



1cm



# Snave Beach Lichen & Tree

micro-nature trail



## What do you need for this micro trail?

Suitable clothing and stout footwear. Viewing with x10 or x20 loupes or hand lenses will add to the detail you can see while examining trees and species of note.

### Caution

This walk can only be done at low tide as much of the area is covered at high tide. Rocks may be slippery underfoot. The trees along the edge of the shore have low branches, so general care is advised along the trail.

## Snave Beach micro-nature trail: lichens and trees

A micro-nature trail for this unassuming section of coastline, typical of West Cork, is being developed to demonstrate the diversity of tree and lichen botany present.

This micro-nature trail is a kind of nature trail in which there are sequential stops at trees, rock outcrops and other individual features of lichen botany interest along the route. The interpretative information is prompted by the species living at each station, and what we would tell you in person if you were with us on a walk to demonstrate the beauty of the microscopic life that can be viewed along Snave Beach.

This micro-nature trail gives a flavour of the lichen flora present, but there is much still to be discovered even on this small stretch of beach. Visitors are encouraged to harness their new-found knowledge of the lichen botany to add original observations to enhance their experience of the trail.



*Location:* Snave Beach where the Coomhola River reaches the sea between Ballylickey and Glengarriff, Co Cork.

*Grid reference:* V996543

*Long/Lat:* 51.73240115 - 9.45319891

## Features of interest

You should try and find these different tree and shrub species along the back of the shore and observe the botanical details that we explain. The trail, which is 200m long, starts where the path goes down to the beach at the side of the Coomhola River and ends at a large rock outcrop.

Elm (*Ulmus procera*)

Hawthorn (*Crataegus monogyna*)

Ash (*Fraxinus excelsior*)

Holly (*Ilex aquifolium*)

Downy Birch (*Betula pubescens*)

Hazel (*Corylus avellana*)

Sycamore (*Acer pseudoplatanus*)

Rusty Willow (*Salix cinerea* subsp. *oleifolia*)

Rhododendron (*Rhododendron ponticum*)

Rock outcrops and boulders

## A Botanical overview of the Snave Beach

The interpretative information is organised by the substrates - the trees and rocks - on which the lichens grow. Once you are prompted by seeing the relevant tree read the text *in situ* at your chosen stop.

Let us begin by looking at the bay. Depending on the tide, your view changes. At low tide, gravels are exposed with seaweed growing in the inter-tidal zone, while at high tide, a line of leaf-litter humus mixed with brown seaweeds is floated in. Along the strandline are wracks (*Fucus vesiculosus*, *Fucus serratus* and *Ascophyllum nodosum*) cast up from the sea, and tree leaves arrived down the Coomhola River. This pure, river-washed, leaf-litter humus is composed of old leaves of alder, willow, oak, elm, hazel, ash, hawthorn, rhododendron, sycamore, holly, ivy, and shed twigs, floating sticks, petals, bracts, cones, nuts and bobbing crab apples.

The main thing to begin to notice on the Snave micro-nature trail, is that not every tree is the same. There is actually quite a range of species here. Beginning to learn to identify the trees in order to fully appreciate the botany typical of West Cork, is our first challenge to you, our Snave micro-nature trail visitor.



## Elm (*Ulmus procera*)



Willow is the first tree species encountered on the beach but soon after we find elm (*Ulmus procera*) by a bend in the fence. The older trunk has a flaky bark, with several interesting lichens - *Coenogonium luteum*, with orange discs on an olive-green thallus; *Leptogium subtile* agg., a black fur of cyanobacterial lichen encrusting the bark; *Normandina pulchella*, forming scales, usually amongst one of two liverworts, either the green-forked *Metzgeria furcata*, or the brown *Frullania dilitata*. The branches of elm have corky outgrowths, often with some crusty lichens on, such as the black conical pycnidial vessels (asexual fruiting bodies) that make the conidia (a type of spore) of *Anisomeridium polypori*.

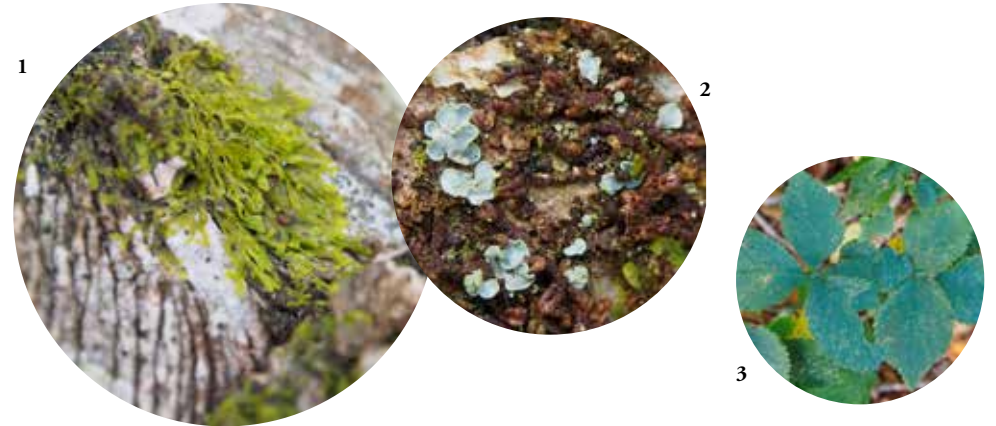
## Hawthorn (*Crataegus monogyna*)



Hawthorn is a good host for a range of lichens and bryophytes, including the lichens *Graphis scripta*, *Phaeographis smithii* and *Normandina puchella* on the liverwort *Frullania dilitata*. Find the moss *Ulota crispa* branch nodes with *Hypnum andoi* (green) and *Hypnum cupressiforme* var. *resupinatum* (olive brown green) on the older trunks.

The fruits of hawthorn, unlike apples, have a nutty like seed coat outside the seeds, and the whole nut is covered in the flesh and then skin of the haw. The leaves of hawthorn have an interesting shape. One can imagine how these leaves are folded up in a leaf bud before bud burst, so that rounded lobate sinuous shape, is packed up like a sheet of parachute silk in the leaf bud. The bracts of the leaf bud are brown, and like an apple bud, can have hairs on their edges.

- 1 Liverwort: *Metzgeria furcata*
- 2 Lichen: *Normandina pulchella* among liverwort *Frullania dilitata*
- 3 Elm leaves © Maria Cullen



- 1 Hawthorn berries © Clare Heardman
- 2 Lichen *Parmotrema perlatum* among *Hypnum* moss on hawthorn © Clare Heardman
- 3 Moss *Hypnum andoi* © Maria Cullen



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## Ash (*Fraxinus excelsior*)



Ash trees are occasional along the shore. Ash tends to be cut for hurley butts, and the stocks you see are not much larger than the trunk diameter cut for hurleys. The bark is covered in *Pyrenula macrospora*, the lichen species that also grows on elm and sycamore. The low branches of ash have interesting twig lichens such as the leafy fruiting *Physcia aipolia* and the orange discs of a crusty lichen *Caloplaca ferruginea*. If one gets a chance to dissect the orange fruiting disc, the ascospores (spores in an ascus sac, specific to ascomycete fungi) are polarilocular - that is, an ascospore that has a central tube which joins the cytoplasm in one cell to another cell, penetrating a thick middle wall, of the two-celled ellipsoidal ascospore.

Lichen *Pyrenula macrospora* with large black fruits; *Physcia aipolia* foliose lichen © Maria Cullen



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## Holly (*Ilex aquifolium*)



This tree has smooth bark, a distinctive evergreen leaf with prickles and female flowers in summer that produce red berries in autumn. The white script lichen *Graphis elegans*, so-called because they have spore-producing structures that look like writing on the lichen body, is common on horizontal branches. There are other smooth bark lichens present such as *Arthonia ilicina*, *Arthopyrenia punctiformis* and *Tomasellia gelatinosa*, all of which form black spots or dots on the bark.

Holly and script lichen © Maria Cullen



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## Downy birch (*Betula pubescens*)



In this tree line along the top of Snave Beach, there is a birch tree that is relatively free of epiphytic growth. There are leaf spots, a type of fungal infection, that make infected leaves turn yellow earlier in the season than usual. *Melampsoridium betulinum*, a rust fungus that affects birch trees, can be seen as orange spots on some leaf undersides.

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## Hazel (*Corylus avellana*)



The hazelnut tree has spectacular bracts around the nuts in autumn. The female nut is formed at the ends of shoots. The leaves are large and round, like that on a lime tree (*Tilia x europaea*), but with shorter stalks. Hazel tend to make straight poles up to 3 metres tall. The sun shoots are reddish and are covered in short hairs early in the year. The bark skin, or epidermis, goes from translucent to pale straw as it ages, and the finger-sized poles have glossy smooth bark with paper-like folds of epidermal bark. The older poles get to arm width, and have a wide range of smooth bark lichens. As the bark thickens, it gets corkier.

Older hazel forms a shrub with a stool where many poles grow from. This multi-stemmed form is typical of hazel. Older poles tend to rot down, and species to look for on old, dry, white-rotted hazel include the wood wart *Hypoxylon fuscum* and the hazel weld *Hymenochaete corrugata* which fuses poles together. The lichen *Arthonia cinnabarina* likes this microhabitat. A fungal species to anticipate at Snavo on really old hazel is the weld - *Hymenochaete tabacina* - a species you are more likely to find at old hazel groves in the Burren, County Clare.

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## Sycamore (*Acer pseudoplatanus*)



The next tree to get to know is sycamore which is in the maple family (Sapinaceae). The trunk bark of sycamore has larger plates than on elm. It often has *Pyrenula macrospora* on it, a green-grey lichen with a yellow-orange algal partner called *Trentepohlia*. One can see the yellow pigments of the alga if you scrape the cortex

Hazel catkin © Maria Cullen

Hazel branch with crustose lichens (*Pyrenula* and *script*) © Clare Heardman



Sycamore keys © Maria Cullen

away to expose the medulla (internal tissues). The black flask-like fruits are grouped together and the thallus (plant body) has little pores on the cortical (outer) surface called pseudocyphellae, or air breathing pores. The margin of the thallus is a black line or prothallus and if one looks closely this is where the pycnidia of *Pyrenula* makes curved sickle-shaped conidial cells that allow this lichen to spread asexually over the bark of the tree rather rapidly. The black marginal zone is pure fungus, and no alga, and that is where the black fungal pycnidia are formed.

There is a sycamore further along the shore with an excellent population of *Degelia atlantica* on the trunks. The trunks are around 50 years old and have this soft grey leathery cyano-lichen on the vertical bark faces. The roots buttresses are ramified and have temporary water pools, called telemata, close to the high tide mark.

## Rusty Willow (*Salix cinerea* subsp. *oleifolia*)



Willow is the first tree one meets when one descends from the slope of the road to the beach. The willow here is rusty willow (*Salix cinerea* subsp. *oleifolia*). Where the willows have been cut back in the recent past, there are no mosses, hepatics (liverworts) or lichens. However, one bush on the high ground of the shingle is exceptional, with bushy *Usnea subfloridana* and the leafy *Parmotrema perlatum*. Old boughs in the centre of the willow have Atlantic cyano-lichens which contain cyanobacteria, otherwise known as blue-green algae.

Lichen *Degelia atlantica* on shady trunk bark  
© Maria Cullen



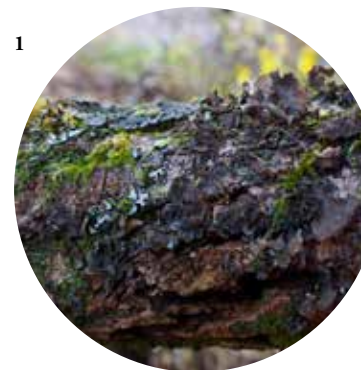
- 1 Foliose lichen *Parmotrema perlatum* among *Hypnum* moss on bark of tree © Maria Cullen
- 2 Fruticose lichen *Usnea subfloridana* with *Frullania dilitata* © Maria Cullen



Once you get to know willow, you will recognise it as a bushy tree that produces catkins as male flowers, that make the pollen. The leaves of rusty willow have some orange hairs on the rounded veins close to the mid-under-rib on the leaf under-side (pictured right). These silky hairs are very interesting to see close-up with a x10 hand lens.

If you look closely at the willow bark, you may also see nymphs of willow scale (*Chionaspis salicis*), a small insect that overwinters as eggs beneath the scale of the female parent.

1 *Sticta fuliginosa* on willow bark © Maria Cullen  
This lichen is an ascomycete fungus - cyanobacterium association, so it requires a clean, humid environment with liquid water in which to live.



2 Lower side of leaves of *Salix cinerea* ssp *oleifolia*



## Rhododendron (*Rhododendron ponticum*)

This plant is an introduction from the Caucasus Mountains of Armenia, Azerbaijan and Georgia between the Black Sea and the Caspian Sea. The tubular clustered purple flowers have nectaries in them. Buds that fail can be infected by a black pin hyphomycete (a type of fungus) such as *Seifertia azaleae* (pictured right).

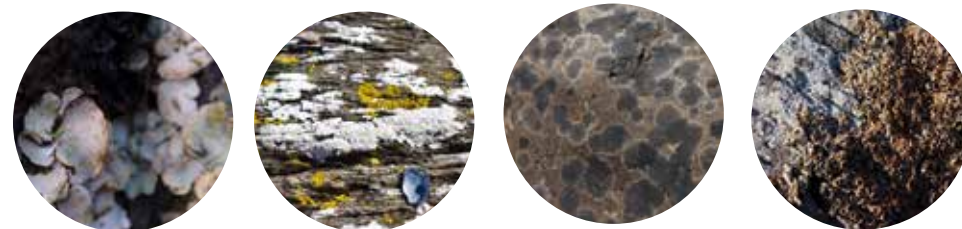


## Rock outcrop and boulders

The old red sandstone rock outcrops by the shore are home to a wide array of crust and leafy lichens including the leafy *Dermatocarpon miniatum*. This is the best example of a leafy lichen attached at a single point or umbilicus. On the upper cortex there are pores, from the perithecial (flask-shaped) fruits, that are ascospore producing.

Another lichen found on the rock outcrops is *Ochrolechia parella*. The fruits of this crustose lichen are pinkish pruinose (powdery) on a lumpy white crusty thallus.

L-R: *Dermatocarpon miniatum* (Elephant ears!) lichen on rock; rock with seashore lichens, *Ochrolechia parella*, *Dermatocarpon miniatum* and *Xanthoria parietina*, among others; lichen on boulder that is sometimes submerged by the tide; and *Anaptychia runcinata* lichen showing brown-centred fruits with pale khaki rims © Maria Cullen.





## Appendix 1

Species observed at Snave Beach micro-nature trail

The following species records were made in 2018 by botanists Maria Cullen and Howard Fox along the Snave Beach micro-nature trail. This provides some guidance on what visitors can expect to see, if you look in the same places, and if habitat conservation is successful in keeping these species alive.

Host tree	Epiphytic species	Group	Seq.	Notes
<i>Picea sitchensis</i>	<i>Caloplaca cerina</i>	crustose lichen	A	picnic table
<i>Ulmus procera</i>	<i>Coenogonium luteum</i>	crustose lichen	B	on trunk
<i>Ulmus procera</i>	<i>Leptogium subtile</i> agg.	cyano lichen	B	black fur
<i>Ulmus procera</i>	<i>Frullania dilitata</i>	hepatic	B	
<i>Ulmus procera</i>	<i>Metzgeria furcata</i>	hepatic	B	
<i>Ulmus procera</i>	<i>Normandina pulchella</i>	squamulose lichen	B	
<i>Acer pseudoplatanus</i>	<i>Graphis scripta</i>	crustose lichen	C	thin
<i>Acer pseudoplatanus</i>	<i>Lecanora chlarotera</i>	crustose lichen	C	
<i>Acer pseudoplatanus</i>	<i>Lecidella elaeochroma</i>	crustose lichen	C	
<i>Acer pseudoplatanus</i>	<i>Pyrenula macrospora</i>	crustose lichen	C	
<i>Acer pseudoplatanus</i>	<i>Frullania dilitata</i>	hepatic	C	
<i>Acer pseudoplatanus</i>	<i>Metzgeria furcata</i>	hepatic	C	
<i>Acer pseudoplatanus</i>	<i>Ramalina farinacea</i>	lichen fruticose	C	rare
<i>Acer pseudoplatanus</i>	<i>Hypnum cupressiforme</i> var. <i>resupinatum</i>	moss	C	
<i>Acer pseudoplatanus</i>	<i>Ulota crispa</i>	moss	C	
<i>Crataegus monogyna</i>	<i>Trentepohlia aurea</i>	alga	D	
<i>Crataegus monogyna</i>	<i>Lecanora chlarotera</i>	crustose lichen	D	
<i>Crataegus monogyna</i>	<i>Microlejeunea ulicina</i>	hepatic	D	
<i>Crataegus monogyna</i>	<i>Parmotrema perlatum</i>	foliose lichen	D	
<i>Crataegus monogyna</i>	<i>Ramalina farinacea</i>	fruticose lichen	D	rare
<i>Crataegus monogyna</i>	<i>Hymnum andoi</i>	moss	D	
<i>Crataegus monogyna</i>	<i>Hypnum cupressiforme</i> var. <i>resupinatum</i>	moss	D	
<i>Crataegus monogyna</i>	<i>Pertusaria leioplaca</i>	crustose lichen	D	
<i>Crataegus monogyna</i>	<i>Normandina pulchella</i>	squamulose lichen	D	common, but seldom fertile
<i>Ulmus procera</i>	<i>Anisomeridium polypori</i>	crustose lichen	E	
<i>Ulmus procera</i>	<i>Pyrenula macrospora</i>	crustose lichen	E	
<i>Ulmus procera</i>	<i>Metzgeria furcata</i>	hepatic	E	
<i>Ulmus procera</i>	<i>Normandina pulchella</i>	squamulose lichen	E	
<i>Ulmus procera</i>	<i>Cryphaea heteromala</i>	moss	E	
<i>Corylus avellana</i>		bush	F	good for many species
<i>Crataegus monogyna</i>	<i>Caloplaca ferruginea</i>	crustose lichen	G	
<i>Fraxinus excelsior</i>	<i>Pyrenula macrospora</i>	crustose lichen	H	cut
<i>Acer pseudoplatanus</i>		tree	I	seaweed on low branches
<i>Salix cinerea</i> subsp. <i>oleifolia</i>		tree	J	smooth bark

Host tree	Epiphytic species	Group	Seq.	Notes
<i>Ilex aquifolium</i>		tree	K	berries
<i>Acer pseudoplatanus</i>	<i>Hedera helix</i>	climber	M	
<i>Ilex aquifolium</i>		tree	O	berries
<i>Fraxinus excelsior</i>	<i>Pyrenula macrospora</i>	crustose lichen	P	dead cut stump
<i>Acer pseudoplatanus</i>	<i>Pertusaria hymenea</i>	crustose lichen	Q	
<i>Acer pseudoplatanus</i>	<i>Degelia atlantica</i>	cyano lichen	Q	
<i>Rhododendron ponticum</i>		bush	R	bare
<i>Betula pubescens</i>	<i>Melampsorium betulinum</i>	rust	S	leaf spot
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Leptogium cyanescens</i>	cyano lichen	T	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Leptogium lichenoides</i>	cyano lichen	T	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Lobaria virens</i>	cyano lichen	T	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Hypnum cupressiforme</i> var. <i>resupinatum</i>	moss	T	with setae and capsules
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Isothecium myosuroides</i>	moss	T	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Neckera complanata</i>	moss	T	
<i>Crataegus monogyna</i>		tree	U	haw berries
<i>Corylus avellana</i>	<i>Degelia atlantica</i>	cyano lichen	V	
<i>Corylus avellana</i>	<i>Normandina pulchella</i>	squamulose lichen	V	
<i>Corylus avellana</i>	<i>Hymneochaete corrugata</i>	resupinate basidiomycete	V	huge tree
<i>Acer pseudoplatanus</i>	<i>Uncinula bicornis</i>	ascomycete	W	leaf mildew
<i>Acer pseudoplatanus</i>	<i>Rhytisma acerinum</i>	ascomycete	X	tar spot
<i>Acer pseudoplatanus</i>	<i>Evernia prunastri</i>	foliose lichen	X	
<i>Acer pseudoplatanus</i>	<i>Parmelia sulcata</i>	foliose lichen	X	
<i>Acer pseudoplatanus</i>	<i>Parmotrema perlata</i>	foliose lichen	X	
<i>Acer pseudoplatanus</i>	<i>Physcia aipolia</i>	foliose lichen	X	
<i>Acer pseudoplatanus</i>	<i>Usnea ceratina</i>	fruticose lichen	X	
<i>Rhododendron ponticum</i>	<i>Seitifera azalaea</i>	hyphomycete	Y	bas. <i>Periconia azalaea</i>
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Microcera coccophila</i>	ascomycete	Z	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Rhytisma salicis</i>	ascomycete	Z	tar spot
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Flavoparmelia caperata</i>	foliose lichen	Z	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Hypotrachyna revoluta</i>	foliose lichen	Z	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Melanelia subaurifera</i>	foliose lichen	Z	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Usnea subfloridana</i>	fruticose lichen	Z	
<i>Salix cinerea</i> subsp. <i>oleifolia</i>	<i>Peniophora lycii</i>	resupinate basidiomycete	Z	



## Snave Beach lichen and tree micro-nature trail. November 2018

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*Photographs:* Maria Cullen and Clare Heardman

*Cover image:* Painting of *Usnea subfloridana* and *Parmotrema perlatum* on willow at Snave by Shevaun Doherty (2018)

*Design:* Jenny Dempsey

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