewberry	<i>Silene vulgaris</i> Bladder campion
<i>Rubus fruticosus</i> Bramble	<i>Sinapis alba</i> White mustard
<i>Rubus idaeus</i> Raspberry	<i>Sinapis arvensis</i> Charlock
<i>Rubus saxatilis</i> Stone bramble	<i>Sisymbrium altissimum</i> Tall rocket
<i>Rumex acetosa</i> Common sorrel	<i>Sisymbrium officinale</i> Hedge mustard
<i>Rumex acetosella</i> Sheep's sorrel	<i>Sisymbrium orientale</i> Eastern rocket
<i>Rumex conglomeratus</i> Clustered dock	<i>Sium latifolium</i> Greater water-parsnip
<i>Rumex crispus</i> Curled dock	<i>Smyrnium olusatrum</i> Alexanders
<i>Rumex hydrolapathum</i> Water dock	<i>Solanum dulcamara</i> Bittersweet
<i>Rumex obtusifolius</i> Broad-leaved dock	<i>Solanum nigrum</i> Black nightshade
<i>Rumex sanguineus</i> Wood dock	<i>Solanum tuberosum</i> Potato
<i>Sagina apetala</i> Annual pearlwort	<i>Soleirolia soleiroliae</i> Mind-your-own-business
<i>Sagina apetala</i> subsp. <i>erecta</i>	<i>Solidago virgaurea</i> Goldenrod
<i>Sagina nodosa</i> Knotted pearlwort	<i>Sonchus arvensis</i> Perennial sow-thistle
<i>Sagina procumbens</i> Procumbent pearlwort	<i>Sonchus asper</i> Prickly sow-thistle
<i>Sagittaria sagittifolia</i> Arrowhead	<i>Sonchus oleraceus</i> Smooth sow-thistle
<i>Salix alba</i> White willow	<i>Sorbus aucuparia</i> Rowan
<i>Salix aurita</i> Eared willow	<i>Sorbus hibernica</i> Irish whitebeam
<i>Salix aurita</i> x <i>S. repens</i>	<i>Sparganium emersum</i> Unbranched bur-reed
<i>Salix caprea</i> Goat willow	<i>Sparganium erectum</i> Branched bur-reed
<i>Salix caprea</i> x <i>S. cinerea</i>	<i>Sparganium natans</i> Least bur-reed
<i>Salix caprea</i> x <i>S. viminalis</i> Broad-leaved osier	<i>Spergularia rubra</i> Sand spurrey
<i>Salix cinerea</i> Grey willow	<i>Spiranthes spiralis</i> Autumn lady's-tresses
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Spirodela polyrhiza</i> Greater duckweed
<i>Salix fragilis</i> Crack-willow	<i>Stachys arvensis</i> Field woundwort
<i>Salix pentandra</i> Bay willow	<i>Stachys palustris</i> Marsh woundwort
<i>Salix purpurea</i> Purple willow	<i>Stachys palustris</i> x <i>S. sylvatica</i> Hybrid woundwort
<i>Salix repens</i> Creeping willow	<i>Stachys sylvatica</i> Hedge woundwort
<i>Salix triandra</i> Almond willow	<i>Stellaria graminea</i> Lesser stitchwort
<i>Salix viminalis</i> Osier	<i>Stellaria holostea</i> Greater stitchwort
<i>Sambucus ebulus</i> Dwarf elder	<i>Stellaria media</i> Common chickweed
<i>Sambucus nigra</i> Elder	<i>Stellaria palustris</i> Marsh stitchwort
<i>Samolus valerandi</i> Brookweed	<i>Stellaria uliginosa</i> Bog stitchwort
<i>Sanguisorba minor</i> subsp. <i>minor</i> Salad burnet	<i>Succisa pratensis</i> Devil's-bit scabious
<i>Sanicula europaea</i> Sanicle	<i>Symphoricarpos albus</i> Snowberry
<i>Saponaria officinalis</i> Soapwort	<i>Symphytum asperum</i> x <i>S. officinale</i> Russian comfrey
<i>Sarracenia purpurea</i> Pitcher plant	<i>Symphytum officinale</i> Common comfrey
<i>Saxifraga hirculus</i> Marsh saxifrage (1866)	<i>Syringa vulgaris</i> Lilac
<i>Saxifraga spathularis</i> x <i>S. umbrosa</i> Londonpride	<i>Tanacetum parthenium</i> Feverfew
<i>Saxifraga tridactylites</i> Rue-leaved saxifrage	<i>Tanacetum vulgare</i> Tansy
<i>Scandix pecten-veneris</i> Shepherd's-needle	<i>Taraxacum agg.</i> Dandelions
<i>Scheuchzeria palustris</i> Rannoch-rush (extinct)	<i>Taxus baccata</i> Yew
<i>Schoenoplectus lacustris</i> Common club-rush	<i>Teucrium scorodonia</i> Wood sage
<i>Schoenoplectus tabernaemontani</i> Grey club-rush	<i>Thalictrum flavum</i> Common meadow-rue
<i>Schoenus nigricans</i> Black bog-rush	<i>Thlaspi arvense</i> Field penny-cress
<i>Scirpus sylvaticus</i> Wood club-rush	<i>Thymus polytrichus</i> Wild thyme
<i>Scrophularia auriculata</i> Water figwort	<i>Tilia cordata</i> x <i>T. platyphyllos</i> Lime
<i>Scrophularia nodosa</i> Common figwort	<i>Tilia platyphyllos</i> Large-leaved lime
<i>Scutellaria galericulata</i> Skullcap	<i>Torilis japonica</i> Upright hedge-parsley

## DOMAIN EUCARYOTA (EUCARYOTES)

*Torilis nodosa* Knotted hedge-parsley  
*Tragopogon pratensis* Goat's-beard  
*Trichophorum cespitosum* Deergrass  
*Trifolium campestre* Hop trefoil  
*Trifolium dubium* Lesser trefoil  
*Trifolium hybridum* Alsike clover  
*Trifolium medium* Zigzag clover  
*Trifolium pratense* Red clover  
*Trifolium repens* White clover  
*Triglochin palustre* Marsh arrowgrass  
*Tripleurospermum inodorum* Scentless mayweed  
*Trisetum flavescens* Yellow oat-grass  
*Triticum aestivum* Bread wheat  
*Tussilago farfara* Colt's-foot  
*Typha angustifolia* Lesser bulrush  
*Typha latifolia* Bulrush  
*Ulex europaeus* Gorse  
*Ulex gallii* Western gorse  
*Ulmus glabra* Wych elm  
*Ulmus minor* Ulmus minor  
*Ulmus procera* English elm  
*Umbilicus rupestris* Navelwort  
*Urtica dioica* Common nettle  
*Urtica urens* Small nettle  
*Utricularia intermedia* Intermediate bladderwort  
*Utricularia minor* Lesser bladderwort  
*Utricularia vulgaris* Greater bladderwort  
*Vaccinium myrtillus* Bilberry  
*Vaccinium oxycoccos* Cranberry  
*Valeriana officinalis* Common valerian  
*Valerianella carinata* Keeled-fruited cornsalad  
*Valerianella dentata* Narrow-fruited cornsalad  
*Valerianella locusta* Common cornsalad  
*Valerianella rimosa* Broad-fruited cornsalad  
*Verbascum thapsus* Great mullein  
*Verbena officinalis* Vervain  
*Veronica agrestis* Green field-speedwell  
*Veronica anagallis-aquatica* Blue water-speedwell

*Veronica arvensis* Wall speedwell  
*Veronica beccabunga* Brooklime  
*Veronica catenata* Pink water-speedwell  
*Veronica chamaedrys* Germander speedwell  
*Veronica filiformis* Slender speedwell  
*Veronica hederifolia* Ivy-leaved speedwell  
*Veronica montana* Wood speedwell  
*Veronica officinalis* Heath speedwell  
*Veronica persica* Common field-speedwell  
*Veronica polita* Grey field-speedwell  
*Veronica scutellata* Marsh speedwell  
*Veronica serpyllifolia* Thyme-leaved speedwell  
*Viburnum lantana* Wayfaring-tree  
*Viburnum opulus* Guelder-rose  
*Vicia cracca* Tufted vetch  
*Vicia faba* Broad bean  
*Vicia hirsuta* Hairy tare  
*Vicia orobus* Wood bitter-vetch (1836)  
*Vicia sativa* Common vetch  
*Vicia sativa subsp. nigra*  
*Vicia sativa subsp. sativa*  
*Vicia sepium* Bush vetch  
*Vicia sylvatica* Wood vetch  
*Vinca major* Greater periwinkle  
*Vinca minor* Lesser periwinkle  
*Viola arvensis* Field pansy  
*Viola canina* Heath dog-violet  
*Viola odorata* Sweet violet  
*Viola palustris* Marsh violet  
*Viola reichenbachiana* Early dog-violet  
*Viola reichenbachiana* x *V. riviniana*  
*Viola riviniana* Common Dog-violet  
*Vulpia bromoides* Squirreltail fescue  
*Vulpia myuros* Rat's-tail fescue  
*Zannichellia palustris* Horned pondweed

<sup>1</sup> Compiled by Fiona Devery.

## PLANTS WITHOUT FLOWERS

### Bryophytes

We know a great deal about the distribution of vascular plants (flowering plants, ferns, horsetails and club-mosses: those plants which have sophisticated systems for transporting water and nutrients in solution, and are therefore able to grow large and conspicuous), but much less about the smaller, non-vascular plants and plant-like organisms. On land the most widespread non-vascular plants are mosses and their less familiar relatives the liverworts, collectively known as bryophytes. With one great exception these plants have little direct influence upon human affairs, so we tend not to notice or pay much attention to them. The exception is the bog-mosses that belong to the genus *Sphagnum*, which once dominated the great



*Marchantia polymorpha*



## DOMAIN EUCARYOTA (EUCARYOTES)

raised bogs of the county and are the main constituent of moss peat. The leaves of sphagnum mosses have an extraordinary water-holding capacity, and this is one of the things that enables them to be the dominant plants of bogs.

The sphagnum mosses have been greatly affected by our activities, especially over the past sixty years or so, during which the industrial exploitation of the raised bogs has been widespread. Most of the large bogs are now nearing the end of their commercial phase, and many bryophytes are becoming re-established on the cutaway, including various species of *Sphagnum*. We should make every effort to support this modest recovery of lost territory.



*Sphagnum* moss

Sphagnum mosses are not as important a constituent of blanket bog, but in certain situations they are very luxuriant and prolific. The area occupied by sphagnum mosses in Slieve Bloom has been greatly reduced by afforestation, but they still thrive on steeper, unplanted slopes and beside forest tracks. They deserve to be noticed and considered during forestry operations, and in the designation and management of the 15% of forest property set aside for biodiversity value.

### What we know about Offaly's mosses and liverworts

Although the great botanical explorer Lloyd Praeger described Slieve Bloom as 'very poor in mountain plants', the glens that radiate from their heart are very rich in mosses and liverworts, but still relatively unknown. A tiny hawthorn twig plucked late one afternoon in January 2006 of the glens – almost at random, because a liverwort on it looked interesting, but it was too dark to see clearly! – turned out to have *three* rare bryophytes never seen in Laois before (unfortunately this was in Gorteennameale, a stone's throw over the border!): the liverworts *Metzgeria fruticulosa* and *Colura calyptrifolia*, and the moss *Daltonia splachnoides*.

In spite of the limited amount of work that has been carried out we do have an impressive county list for Offaly, numbering 718 species so far: but much work remains to be done on these wonderful plants.

### The bryophytes of Offaly<sup>1</sup>

#### Liverworts

*Aneura pinguis*  
*Blasia pusilla*  
*Calypogeia arguta*  
*Calypogeia fissa*  
*Calypogeia muelleriana*  
*Cephalozia bicuspidata*  
*Cephalozia catenulata*  
*Cephalozia connivens*  
*Cephalozia lunulifolia*  
*Cephalozia hampeana*  
*Chiloscyphus polyanthos*  
*Cladopodiella fluitans*  
*Cololejeunea minutissima*  
*Conocephalum conicum*  
*Diplophyllum albicans*  
*Frullania dilatata*  
*Frullania tamarisci*  
*Frullania teneriffae*

*Gymnocolea inflata*  
*Kurzia pauciflora*  
*Leiocolea badensis*  
*Lejeunea cavifolia*  
*Lepidozia reptans*  
*Lophocolea bidentata*  
*Lophozia incisa*  
*Lophozia ventricosa*  
*Lunularia cruciata*  
*Marchantia polymorpha*  
*Metzgeria conjugata*  
*Metzgeria fruticulosa*  
*Metzgeria furcata*  
*Microlejeunea ulicina*  
*Moerckia hibernica*  
*Mylia anomala*  
*Mylia taylorii*  
*Nardia scalaris*  
*Nowellia curvifolia*

*Odontoschisma denudatum*  
*Odontoschisma sphagni*  
*Pellia endivifolia*  
*Pellia epiphylla*  
*Plagiochila asplenoides*  
*Plagiochila porelloides*  
*Pleurozia purpurea*  
*Porella obtusata*  
*Porella platyphylla*  
*Preissia quadrata*  
*Radula complanata*  
*Riccardia latifrons*  
*Riccardia multifida*  
*Riccardia palmata*  
*Saccogyna viticulosa*  
*Scapania aspera*  
*Scapania gracilis*  
*Trichocolea tomentalla*

## DOMAIN EUCARYOTA (EUCARYOTES)

### Mosses

*Aloina aloides* Common aloe-moss  
*Anomodon viticulosus* Rambling tail-moss  
*Atrichum undulatum* Common smoothcap  
*Aulacomnium androgynum* Bud-headed groove-moss  
*Aulacomnium palustre* Bog groove-moss  
*Barbula convoluta* Lesser Bird's-claw beard-moss  
*Bryum algovicum* Drooping thread-moss  
*Bryum argenteum* Silver-moss  
*Bryum bicolor* Bicoloured bryum  
*Bryum capillare* Capillary thread-moss  
*Bryum klinggraeffii* Raspberry bryum  
*Bryum pallens* Pale thread-moss  
*Bryum pseudotriquetrum* Marsh bryum  
*Bryum rubens* Crimson-tuber thread-moss  
*Bryum ruderales* Pea bryum  
*Bryum uliginosum* Cernuous thread-moss  
*Bryum violaceum* Pill bryum  
*Campylopus fragilis* Brittle swan-neck moss  
*Campylopus introflexus* Heath star moss  
*Campylopus pyriformis* Dwarf swan-neck moss  
*Ceratodon purpureus* Redshank  
*Climacium dendroideum* Tree-moss  
*Cratoneuron filicinum* Fern-leaved hook-moss  
*Cryphaea heteromalla* Lateral cryphaea  
*Dichodontium pellucidum* Transparent fork-moss  
*Dicranella cerviculata* Red-neck forklet-moss  
*Dicranella palustris* Marsh forklet-moss  
*Dicranella schreberiana* Schreber's forklet-moss  
*Dicranella staphylina* Field forklet-moss  
*Dicranella varia* Variable forklet-moss  
*Dicranum bergeri* (only Irish record: Pollagh bog 1957).  
**Waved Fork-moss**  
*Dicranum bonjeani* Crisped fork-moss  
*Dicranum scoparium* Broom fork-moss  
*Didymodon acutus* Pointed beard-moss  
*Didymodon fallax* Fallacious beard-moss  
*Didymodon insulanus* Cylindric beard-moss  
*Didymodon rigidulus* Rigid beard-moss  
*Didymodon vinealis* Soft-tufted beard-moss  
*Ditrichum gracile* Slender ditrichum  
*Encalypta vulgaris* Common extinguisher-moss  
*Ephemerum serratum* (*/minutissimum*) Serrated (Minute) earth-moss  
*Eucladium verticillatum* Whorled tufa-moss  
*Fissidens adianthoides* Maidenhair pocket-moss  
*Fissidens dubius* Rock pocket-moss  
*Fissidens incurvus* Short-leaved pocket-moss  
*Fissidens osmundoides* Purple-stalked pocket-moss  
*Fissidens taxifolius* Common pocket-moss  
*Fissidens viridulus* Green pocket-moss  
*Fontinalis antipyretica* Greater water-moss  
*Funaria hygrometrica* Common cord-moss  
*Grimmia pulvinata* Grey-cushioned grimmia  
*Grimmia trichophylla* Hair-pointed grimmia  
*Homalia trichomanoides* Blunt feather-moss  
*Leptobryum pyriforme* Golden thread-moss  
*Leucobryum glaucum*  
*Leucodon sciurioides* Squirrel-tail moss  
*Mnium hornum* Swan's-neck thyme-moss  
*Neckera crispa* Crisped neckera  
*Neckera pumila* Dwarf neckera  
*Orthotrichum anomalum* Anomalous bristle-moss  
*Orthotrichum diaphanum* White-tipped bristle-moss  
*Orthotrichum lyellii* Lyell's bristle-moss

*Palustriella commutata* Curled hook-moss  
*Philonotis calcarea* Thick-nerved apple-moss  
*Physcomitrium pyriforme* Common bladder-moss  
*Plagiomnium elatum* Tall thyme-moss  
*Plagiomnium rostratum* Long-beaked thyme-moss  
*Plagiomnium undulatum* Hart's-tongue thyme-moss  
*Pohlia melanodon* Pink-fruited thread-moss  
*Pohlia nutans* Nodding thread-moss  
*Pohlia wahlenbergii* Pale glaucous thread-moss  
*Polytrichum commune* Common haircap  
*Polytrichum formosum* Bank haircap  
*Polytrichum juniperinum* Juniper haircap  
*Polytrichum longisetum* Slender haircap  
*Polytrichum strictum* Strict haircap  
*Racomitrium aquaticum* Narrow-leaved fringe-moss  
*Racomitrium ericoides* Dense fringe-moss  
*Racomitrium lanuginosum* Woolly fringe-moss  
*Rhizomnium punctatum* Dotted thyme-moss  
*Rhodobryum roseum* Rose-moss  
*Schistidium apocarpum* agg.  
*Schistidium crassipilum* Thickpoint grimmia  
*Schistidium strictum* Upright Brown grimmia  
*Seligeria pusilla* Dwarf rock-bristle  
*Sphagnum austinii* Austin's bog-moss  
*Sphagnum capillifolium* Red bog-moss  
*Sphagnum cuspidatum* Feathery bog-moss  
*Sphagnum denticulatum* Cow-horn bog-moss  
*Sphagnum fallax* Flat-topped bog-moss  
*Sphagnum fimbriatum* Fringed bog-moss  
*Sphagnum fuscum* Rusty bog-moss  
*Sphagnum inundatum* Lesser Cow-horn bog-moss  
*Sphagnum palustre* Blunt-leaved bog-moss  
*Sphagnum papillosum* Papillose bog-moss  
*Sphagnum squarrosum* Spiky bog-moss  
*Sphagnum subnitens* Lustrous bog-moss  
*Sphagnum subsecundum* Slender cow-horn bog-moss  
*Sphagnum tenellum* Soft bog-moss  
*Syntrichia intermedia* Intermediate screw-moss  
*Syntrichia laevipila* Small hairy screw-moss  
*Syntrichia papillosa* Marble screw-moss  
*Syntrichia ruralis* Great hairy screw-moss  
*Tetraphis pellucida* Pellucid four-tooth moss  
*Tetraplodon angustatus* (only Irish record) Narrow cruet-moss (protected by law)  
*Thamnobryum alopecurum* Fox-tail feather-moss  
*Thuidium delicatulum* Delicate tamarisk-moss  
*Thuidium tamariscinum* Common tamarisk-moss  
*Tortella tortuosa* Frizzled crisp-moss  
*Tortula acaulon* Cuspidate earth-moss  
*Tortula modica* Blunt-fruited pottia  
*Tortula muralis* Wall screw-moss  
*Trichostomum crispulum* Curly crisp-moss  
*Ulota bruchii* Bruch's pincushion  
*Ulota calvenscens* Balding pincushion  
*Ulota crispa* Crisped pincushion  
*Weissia condensa* Curly beardless-moss  
*Weissia controversa* Green-tufted stubble-moss  
*Zygodon conoideus* Lesser yoke-moss

<sup>1</sup> Extracted from *The Distribution of Bryophytes in Ireland* (2003), compiled by D.T. Holyoak (Broadleaf Books).

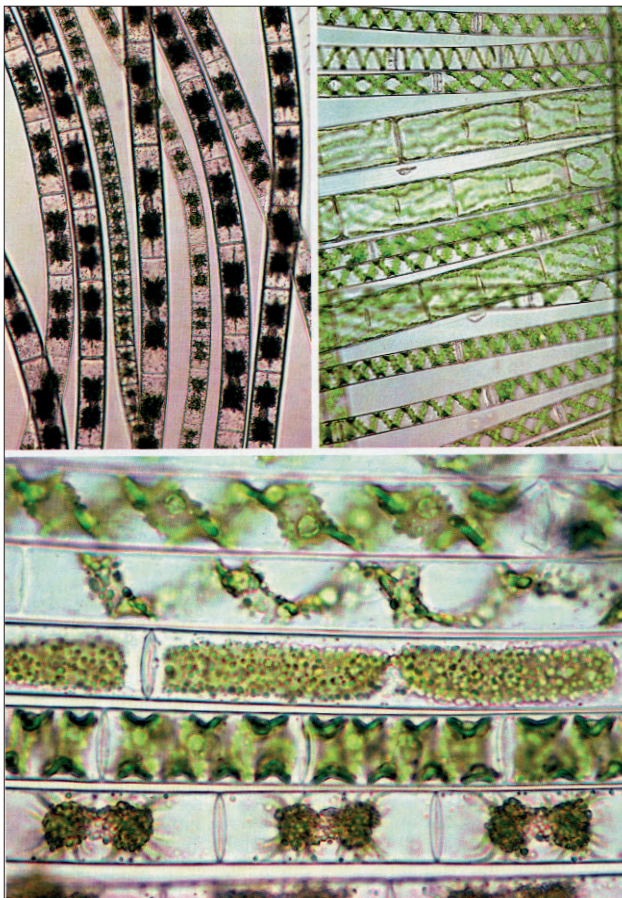


## DOMAIN EUCARYOTA (EUCARYOTES)

### Algae and others

The term algae encompasses a diverse assemblage of phyla, the most familiar of which are the various seaweeds and the green 'stuff' often seen in stagnant ponds and ditches. Many others comprise predominantly single-celled organisms, and as with every other group of such creatures their small size should not blind us to their great complexity and variety. Even the most widespread and abundant kinds are hardly ever noticed. These include a number of species of green thread algae (phylum Chlorophyta) such as the *Spirogyra* found in bog pools and old drains throughout the county. They are not much to look at with the unaided eye: *Spirogyra* is like a slimy mass of very fine hair, but under the microscope algae are plants of great beauty: for plants is what they are, and indeed the ancestors of all other plants lie somewhere among the green algae of the Palaeozoic earth. *Cladophora* is one type of green alga that has become much more abundant as a result of the eutrophication of surface waters that has been a feature of the last half century.

It will be no surprise to learn that apart from casual observations, and occasional lists from a few habitats, we know virtually nothing about the status of algae in Offaly. Here is yet another universe of life awaiting exploration.



Different species of green algae

## KINGDOM FUNGI

Fungi are everywhere, but we usually only notice them when they produce their spore-producing fruit bodies (*sporocarps*). They play enormously important roles in the economy of nature. Without the work of the saprobic fungi that break down the tissues of dead plants nutrient recycling would come to an end and everything would simply pile up. A number of fungi cause diseases, especially of plants, including many cultivated plants.

Bread moulds



Fungi are assigned to a separate kingdom, and comprise three phyla. **Zygomycota** are mould-like fungi, with some 1,100 described species. The **Basidiomycota**, of which there are 22,500 described species include mushrooms and toadstools, puffballs, jelly fungi and stinkhorns, as well as rusts and smuts. Many of the basidiomycetes form mutually beneficial associations with plants (*ectomycorrhiza*) which are vitally important to their nutrient economy. The **Ascomycota** comprise 30,000 species, of which some 13,500 are **lichens** (see below).

The list of fungi recorded for Offaly is surprisingly long. One reason for this is that in September 1989 the British Mycological Society held its annual Autumn Foray in the midlands, and visited several sites in the county. This shows just how much remains to be found once we start to look carefully – and this is as true of most other groups of plants and animals as it is of fungi.



*Sarcoscypha austriaca* -  
Scarlet elf cup

## DOMAIN EUCARYOTA (EUCARYOTES)

### The Fungi Of Offaly<sup>1</sup>

#### Kingdom Fungi (Mycota)

##### Phylum Basidiomycota

##### Basidiomycetes: Agaricales

*Agaricus augustus* The prince  
*Agaricus campestris* Field mushroom  
*Agaricus fuscofibrillosus*  
*Agaricus langei* Scaly wood mushroom  
*Agaricus silvaticus* Blushing wood mushroom  
*Agaricus silvicola* Wood mushroom  
*Agaricus urinascens* var. *excellens* Macro mushroom  
*Amanita ceciliae* Snakeskin grisette  
*Amanita crocea* Orange grisette  
*Amanita fulva* Tawny grisette  
*Amanita muscaria* Fly agaric  
*Amanita pantherina* Panthercap  
*Amanita phalloides* Deathcap  
*Amanita rubescens* Blusher  
*Amanita strobiliformis* Warted amanita  
*Armillaria gallica* Bulbous honey fungus  
*Armillaria mellea* Honey fungus  
*Arrhenia onisca*  
*Arrhenia retiruga*  
*Arrhenia rustica*  
*Arrhenia sphagnicola*  
*Bolbitius titubans*  
*Calocybe carnea*  
 Pink Domecap  
*Clitocybe gibba* Common funnel  
*Clitocybe odora* Aniseed funnel  
*Clitopilus prunulus* The miller  
*Collybia butyracea* Butter cap  
*Collybia confluens* Clustered toughshank  
*Collybia distorta*  
*Collybia dryophila* Russet toughshank  
*Collybia erythropus* Redleg toughshank  
*Collybia fusipes* Spindle toughshank  
*Collybia maculata* Spotted toughshank  
*Collybia peronata* Wood woolyfoot  
*Collybia racemosa* Branched shanklet  
*Conocybe apala*  
*Conocybe subovalis*  
*Conocybe vexans*  
*Coprinus acuminatus* Humpback inkcap  
*Coprinus atramentarius* Common inkcap  
*Coprinus comatus* Shaggy inkcap  
*Coprinus disseminatus* Fairy inkcap  
*Coprinus heptemerus*  
*Coprinus hiascens*  
*Coprinus lagopus* Hare's Foot inkcap  
*Coprinus micaceus* Glistening inkcap  
*Coprinus narcoticus*  
*Coprinus subdisseminatus*  
*Cystoderma amianthinum* Earthy powdercap  
*Cystoderma jasonis*  
*Cystolepiota bucknallii* Lilac dapperling  
*Cystolepiota seminuda*  
*Entoloma chalybaeum* var. *lazulinum* Indigo pinkgill  
*Entoloma conferendum* Star pinkgill  
*Entoloma corvinum*  
*Entoloma elodes*  
*Entoloma formosum*  
*Entoloma fuscomarginatum*  
*Entoloma incanum* Mousepee pinkgill  
*Entoloma longistriatum* var. *sarcitulum*  
*Entoloma nausiosme*

*Entoloma pallens*  
*Entoloma porphyrophaeum* Lilac pinkgill  
*Entoloma rhodopolium* Wood pinkgill  
*Entoloma sericellum* Cream pinkgill  
*Entoloma sericeum* Silky pinkgill  
*Entoloma serrulatum* Blue edge pinkgill  
*Entoloma sinuatum* Livid pinkgill  
*Flammulina velutipes* Velvet shank  
*Hemimycena cucullata*  
*Hemimycena tortuosa* Dewdrop bonnet  
*Hygrocybe cantharellus* Goblet waxcap  
*Hygrocybe chlorophana* Golden waxcap  
*Hygrocybe coccinea* Scarlet waxcap  
*Hygrocybe colemanniana* Toasted waxcap  
*Hygrocybe conica* Blackening waxcap  
*Hygrocybe insipida* Spangle waxcap  
*Hygrocybe intermedia* Fibrous waxcap  
*Hygrocybe miniata* Vermillion waxcap  
*Hygrocybe mucronella* Bitter waxcap  
*Hygrocybe nitrata* Nitrous waxcap  
*Hygrocybe persistens* Persistent waxcap  
*Hygrocybe psittacina* Parrot waxcap  
*Hygrocybe quieta* Oily waxcap  
*Hygrocybe virginea* var. *fuscescens* Snowy waxcap  
*Hygrocybe virginea* var. *ochraceopallida* Snowy waxcap  
*Hygrocybe virginea* Snowy waxcap  
*Hypholoma elongatum* Sphagnum brownie  
*Hypholoma fasciculare* Sulphur tuft  
*Hypholoma marginatum* Snakeskin brownie  
*Hypholoma myosotis* Olive brownie  
*Hypholoma udum* Peat brownie  
*Kuehneromyces mutabilis* Sheated woodtuft  
*Laccaria amethystina* Amethyst deceiver  
*Laccaria bicolor* Bicoloured deceiver  
*Laccaria laccata* Deceiver  
*Laccaria proxima* Scurfy deceiver  
*Lachnella villosa*  
*Lacrymaria lacrymabunda* Weeping widow  
*Lacrymaria pyrotricha*  
*Lepiota boudieri* Girdled dapperling  
*Lepiota castanea* Chestnut dappereling  
*Lepiota cristata* Stinking dapperling  
*Lepista sordida*  
*Lichenomphalia hudsoniana*  
*Lichenomphalia umbellifera*  
*Limacella guttata*  
*Lyophyllum decastes* Clustered domecap  
*Macrocystidia cucumis* Cucumber cap  
*Macrolepiota procera* Parasol  
*Macrolepiota rhacodes* Shaggy parasol  
*Marasmiellus ramealis* Twig parachute  
*Marasmius androsaceus* Horsehair parachute  
*Marasmius cohaerens*  
*Marasmius epiphyllodes*  
*Marasmius rotula* Collared parachute  
*Megacolliya platyphylla* Whitelaced shank  
*Melanoleuca melaleuca*  
*Melanoleuca polioleuca* Common cavalier  
*Melanoleuca strictipes*  
*Melanotus phillipsii*  
*Mycena acicula* Orange bonnet  
*Mycena adonis* Scarlet bonnet  
*Mycena adscendens* Frosty bonnet  
*Mycena aetites* Drab bonnet  
*Mycena amicta*  
*Mycena arcangeliana* Angel's bonnet



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*Mycena bulbosa*  
*Mycena filopes* Iodine bonnet  
*Mycena galericulata* Common bonnet  
*Mycena galopus* Milking bonnet  
*Mycena galopus* var. *nigra* Black milking bonnet  
*Mycena haematopus* Burgandydrop bonnet  
*Mycena inclinata* Clustered bonnet  
*Mycena megaspora*  
*Mycena olida* Rancid bonnet  
*Mycena polygramma* Grooved bonnet  
*Mycena pura* Lilac bonnet  
*Mycena sanguinolenta* Bleeding bonnet  
*Mycena speirea* Bark bonnet  
*Mycena vitilis* Snapping bonnet  
*Mycenella bryophila/margaritispota*  
*Oudemansiella mucida* Porcelain fungus  
*Panaeolus acuminatus* Dewdrop mottlegill  
*Panaeolus semiovatus* Egghead mottlegill  
*Pholiota flammans* Flaming scalycap  
*Pholiota squarrosa* Shaggy scalycap  
*Pleurocybella porrigens* Angel's wings  
*Pluteus atromarginatus*  
*Pluteus cervinus* Deer shield  
*Pluteus cinereofuscus*  
*Pluteus ephebeus*  
*Pluteus romellii* Goldleaf shield  
*Pluteus salicinus* Willow shield  
*Pluteus umbrus* Velvet shield  
*Psathyrella candolleana* Pale brittlestem  
*Psathyrella conopilus* Conical brittlestem  
*Psathyrella corrugis* Red Edge brittlestem  
*Psathyrella piluliformis* Common stump brittlestem  
*Psathyrella pseudogracilis*  
*Psathyrella spadicea* Chestnut brittlestem  
*Psathyrella spadiceogrisea* Spring brittlestem  
*Psathyrella sphagnicola*  
*Psilocybe crobula*  
*Psilocybe semilanceata* Magic mushroom/ liberty cap  
*Rickenella fibula* Orange moss-cap  
*Stropharia caerulea* Blue roundhead  
*Stropharia semiglobata* Dung roundhead  
*Tricholoma album* White knight  
*Tricholoma fulvum* Birch knight  
*Tricholoma imbricatum* Matt knight  
*Tricholoma lascivum* Aromatic knight  
*Tricholoma sulphureum* Sulphur knight  
*Tricholomopsis rutilans* Plums and custard  
*Xerula pudens*  
*Xerula radicata* Rooting shank

### Basidiomycetes: Auriculariales

*Auricularia auricula-judae* Jelly ear

### Basidiomycetes: Boletales

*Boletus badius* Bay bolete  
*Boletus chrysenteron* Red cracking bolete  
*Boletus edulis* Penny bun/cep  
*Boletus luridiformis*  
*Boletus pruinatus* Matt bolete  
*Boletus rubellus* Ruby bolete  
*Boletus subtomentosus* Suede bolete  
*Chalciporus piperatus* Peppery bolete  
*Chroogomphus rutilus* Copper spike  
*Gomphidius maculatus*  
*Hygrophoropsis aurantiaca* False chanterelle  
*Leccinum auriscalpium* Slate bolete  
*Leccinum rigidipes*  
*Leccinum scabrum* Brown birch bolete  
*Leccinum variicolor* Mottled bolete  
*Paxillus involutus* Brown rimroll

*Suillus granulatus* Weeping bolete  
*Suillus grevillei* Larch bolete  
*Suillus variegatus* Velvet bolete  
*Suillus viscidus* Sticky bolete

### Basidiomycetes: Cantharellales

*Botryobasidium aureum*  
*Botryobasidium conspersum*  
*Cantharellus cibarius* Chanterelle  
*Clavaria argillacea* Moor club  
*Clavaria fragilis* White spindles  
*Clavaria fumosa* Smoky spindles  
*Clavulina cinerea* Grey coral  
*Clavulina coralloides* Crested coral  
*Clavulina rugosa* Wrinkled club  
*Clavulinopsis corniculata* Meadow coral  
*Clavulinopsis helvola* Yellow club  
*Clavulinopsis luteoalba* Apricot club  
*Clavulinopsis subtilis*  
*Hydnum repandum* Wood hedgehog  
*Sparassis crispa* Wood cauliflower

### Basidiomycetes: Cortinariales

*Cortinarius anomalus* Variable webcap  
*Cortinarius betuletorum*  
*Cortinarius croceus*  
*Cortinarius flexipes* var. *flabellus* Pelargonium webcap  
*Cortinarius helvelloides*  
*Cortinarius hinnuleus* Earthy webcap  
*Cortinarius malicorius*  
*Cortinarius semisanguineus* Surprise webcap  
*Cortinarius turmalis* (?)  
*Cortinarius variicolor*  
*Cortinarius violaceus* Violet webcap  
*Crepidotus applanatus* Flat oysterling  
*Crepidotus mollis* Peeling oysterling  
*Galerina calypttrata*  
*Galerina hypnorum*  
*Galerina marginata* Funeral bell  
*Galerina tibiicystis*  
*Galerina vittiformis*  
*Gymnopilus fulgens*  
*Gymnopilus junonius* Spectacular rustgill  
*Hebeloma crustuliniforme* poisonpie  
*Hebeloma leucosarx*  
*Hebeloma sacchariolens* Sweet poisonpie  
*Hebeloma sinapizans* Bitter poisonpie  
*Hebeloma theobrominum*  
*Inocybe adaequata*  
*Inocybe asterospora* Star fibrecap  
*Inocybe cincinnata* var. *major* Collared fibrecap  
*Inocybe fraudans*  
*Inocybe fuscidula*  
*Inocybe geophylla* White fibrecap  
*Inocybe geophylla* var. *lilacina* Lilac fibrecap  
*Inocybe godeyi*  
*Inocybe hirtella*  
*Inocybe maculata* Frosty fibrecap  
*Inocybe mixtilis*  
*Inocybe napipes* Bulbous fibrecap  
*Inocybe rimosa* Split fibrecap  
*Naucoria escharioides*  
*Naucoria subconspersa*  
*Tubaria conspersa* Felted twiglet  
*Tubaria furfuracea* Scurfy twiglet

### Basidiomycetes: Dacrymycetales

*Calocera cornea* Small stagshorn  
*Calocera furcata*  
*Calocera viscosa* Yellow stagshorn

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*Dacrymyces capitatus*

*Dacrymyces stillatus* Common jellyspot

### **Basidiomycetes: Exobasidiales**

*Exobasidium karstenii*

*Exobasidium oxycocci*

### **Basidiomycetes: Fistulinales**

*Fistulina hepatica* Beefsteak fungus

### **Basidiomycetes: Ganodermatales**

*Ganoderma applanatum* Artist's bracket

*Ganoderma australe* Southern bracket

### **Basidiomycetes: Hericiales**

*Gloiothele lactescens*

*Lentinellus cochleatus* Aniseed cockleshell

### **Basidiomycetes: Hymenochaetales**

*Hymenochaete corrugata* Glue crust

*Hymenochaete rubiginosa* Oak curtain rust

*Inonotus dryadeus* Oak bracket

### **Basidiomycetes: Lycoperdales**

*Calvatia gigantea* Giant puffball

*Handkea excipuliformis* Pestle puffball

*Lycoperdon nigrescens* Dusky puffball

*Lycoperdon perlatum* Common puffball

*Lycoperdon pyriforme* Stump puffball

*Vascellum pratense* Meadow puffball

### **Basidiomycetes: Nidulariales**

*Crucibulum laeve* Common bird's nest

### **Basidiomycetes: Phallales**

*Geastrum triplex* Collared earthstar

*Gomphus clavatus* Pig's ear

*Mutinus caninus* Dog stinkhorn

*Phallus impudicus* Stinkhorn

### **Basidiomycetes: Poriales**

*Abortiporus biennis* Blushing rosette

*Bjerkandera adusta* Smoky bracket

*Ceriporia reticulata*

*Datronia mollis* Common mazegill

*Grifola frondosa* Hen of the woods

*Heterobasidion annosum* Root rot

*Laetiporus sulphureus* Chicken of the woods

*Meripilus giganteus* Giant polypore

*Physisporinus sanguinolentus* Bleeding porecrust

*Piptoporus betulinus* Birch Polypore/razorstrop fungus

*Polyporus leptcephalus* Blackfoot polypore

*Polyporus squamosus* Dryad's saddle

*Postia subcaesia* Blueing bracket

*Postia tephroleuca* Greyling bracket

*Pleurotus ostreatus* Oyster mushroom

*Skeletocutis nivea* Hazel bracket

*Trametes versicolor* Turkeytail oyster mushroom

### **Basidiomycetes: Russulales**

*Lactarius acerrimus*

*Lactarius acris*

*Lactarius aurantiacus* Orange milkcap

*Lactarius blennius* Beech milkcap

*Lactarius camphoratus* Curry milkcap

*Lactarius deterrimus* False Saffron milkcap

*Lactarius fulvissimus* Tawny milkcap

*Lactarius glycosmus* Coconut milkcap

*Lactarius helvus* Fenugreek milkcap

*Lactarius pallidus* Pale milkcap

*Lactarius pterosporus*

*Lactarius quietus* Oakbug milkcap

*Lactarius rufus* Rufous milkcap

*Lactarius scoticus*

*Lactarius subdulcis* Mild milkcap

*Lactarius tabidus* Birch milkcap

*Lactarius torminosus* Woolly milkcap

*Lactarius turpis* Ugly milkcap

*Lactarius uvidus*

*Russula albonigra*

*Russula atropurpurea* Purple brittlegill

*Russula betularum* Birch brittlegill

*Russula caerulea* Humpback brittlegill

*Russula chloroides* Blue band brittlegill

*Russula claroflava* Yellow swamp brittlegill

*Russula cyanoxantha* Charcoal burner

*Russula delica* Milk white brittlegill

*Russula densifolia* Crowded brittlegill

*Russula exalbicans* Bleached brittlegill

*Russula fellea* Geranium brittlegill

*Russula foetens* Stinking brittlegill

*Russula fragilis* Fragile brittlegill

*Russula ionochlora* Oilslick brittlegill

*Russula nigricans* Blackening brittlegill

*Russula nitida* Purple Swamp brittlegill

*Russula nobilis* Beechwood sickener

*Russula ochroleuca* Ochre brittlegill

*Russula queletii* Fruity Brittlegill

*Russula sanguinaria* Bloody brittlegill

*Russula sardonia* Primrose brittlegill

*Russula xerampelina* Crab brittlegill

### **Basidiomycetes: Schizophyllales**

*Schizophyllum commune* Split-gill/Common porecrust

### **Basidiomycetes: Sclerodermatales**

*Scleroderma areolatum* Leopard earthball

*Scleroderma bovista* Potato earthball

*Scleroderma citrinum* Common earthball

*Scleroderma verrucosum* Scaly earthball

### **Basidiomycetes: Steareales**

*Athelia epiphylla*

*Chondrostereum purpureum* Silverleaf fungus

*Hyphoderma argillaceum*

*Hyphodontia crustosa*

*Hyphodontia sambuci* Elder whitewash

*Laetisaria fuciformis*

*Mycoacia uda*

*Peniophora lycii*

*Schizopora paradoxa* Split porecrust

*Steccherinum fimbriatum*

*Steccherinum ochraceum*

*Stereum hirsutum* Hairy curtain crust

*Stereum rugosum* Bleeding broadleaf crust

*Subulicystidium longisporum*

*Tubulicrinis regificus*

*Tylospora fibrillosa*

### **Basidiomycetes: Thelephorales**

*Hydnellum ferrugineum* Mealy tooth

*Thelephora terrestris* Earthfan

*Tomentella bryophila*

*Tomentella lapidum*

### **Basidiomycetes: Tremellales**

*Eichleriella deglubens*

*Exidia glandulosa* Witch's butter

*Exidia nucleata* Crystal brain

*Exidia thuretiana* White brain

*Sebacina epigaea*

*Stypella crystallina*

*Stypella subhyalina*

*Tremella mesenterica* Yellow brain



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### **Urediniomycetes: Uredinales** Rusts

*Coleosporium tussilaginis* on Euphrasia, Petasites & Tussilago  
*Cumminsella mirabilissima* on Mahonia  
*Kuehneola uredinis* on Rubus  
*Melampsora caprearum* on Salix  
*Melampsora epitea* on Salix  
*Melampsora euphorbiae* on Euphorbia  
*Melampsora hypericorum* on Hypericum  
*Melampsorium betulinum* on Betula  
*Milesina scolopendrii* on Phyllitis  
*Miyagia pseudosphaeria* on Sonchus  
*Phragmidium bulbosum* on Rubus  
*Phragmidium fragariae* on Potentilla  
*Phragmidium mucronatum* on Rosa  
*Phragmidium rosae-pimpinellifoliae* on Burnet rose  
*Phragmidium rubi-idaei* on Rubus idaeus  
*Phragmidium violaceum* on Rubus  
*Puccinia acetosae* on Rumex  
*Puccinia brachypodii* on Brachypodium  
*Puccinia buxi* on Buxus  
*Puccinia calcitrapae* on Cirsium  
*Puccinia caricina* on Carex  
*Puccinia caricina* var. *ribesii-pendulae* on Carex  
*Puccinia circaeae* on Circaea  
*Puccinia coronata* on Festuca & Holcus  
*Puccinia glechomatis* on Glechoma  
*Puccinia graminis* subsp. *Graminis* on Festuca  
*Puccinia lagenophorae* on Senecio  
*Puccinia lapsanae* on Lapsana  
*Puccinia magnusiana* on Phragmites  
*Puccinia malvacearum* on Malva  
*Puccinia menthae* on Menta  
*Puccinia obscura* on Bellis & Luzula  
*Puccinia phragmitis* on Phragmites  
*Puccinia poarum* on Tussilago  
*Puccinia punctata* on Galium  
*Puccinia punctiformis* on Cirsium  
*Puccinia recondita* on Elytrigia  
*Puccinia urticata* var. *urticae-inflatae* on Carex  
*Puccinia veronicae* on Veronica  
*Puccinia violae* on Viola  
*Triphragmium ulmariae* on Filipendula  
*Uromyces dactylidis* on Rannunculus  
*Uromyces rumicis* on Rumex  
*Uromyces valerianae* on Valeriana  
*Uromyces viciae-fabae* on Vicia

### **Ustilaginomycetes: Ustilaginales**

*Ustilago filiformis* on Glyceria  
*Ustilago grandis* on Phragmites  
*Ustilago striiformis* on Phalaris

## **Kingdom Fungi (Mycota)**

### **Phylum Ascomycota**

#### **Archaeascomycete: Taphrinales**

*Protomyces macrosporus*  
*Taphrina tosquinetii*

#### **Euascomycetes: Boliniales**

*Endoxyla cirrhosa*

#### **Euascomycetes: Calosphaeriales**

*Calosphaeria*

#### **Euascomycetes: Capnodiales**

*Tripospermum myrti*

#### **Euascomycetes: Diaporthales**

*Diaporthe arctii*  
*Phomopsis stictica*  
*Sydowiella fenestrans*

### **Euascomycetes: Dothidiales**

*Bactrodesmium obovatum*  
*Dothiorella candollei*  
*Leptospora rubella*

### **Euascomycetes: Erysiphales** Powdery Mildews

*Erysiphe alphitoides* on Quercus  
*Erysiphe aquilegiae* on Aquilegia  
*Erysiphe berberidis* on Mahonia  
*Erysiphe biocellata* on Mentha  
*Erysiphe circaeae* on Circaea  
*Erysiphe cruciferarum* on Sisymbrium  
*Erysiphe depressa* on Arctium  
*Erysiphe heraclei* on Heracleum  
*Erysiphe hyperici* on Hypericum  
*Erysiphe knautiae* on Succisa  
*Erysiphe lythri* on Lythrum  
*Erysiphe pisi* on Vicia  
*Erysiphe sordida* on Plantago  
*Erysiphe trifolii* on Trifolium  
*Golovinomyces cichoracearum* va. *chicoracearum* on Compositae  
*Golovinomyces cichoracearum* var. *fischeri* on Senecio  
*Neoerysiphe galeopsidis* on Stachys  
*Phyllactinia fraxini* on Fraxinus  
*Phyllactinia guttata* on Corylus  
*Podosphaera myrtilina* on Vaccinium  
*Podosphaera aphanis* on Potentilla & Geum  
*Podosphaera fusca* on Taraxacum & Senecio  
*Podosphaera pannosa* on Rosa  
*Sawadaea bicornis* on Acer  
*Sphaerotheca epilobii* on Epilobium

### **Euascomycetes: Eurotiales**

*Paecilomyces farinosus*

### **Ascomycota; Halosphaeriales**

*Clavariopsis aquatica*

### **Euascomycetes: Helotiales**

*Bisporella citrina* Lemon disco  
*Bisporella sulfurina*  
*Botrytis cinerea* Grey mould  
*Chlorociboria aeruginascens* Green elfcup  
*Claussenomyces prasinulus*  
*Crocicreas cyathoideum*  
*Diplocarpon earlianum*  
*Geoglossum cookeanum* Earth tongue  
*Heterosphaeria patella*  
*Hymenoscyphus albidus*  
*Hymenoscyphus fructigenus* Nut disco  
*Hymenoscyphus imberbis*  
*Hymenoscyphus scutula*  
*Hymenoscyphus splendens*  
*Lachnum apalum* Rush disco  
*Lachnum ciliare*  
*Lachnum clavisporem*  
*Lachnum corticale*  
*Lachnum diminutum*  
*Lachnum dumorum*  
*Lachnum virgineum* Snowy disco  
*Laetinaevia carneoflavida*  
*Leptotrochila ranunculi*  
*Moellerodiscus tenuistipes*  
*Mollisia cinerea* Common Grey disco  
*Mollisia juncina*  
*Mollisia rubi*  
*Myriosclerotinia*

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*Neobulgaria pura* Beech jellydisc  
*Pezizella albosanguinea*  
*Phacidium multivalve*  
*Phialina lachnibrachya*  
*Phialina ulmariae*  
*Polydesmia pruinosa*  
*Psilalachnum inquilinum*  
*Pyrenopeziza escharodes*  
*Pyrenopeziza revincta*  
*Rutstroemia firma* Brown cup  
*Rutstroemia petiolorum*  
*Rutstroemia sydowniana* Oakleaf cup  
*Strossmayeria atriseda*  
*Tapesia fusca*  
*Tapesia lividofusca*  
*Tapesia yallundae*  
*Trichoglossum hirsutum* Hairy earthtongue  
*Tricladium angulatum*  
*Trochila craterium*  
*Trochila ilicina* Holly Speckle  
*Trochila laurocerasi*

### **Euascomycetes: Hypocreales**

*Byssostilbe stilbigera*  
*Claviceps purpurea* Ergot  
*Erothrotheca multiformis*  
*Hyalopeziza millepunctata*  
*Hypocrea schweinitzii*  
*Hypomyces chrysospermus* Bolete mould  
*Hypomyces lateritius*  
*Nectria cinnebarina* Coral spot  
*Nectria desmazieri*  
*Nectria episphaeria*  
*Nectria hederiae*  
*Nectria leptosphaeriae*  
*Nectria lugdunensis*  
*Nectria peziza*  
*Pseudonectria rousseliana*  
*Pycnofusarium rusci*

### **Euascomycetes: Hysteriales**

*Hysterium angustatum*  
*Hysterographium fraxini*

### **Euascomycetes: Incertae sedis**

*Alatospora acuminata*  
*Anguillospora crassa*  
*Arthrobotrys* sp.  
*Bactridium flavum*  
*Campylospora chaetocladia*  
*Campylospora tetracladia*  
*Coleophoma empetri*  
*Dendrospora erecta*  
*Dictyosporium toruloides*  
*Flabellospora acuminata*  
*Flagellospora curvula*  
*Haplariopsis fagicola*  
*Lemonniera aquatica*  
*Lunulospora curvula*  
*Mycocentrospora acerina*  
*Orbillia curvatispora*  
*Orbillia euonymi*  
*Orbillia leucostigma*  
*Orbillia xanthostigma* Common glasscup  
*Periconia cookei*  
*Sesquicillium buxi*  
*Stachybotrys dichroa*

*Stromiopeltis pinastri*  
*Tetracladium marchalianum*  
*Tetracladium setigerum*  
*Torula herbarum*  
*Tridentaria carnivora*  
*Triposporium elegans*  
*Triscelophorus monosporus*  
*Tuberculina persicina*  
*Wiesneriomyces laurinus*  
*Xylohypha nigrescens*

### **Euascomycetes: Meliolales**

*Appendiculella calostroma*

### **Euascomycetes: Microascales**

*Cephalotrichum microsporum*

### **Euascomycetes: Microthyriales**

*Lichenopeltella pnoophylla*  
*Microthyrium macrosporum*  
*Microthyrium microscopicum*  
*Microthyrium pinophyllum*  
*Microthyrium versicolor*

### **Euascomycetes: Mycosphaerellales**

*Cladosporium macrocarpum*  
*Ramularia bistorte*  
*Ramularia circaeae*  
*Ramularia didyma*  
*Ramularia glechomatis*  
*Ramularia lactea*  
*Ramularia lapsanae*  
*Ramularia rhabdospora*  
*Ramularia scrophulariae*  
*Ramularia sphaeroidea*  
*Ramularia taraxaci*  
*Mycosphaerella tulasnei*  
*Septoria convolvuli*  
*Septoria stachydis*

### **Euascomycetes: Ophiostomatales**

*Ophiostoma novo-ulmi* Dutch elm disease  
*Ophiostoma ulmi* Dutch elm disease

### **Euascomycetes: Pezizales**

*Aleuria aurantia* Orange peel fungus  
*Cheilymenia fimicola*  
*Coprobria granulata*  
*Helvella crispa* White saddle  
*Helvella elastica* Elastic saddle  
*Helvella macropus* Felt saddle  
*Melastiza chateri* Orange cup  
*Miladina lecithina*  
*Otidea alutacea* Tan ear  
*Peziza badia* Bay cup  
*Peziza micropus*  
*Peziza repanda* Palamino cup  
*Scutellinia crinita*

### **Euascomycetes: Phyllachorales**

*Colletotrichum trichellum*  
*Phyllachora dactylidis*  
*Phyllachora junci*

### **Euascomycetes: Pleosporales**

*Coleroa robertiani*  
*Dendryphion comosum*  
*Hendersonia innumerosa*  
*Leptosphaeria acuta* Nettle rash



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*Leptosphaeria dolium*  
*Leptosphaeria libanotis*  
*Lophiostoma compressum*  
*Lophiostoma semilibrum*  
*Lophiostoma vagabundum*  
*Massarina aquatica*  
*Massarina tetraploa*  
*Melanomma pulvis-pyrius*  
*Paraphaeosphaeria glaucopunctata*  
*Paraphaeosphaeria vectis*  
*Phoma hedericola*  
*Rhopoglyphus filicinus* Bracken map  
*Sporormiella bipartis*  
*Tubeufia cerea*

### **Euascmycetes: Rhytismatales**

*Hypoderma rubi*  
*Lophodermium apiculatum*  
*Lophodermium piceae*  
*Rhytisma acerinum* Sycamore tar spot  
*Rhytisma andromedae*  
*Rhytisma salicinum*

### **Euascmycetes: Sordariales**

*Bertia moriformis* Wood mulberry  
*Coniochaeta ligniaria*  
*Dictyochoeta simplex*  
*Endophragmiella pinicola*  
*Lasiosphaeria hirsuta*  
*Melanopsammella vermicularioides*  
*Podospora appendiculata*  
*Sporoschisma juvenile*

### **Euascmycetes: Trichosphaeriales**

*Chaetosphaerella phaeostroma*

### **Euascmycetes: Xylariales**

*Anthostomella appendiculosa*  
*Anthostomella punctulata*  
*Anthostomella tomicoides*  
*Cainia graminis*  
*Daldinia concentrica* Cramp balls  
*Diatrype disciformis* Beech barkspot  
*Discostroma tostum*  
*Eutypa flavovirens*  
*Eutypa spinosa*  
*Hypoxyton fragiforme* Beech woodwart  
*Hypoxyton fuscum* Hazel woodwart  
*Hypoxyton intermedium*  
*Hypoxyton multifforme* Birch woodwart  
*Kretzschmaria deusta* Brittle cinder  
*Melomastia mastoidea*  
*Phomatospora dinemasporium*  
*Rosellinia aquila*  
*Xylaria hypoxyton* Candlesnuff fungus  
*Xylaria longipes* Dead Moll's fingers  
*Xylaria polymorpha* Dead man's fingers

### **Kingdom Fungi (Mycota)**

#### **Phylum Zygomycota**

##### **Zygomycetes: Mucorales**

*Spinellus fusiger* Bonnet mould

### **Fungus-like Organisms**

#### **Kingdom: Straminipila**

##### **Phylum Oomycota**

##### **Oomycetes: Peronosporales**

*Albugo candida* White blister  
*Albugo tragopogonis* Downy mildew  
*Peronospora aparines* Downy mildew  
*Peronospora oerteliana* Downy mildew  
*Peronospora parasitica* Downy mildew

##### **Oomycetes: Pythiales**

*Phytophthora infestans* Potato blight

#### **Kingdom: Uncertain Affinity**

##### **Phylum Myxomycota (Slime Moulds)**

##### **Myxomycota: Liceales**

*Cribraria argillacea*  
*Cribraria aurantiaca*  
*Cribraria cancellata* var. *cancellata*  
*Licea clarkii*  
*Lycogala epidendrum*  
*Lycogala exiguum*  
*Tuberifera ferruginosa*

##### **Myxomycota: Physarales**

*Badhamia lilacina* var. *lilacina*  
*Badhamia panicea*  
*Diderma deplanatum*  
*Diderma simplex*  
*Didymium difforme*  
*Didymium squamulosum*  
*Fuligo septica* var. *septica*  
*Leocarpus fragilis*  
*Physarum cinereum*  
*Physarum nutans*  
*Physarum pusillum*

##### **Myxomycota: Protosteliales**

*Ceratiomyxa fruticulosa* var. *fruticulosa*

##### **Myxomycota: Stemonitales**

*Collaria arcyronema*  
*Comatricha nigra*  
*Comatricha tenerima*  
*Lamproderma scintillans*  
*Macbrideola cornea*  
*Stemonitis fusca* var. *fusca*  
*Stemonitopsis typhina*

##### **Myxomycota: Trichiales**

*Arcyria denudata*  
*Arcyria incarnata*  
*Calomyxa metallica*  
*Perichaena chrysosperma*  
*Trichia affinis*  
*Trichia botrytis* var. *botrytis*  
*Trichia decipiens* var. *decipiens*  
*Trichia varia*

<sup>1</sup> Contributed by Hubert Fuller, School of Biology and Environmental Science, UCD.

## DOMAIN EUCARYOTA (EUCARYOTES)

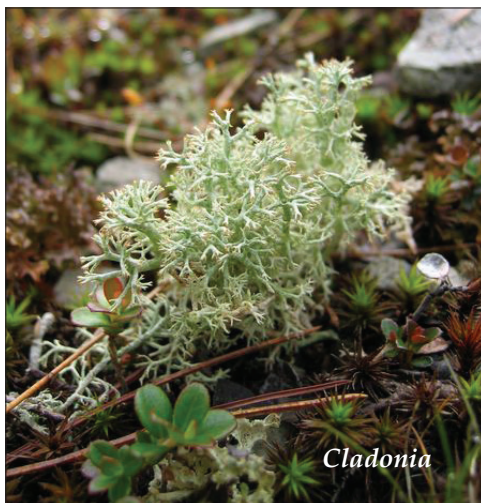
### Lichens

Most people will have noticed the bushy grey outgrowths that often festoon the branches of trees, most conspicuously perhaps in old orchards. These are lichens, dual organisms that consist of an association between an alga and a fungus so extraordinarily intimate that the result is an organism totally different in appearance from either of the constituent partners on their own. In point of fact though, only the algal partner is capable of independent existence; for the fungi involved in the partnership the association has become obligatory.

Bushy (*fruticose*) lichens are the most familiar type. Other lichens are irregular, frilly plates, rather like certain seaweeds or leafy liverworts; such *thallose* lichens are particularly common on tree bark and rock in unpolluted districts. Many kinds of lichens live in the surface tissue of trees or the outer skin of rock; these are *crustose* lichens. Certain kinds (especially *Cladonia* species) have fruiting structures (podetia) that look like miniature clubs or golf tees. In the old days various lichens were used for making dyes, but their main practical interest today is for monitoring air pollution,

because they are extraordinarily sensitive in this regard. This sensitivity varies greatly from species to species, which makes the group as a whole ideal for assessing the level of pollution.

Lichens are a very diverse group. A mature oak tree may have as many as several dozen species, and there could be as many again on an old gravestone. 1285 species have been recorded from the whole of Ireland. We have a reasonably accurate list of the species that occur in Offaly, but our knowledge of their detailed distribution is limited and there is plenty of scope for detailed studies. Of particular interest from the conservation viewpoint are those lichens characteristic of old woodland, and especially the lungworts (*Lobaria* species), known from only a handful of locations in the county. A lichen survey of the towns of Offaly would be an ideal way to draw attention to the variety and importance of the group, as well as highlighting issues of air quality.



Three common lichens: *Cladonia*, *Caloplaca* and *Lecanora* (Frank Dobson).

*Lecanora*



### The Lichens Of Offaly<sup>1</sup>

The current number of taxa in the Irish flora (lichens, lichenicolous fungi and allied fungi) is 1285. The following Offaly list contains only 271 taxa; although the county lacks many of the important habitats for a rich lichen flora, clearly there is considerable scope for lichenological study and a total of at least 400 taxa is to be expected. Nomenclature is mainly according to Coppins (2002). Taxa indicated by an asterisk (\*) are lichenicolous fungi and non-lichenized fungi which are traditionally treated by lichenologists and usually overlooked by mycologists.

*Acarospora fuscata* (Schrad.) Th.Fr.  
*Acrocordia conoidea* (Fr.) Körb.  
*A. gemmata* (Ach.) A.Massal.  
*A. salweyi* (Leight. ex Nyl.) A.L.Sm.  
*Agonimia tristicula* (Nyl.) Zahlbr.  
*Amandinea punctata* (Hoffm.) Coppins & Scheid.  
*Anisomeridium biforme* (Borrer) R.C.Harris  
 \* *Arthonia cinnabarina* (DC.) Wallr.  
*A. muscigena* Th.Fr.  
*A. pruinata* (Pers.) Steud. ex A.L.Sm.  
 \* *A. punctiformis* Ach.

*A. radiata* (Pers.) Ach.  
*A. spadicea* Leight.  
 \* *Arthopyrenia analepta* (Ach.) A.Massal.  
 \* *A. cerasi* (Schrad.) A.Massal.  
*A. cinereopruinosa* (Schaer.) A.Massal.  
 \* *A. punctiformis* A.Massal.  
*Aspicilia calcarea* (L.) Körb.  
*A. contorta* (Hoffm.) Kremp.  
*Bacidia arceutina* (Ach.) Arnold  
*B. friesiana* (Hepp) Körb.  
*B. laurocerasi* (Delise ex Duby) Zahlbr.



## DOMAIN EUCARYOTA (EUCARYOTES)

- B. phacodes* Körb.  
*B. rubella* (Hoffm.) A.Massal.  
*Belonia nidarosiensis* (Kindt) P.M.Jørg. & Vězda  
*Bilimbia sabuletorum* (Schreb.) Arnold  
*Bryophagus gloeocapsa* Nitschke ex Arnold  
*Bryoria fuscescens* (Gyeln.) Brodo & D.Hawksw.  
*Byssoloma leucoblepharum* (Nyl.) Vain.  
*B. subdiscordans* (Nyl.) P.James  
*Calicium viride* Pers.  
*Caloplaca aurantia* (Pers.) Hellb.  
*C. cerina* (Ehrh. ex Hedw.) Th.Fr.  
*C. cerinella* (Nyl.) Flagey  
*C. citrina* (Hoffm.) Th.Fr.  
*C. crenularia* (With.) J.R.Laundon  
*C. flavescens* (Huds.) J.R.Laundon  
*C. holocarpa* (Hoffm.) A.E.Wade  
*C. luteoalba* (Turner) Th.Fr.  
*C. obscurella* (Lahm ex Körb.) Th.Fr.  
*C. saxicola* (Hoffm.) Nordin  
*Candelaria concolor* (Dicks.) Stein  
*Candelariella aurella* (Hoffm.) Zahlbr.  
*C. medians* (Nyl.) A.L.Sm.  
*C. reflexa* (Nyl.) Lettau  
*C. vitellina* (Hoffm.) Müll.Arg.  
*C. xanthostigma* (Ach.) Lettau  
*Catapyrenium pilosellum* Breuss  
*C. squamulosum* (Ach.) Breuss  
*Catillaria lenticularis* (Ach.) Th.Fr.  
*C. nigroclavata* (Nyl.) Schuler  
*Cetraria aculeata* (Schreb.) Fr.  
*C. muricata* (Ach.) Eckfeldt  
*Chrysothrix candelaris* (L.) J.R.Laundon  
*Cladonia arbuscula* (Wallr.) Flot.  
*C. cervicornis* (Ach.) Flot. ssp. *verticillata* (Hoffm.) Ahti  
*C. chlorophaea* (Flörke ex Sommerf.) Spreng.  
*C. cillata* Stirt. var. *tenuis* (Flörke) Ahti  
*C. coccifera* (L.) Willd.  
*C. coniocraea* (Flörke) Spreng.  
*C. crispata* var. *cetrariiformis* (Delise ex Duby) Vain.  
*C. fimbriata* (L.) Fr.  
*C. floerkeana* (Fr.) Flörke  
*C. furcata* (Huds.) Schrad.  
*C. glauca* Flörke  
*C. gracilis* (L.) Willd.  
*C. macilenta* Hoffm.  
*C. ochrochlora* Flörke  
*C. pocillum* (Ach.) Grognot  
*C. polydactyla* (Flörke) Spreng.  
*C. portentosa* (Dufour) Coem.  
*C. pyxidata* (L.) Hoffm.  
*C. ramulosa* (With.) J.R.Laundon  
*C. rangiformis* Hoffm.  
*C. scabriuscula* (Delise) Nyl.  
*C. squamosa* Hoffm.  
*C. subulata* (L.) F.H.Wigg.  
*C. uncialis* ssp. *biuncialis* (Hoffm.) M.Choisy  
*Clauzadea immersa* (Hoffm.) Hafellner & Bellem.  
*C. monticola* (Ach.) Hafellner & Bellem.  
*Cliostomum griffithii* (Sm.) Coppins  
*Collema auriforme* (With.) Coppins & J.R.Laundon  
*C. crispum* (Huds.) F.H.Wigg.  
*C. cristatum* (L.) F.H.Wigg.  
*C. flaccidum* (Ach.) Ach.  
*C. tenax* (Sw.) Ach.  
*Cresponea premnea* (Ach.) Egea & Torrente  
*Dermatocarpon miniatum* (L.) W.Mann  
*Dimerella lutea* (Dicks.) Trevis.  
*Diploicia canescens* (Dicks.) A.Massal.  
*Diplolepta albostratum* (Hoffm.) Flot.  
*Enterographa crassa* (DC.) Fée  
*Evernia prunastri* (L.) Ach.  
*Fellhanera bouteillei* (Desm.) Vězda  
*Flavoparmelia caperata* (L.) Hale  
*Fuscidea kochiana* (Hepp) V.Wirth & Vězda  
*F. lightfootii* (Sm.) Coppins & P.James  
*Graphina anguina* (Mont.) Müll.Arg.  
*Graphis elegans* (Borrer ex Sm.) Ach.  
*G. scripta* (L.) Ach.  
*Hyperphyscia adglutinata* (Flörke) Mayrhofer & Poelt  
*Hypocenomyce scalaris* (Ach. ex Lilj.) M.Choisy  
*Hypogymnia physodes* (L.) Nyl.  
*H. tubulosa* (Schaer.) Hav.  
*Hypotrachyna revoluta* (Flörke) Hale  
*Icmadophila ericetorum* (L.) Zahlbr.  
*Japewiella tavaresiana* (H.Magn.) Printzen  
*Lecanactis abietina* (Ach.) Körb.  
*Lecania cuprea* (A.Massal.) Van den Boom & Coppins  
*L. cyrtella* (Ach.) Th.Fr.  
*L. erysibe* (Ach.) Mudd  
*L. hutchinsiae* (Nyl.) A.L.Sm.  
*L. naegellii* (Hepp) Diederich & Van den Boom  
*Lecanora altema* (Ach.) Hepp  
*L. albella* (Pers.) Ach.  
*L. albescens* (Hoffm.) Branth & Rostr.  
*L. argentata* (Ach.) Malmé  
*L. campestris* (Schaer.) Hue  
*L. carpineae* (L.) Vain.  
*L. chlarotera* Nyl.  
*L. confusa* Almb.  
*L. conizaeoides* Nyl. ex Cromb.  
*L. dispersa* (Pers.) Sommerf.  
*L. expallens* Ach.  
*L. intumescens* (Rebent.) Rabenh.  
*L. jamesii* J.R.Laundon  
*L. muralis* (Schreb.) Rabenh.  
*L. piniperda* Körb.  
*L. polytrapa* (Hoffm.) Rabenh.  
*L. pulicaris* (Pers.) Ach.  
*L. sambuci* (Pers.) Nyl.  
*L. symmicta* (Ach.) Ach.  
*L. varia* (Hoffm.) Ach.  
*Lecidea fuscoatra* (L.) Ach.  
*L. lithophila* (Ach.) Ach.  
*Lecidella elaeochroma* (Ach.) M.Choisy  
*L. stigmatia* (Ach.) Hertel & Leuckert  
*Lepraria incana* s.lat.  
*Leproplaca chrysodeta* (Vain. ex Räsänen) J.R.Laundon  
*Leptogium gelatinosum* (With.) J.R.Laundon  
*L. lichenoides* (L.) Zahlbr.  
*L. tenuissimum* (Dicks.) Körb.  
*L. teretiusculum* (Wallr.) Arnold  
*\* Lichenodiplis lecanorae* (Vouaux) Dyko & D.Hawksw.  
*Lichenomphalia hudsoniana* (H.S.Jenn.) Redhead et al.  
*\* Lichenostigma maureri* Hafellner  
*Loxospora elatinum* (Ach.) A.Massal.  
*Melanelia exasperata* (De Not.) Essl.  
*M. fuliginosa* (Fr. ex Duby) Essl.  
    ssp. *glabrata* (Lamy) Coppins  
*M. subaurifera* (Nyl.) Essl.  
*Micarea denigrata* (Fr.) Hedl.  
*M. leprosula* (Th.Fr.) Coppins & A.Fletcher  
*M. lignaria* (Ach.) Hedl.

## DOMAIN EUCARYOTA (EUCARYOTES)

*M. nitschkeana* (J.Lahm ex Rabenh.) Harm.  
*M. peliocarpa* (Anzi) Coppins & R.Sant.  
*M. prasina* Fr.  
*M. sylvicola* (Flot.) Vězda & V.Wirth  
*Normandina pulchella* (Borrer) Nyl.  
*Ochrolechia androgyna* (Hoffm.) Arnold  
*O. parella* (L.) A.Massal.  
*O. subviridis* (Hoeg) Erichsen  
*O. tartarea* (L.) A.Massal.  
*Opegrapha atra* Pers.  
*O. calcarea* Turner ex Sm.  
*O. herbarum* Mont.  
*O. niveoatra* (Borrer) J.R.Laundon  
*O. rufescens* Pers.  
*O. varia* Pers.  
*O. vulgata* (Ach.) Ach.  
*Parmelia saxatilis* (L.) Ach.  
*P. sulcata* Taylor  
*Parmelina pastillifera* (Harm.) Hale  
*Parmotrema crinitum* (Ach.) M.Choisy  
*P. perlatum* (Huds.) M.Choisy  
*Peltigera hymenina* (Ach.) Delise ex Duby  
*P. membranacea* (Ach.) Nyl.  
*P. praetextata* (Flörke ex Sommerf.) Zopf  
*P. rufescens* (Weiss) Humb.  
*Pertusaria albescens* (Huds.) M.Choisy & Werner  
     var. *corallina* (Zahlbr.) J.R.Laundon  
*P. amara* (Ach.) Nyl.  
*P. coccodes* (Ach.) Nyl.  
*P. corallina* (L.) Arnold  
*P. hemisphaerica* (Flörke) Erichsen  
*P. hymenea* (Ach.) Schaer.  
*P. leioplaca* DC.  
*P. pertusa* (Weigel) Tuck.  
*Petractis clausa* (Hoffm.) Kremp.  
*Phaeographis smithii* (Leight.) de Lesd.  
*Phaeophyscia orbicularis* (Neck.) Moberg  
*Phlyctis agelaea* (Ach.) Flot.  
*P. argena* (Spreng.) Flot.  
*Physcia adscendens* (Fr.) H.Olivier  
*P. alpolia* (Ehrh. ex Humb.) Fűrnr.  
*P. caesia* (Hoffm.) Fűrnr.  
*P. leptalea* (Ach.) DC.  
*P. tenella* (Scop.) DC.  
*P. tribacia* (Ach.) Nyl.  
*Physconia distorta* (With.) J.R.Laundon  
*P. enteroxantha* (Nyl.) Poelt  
*P. grisea* (Lam.) Poelt  
*Placynthiella uliginosa* (Schrad.) Coppins & P.James  
*Placynthium nigrum* (Huds.) Gray  
*Platismatia glauca* (L.) W.L.Culb. & C.F.Culb.  
*Polyblastia dermatodes* A.Massal.  
*Porina aenea* (Wallr.) Zahlbr.  
*P. chlorotica* (Ach.) Müll.Arg.  
*P. leptalea* (Durieu & Mont.) A.L.Sm.  
*P. linearis* (Leight.) Zahlbr.  
*Porpidia macrocarpa* (DC.) Hertel & A.J.Schwab  
*P. tuberculosa* (Sm.) Hertel & Knoph  
*Protoblastenia calva* (Dicks.) Zahlbr.  
*P. rupestris* (Scop.) J.Steiner  
*Pseudevernia furfuracea* (L.) Zopf  
*Punctelia borrieri* (Sm.) Krog  
*P. subrudecta* (Nyl.) Krog  
*Pyrenula chlorospila* Arnold  
*P. macrospora* (Degel.) Coppins & P.James  
*Pyrrhospora quernei* (Dicks.) Körb.

*Ramalina calicaris* (L.) Fr.  
*R. canariensis* J.Steiner  
*R. farinacea* (L.) Ach.  
*R. fastigiata* (Pers.) Ach.  
*R. fraxinea* (L.) Ach.  
*R. lacera* (With.) J.R.Laundon  
*Rhizocarpon geographicum* (L.) DC.  
*R. petraeum* (Wulfen) A.Massal.  
*R. reductum* Th.Fr.  
*R. umbilicatum* (Ramond) Flagey  
*Rinodina gennarii* Bagl.  
*R. oleae* Bagl.  
*R. roboris* (Dufour ex Nyl.) Arnold  
*R. sophodes* (Ach.) A.Massal.  
*Sarcogyne regularis* Körb.  
*Schismatomma cretaceum* (Hue) J.R.Laundon  
*S. decolorans* (Turner & Borrer ex Sm.) Clauzade & Vězda  
*Scliciosporum chlorococcum* (Graewe ex Stenh.) Vězda  
*Sticta limbata* (Sm.) Ach.  
*Strangospora ochrophora* (Nyl.) R.A.Anderson  
*Thelidium papulare* (Fr.) Arnold  
*Thelotrema lepadinum* (Ach.) Ach.  
*Toninia aromatica* (Sm.) A.Massal.  
 \* *T. episema* (Nyl.) Timdal  
*T. sedifolia* (Scop.) Timdal  
*T. verrucarioides* (Nyl.) Timdal  
*Trapelia coarctata* (Sm.) M.Choisy  
*T. placodioides* Coppins & P.James  
*Trapeliopsis granulosa* (Hoffm.) Lumbsch  
*Usnea ceratina* Ach.  
*U. cornuta* Körb.  
*U. esperantiana* P.Clerc  
*U. fragiliscens* Hav. ex Lynge  
*U. fulvovirens* (Räsänen) Räsänen  
*U. hirta* (L.) F.H.Wigg.  
*U. subfloridana* Stirt.  
*Verrucaria baldensis* A.Massal.  
*V. calciseda* DC.  
*V. dufourii* DC.  
*V. fuscella* (Turner) Winch  
*V. hochstetteri* Fr.  
*V. macrostoma* Dufour ex DC. forma *furfuracea* de Lesd.  
*V. muralis* Ach.  
*V. nigrescens* Pers.  
*V. viridula* (Schrad.) Ach.  
 \* *Weddellomyces epicallopismum* (Weddell) D.Hawksw.  
*Xanthoria candelaria* (L.) Th.Fr.  
*X. elegans* (Link) Th.Fr.  
*X. parietina* (L.) Th.Fr.  
*X. polycarpa* (Hoffm.) Th.Fr. ex Rieber  
*X. ucrainica* S.Kondratyuk

### Reference:

Coppins, B.J. (2002) *Checklist of Lichens of Great Britain and Ireland*. British Lichen Society, London.

<sup>1</sup> Contributed by M.R.D. Seaward, Department of Geography & Environmental Science, University of Bradford, Bradford BD7 1DP.