

# The Natural History of Broughtonknowe



For the 'Friends of Broughtonknowe'

A review of the 2021 Facebook posts. And extra insights into the woodland / pond ecology.

## JANUARY

### What to Spot.

- At the feeders - Coal, Blue and Great Tits, maybe a Jay, Goldcrest or Tree Creeper if you are lucky. All these bird species overwinter in the woodland. The feeders provide a guaranteed supply of food for many of them, important for survival if conditions are harsh.
- In the woodland - Roe deer are around, chance encounters are possible on any walks. Other animals are active mainly at night e.g. Fox and Badger - look out for their tracks if it snows or in mud.

### Know your 'Knowe.

### 'Hair Ice'

If you are into unusual phenomena 'hair ice' can be found at this time of year - if the conditions are right.

It forms on certain types of dead wood containing a particular species of fungus (*Exidiopsis effusa*). After a misty, damp night and a late dip in temperature to below freezing water in microscopic tubules within the dead wood freezes and is shaped into filaments by the fungus before being squeezed out as 'hairs'.

As long as it remains cold they persist for several hours, even days, as a fur like growth. The fungus that is implemented in creating the hairs of ice also secretes a chemical that prolongs their existence!





## FEBRUARY

What to spot.

- The frogs and toads are still to arrive and before the leaves appear on the trees seems like a good time for some lichen spotting! Areas of Broughtonknowe seem particularly well endowed with a variety of lichen species 'dripping' from the trees. Rowan trees seem to be very accommodating - a good patch is just beyond the ponds heading north. This 'lichen corner' extends just about as far as the old car park.
- You might come across some winter visitor migratory birds, many belong to the thrush family e.g. Redwings and Fieldfares which could be feeding on any remaining Rowan berries. Even Song Thrushes and Blackbirds could be winter visitors from Scandinavia, our own birds having moved away to the South. Mistle Thrushes are likely to be resident, they will have territories as they start to breed very early in the year. You may even hear one singing from a tree top - for this reason they are sometimes referred to as the 'storm cock'.

Know your 'Knowe.

Lichens

They do no damage to the trees just growing on them as 'epiphytes'. Biologically they are a really interesting combination of Algae (think green patches on tree trunks) and Fungi (moulds, mushrooms, toadstools). The fungal component accommodates the algae and in association they can survive in situations neither could on its own! One thing they do require is clean air. Their absence is a clear indicator of air pollution. This gives the Broughtonknowe air quality a big thumbs up! Common types are Evernia, Parmelia and Usnea - all in the photo below.



## MARCH

What to spot.

- Frogs and Toads at the ponds arguably provide the most spectacular event of the Broughtonknowe wildlife year. The frogs arrive first at the beginning of the month. One or two early individuals may be encountered moving through the grass some distance away but some environmental trigger stimulates a sudden dramatic emergence of frogs from all directions all making their way to the security of the water. There are literally hundreds.

Know your 'Knowe'.

Amphibians

Courtship involves a lot of croaking and grappling. Female frogs assess the quality of the males by their croaking! Successful males will eventually clamp on to a female that is about to spawn, he fertilises her eggs as she does so. The newly produced spawn absorbs water and soon reveals itself as familiar clumps. They tend to congregate for mass







spawning so large patches of frog spawn remain once the adults disperse (as quickly as they suddenly arrived!).

This spectacle is followed a few days later by the Toads. Their behaviour is a little different. Hundreds of adults again appear in the ponds the males looking to clasp swollen females. There would appear to be a considerable surplus of males as in their increasingly frantic efforts to secure a female they tend to clump up into 'balls' - somewhere within each is a single female surrounded by males! This is all accompanied by croaking calls. The sounds merge to form a low musical 'hum' that can be heard all around the ponds. One male will eventually secure the female as she spawns. Toad spawn is in the form of long strands that they secure to any floating pond plants. Then like the frogs before them they are suddenly gone for another year. There is some predation, principally by Herons which can be regularly encountered at the ponds at this time.

The frog and toad spawn eventually develops into similar looking tadpoles, toad ones are generally blacker looking. They may be evident later in the year as 'clouds' of individuals in the shallows. In late summer tiny froglets and toadlets leave the ponds - some years in spectacular numbers dispersing through the grass. Take care at this time as they are easy to tread on! There may also be newts present. I have only seen one! It was a male Palmate Newt.

## APRIL

What to spot.

- Hares are very active at this time of year.
- Badgers are largely nocturnal but there is plenty of spring activity.

Know your 'Knowe.

Hares and Badgers

Both species are resident at Broughtonknowe throughout the year. Badgers have a fixed 'set' in which a number of individuals cohabit. Hares on the other hand are mobile spending much of their time squatting in shallow depressions in the vegetation called 'forms'. It is sometimes possible to get very close to them as they will sit perfectly still and camouflaged to avoid detection, if disturbed their long hind legs can propel them at high speeds for considerable distances. The siting of their hiding places change on a regular basis.

The peak of the hare breeding season is between April and July. At this time they become much more noticeable the males being on the look out for receptive females. Females fend off undue attention with impressive bouts of 'boxing'. Chasing and leaping also enables the females to assess the quality of prospective mates. This behaviour can be encountered in the fields adjacent to the woodland and at this time individuals are regularly evident on and around the paths. Pregnant females produce their young 42 to 44 days after mating. The leverets are left hidden throughout the day in 'forms' in the undergrowth. (Young Roe Deer are also left hidden in the undergrowth at this time of year). Please take care with dogs at this time.

The Badger year commences in late winter the young being born underground in the set between January and May, typically April. These events underground are marked on the surface by regular 'airing' of their bedding. It is strewn about at the entrance to the set during the night and then taken below again the next night or later. The cubs begin to venture out at night at about eight weeks old and feed independently once 12 to 14 weds old. They continue to live with the sow until the autumn and sometimes through the winter.

Badgers have a very varied diet being quite opportunistic with regards to seasonal availabilities, for much of the year earthworms being their principal dietary item. In spring they will exploit the temporary abundance of frogs and toads, birds eggs and chicks and young rabbits throughout the summer. Bumblebee and wasp nests are dug up for their grubs and finally nuts (eg acorns), fruit (eg. crab apples and berries) in the autumn.





## MAY

What to spot. - Signs of spring:

- Buds are beginning to swell as the deciduous trees start to come out of their winter dormancy.
- The first wildflowers. Coltsfoot, with its Dandelion like flowers, is one of the earliest.
- Listen out for the Song Thrush - as its name suggests it is a great songster from the tree tops.
- Horsetails grow their spore producing 'sporangia'.

Know your 'Knowe - Horsetails.



These are found in a number of places generally in the damper soils of the woodland. In the garden they are a real pain - almost impossible to get rid of! but in their natural setting they must be admired. They are a relic from the age of the Dinosaurs, they are relatives of the plants that were the dominant form of vegetation at that time. Their survival against all the odds of competition with more advanced plants is amazing. They represent a significant stage in the evolution of plants - more advanced than mosses but a stage below the flowering plants / grasses dominant today. They do not have flowers. The structure evident in the photo is a sporangium that produces spores. There are 9 British species - this large, impressive one is the 'water horsetail' (*Equisetum fluviatile*).



## JUNE

What to spot. - Birds.

- Most of our common birds are evident establishing and holding their territories in which they are going to breed. The 'nest box trail' between the car park and the ponds has 15 numbered nest boxes. Those with the smallest entrance hole are suitable for Blue Tits, the larger holes for Great tits. Some of the boxes are open fronted and are suitable for Robins, Pied Wagtails and maybe Wrens. Look out for any evidence of nesting birds as you take this route

Know your 'Knowe. - Nests - Sticklebacks.

Sticklebacks are back! (somehow - after the ponds were drained last summer). It just shows how tenacious nature is. Sticklebacks, like birds, are nest builders. In spring the male changes colour and builds the 'nest' from plant debris on the bottom of the pond. He then entices any passing, swollen (with eggs), females to spawn in the nest. He fertilises them by swimming through and releasing his sperm. He then dutifully cares for the eggs and fry until they are independent free swimming mini-sticklebacks.



## JULY

What to Spot.

Wildflowers.

- Broughtonknowe has a rich assemblage of spring and summer wildflowers. They are mainly associated with the grassy areas.
- Last year we identified over 50 different species.

Know your 'Knowe.

- Orchids

We have a number of native orchids (unlike supermarket ones - they are quite small!). They have interesting pollination mechanisms generally involving a close association with insects. The Bee Orchid flower looks like a female bumble bee and male bees try to mate with it! No such risqué behaviour here at B'knowe but we do have two other species: the Northern Marsh Orchid and the Common Spotted Orchid. The Marsh Orchid has darker purple flowers otherwise they are pretty similar. (Spotted leaves are not a way to tell them apart - the leaves are very variable, it is the flowers that are spotted).

Charles Darwin was intrigued by orchid pollination mechanisms and how certain insects and orchids had driven each other's evolution.

For a re-creation of one of his classic experiments I use my Swiss army knife toothpick to represent a bee's proboscis (a cocktail stick would work just as well). You just insert it into a flower and if a bee hasn't visited already two structures called 'pollinia' are attached! They hold pollen that is transferred to the next flower the bee visits!

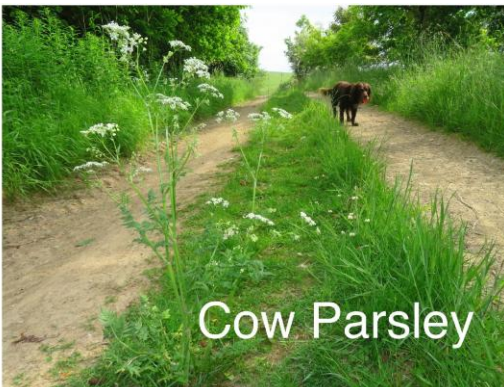
Have a go but first you need to find an orchid.

Usually Northern Marsh Orchids appear by the ponds - and I have previously noticed Common Spotted Orchids in the grass margin along the top path that borders the fields.





Some of the frequently encountered wildflowers this month:



(Appendix 1 is a comprehensive list of Broughtonknowe plant life).



## AUGUST

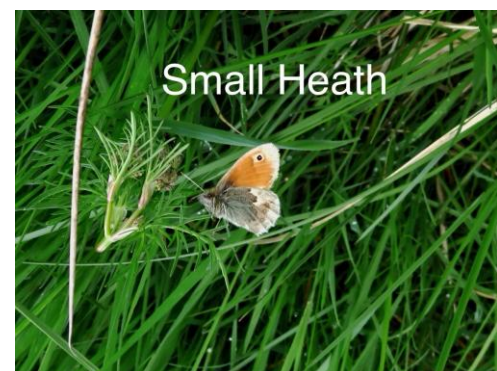
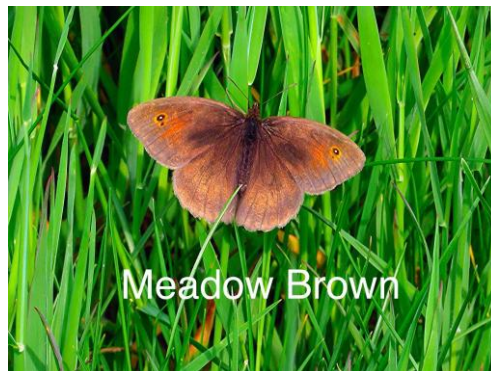
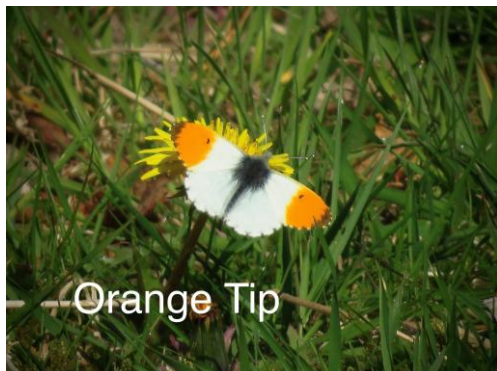
What to spot.

Insect life.

- Look out for damselflies at the ponds.
- Butterflies and moths.

The butterfly season starts in early spring with the emergence from hibernation of Peacock, Small Tortoiseshell Red Admirals and Green Veined Whites on sunny days. They mate, lay eggs and a second generation will be evident by August. Another spring species is the Orange Tip these have overwintered as pupae in the soil. They only have one generation so once they have mated and laid eggs they are seen no more until the following year.

As the diversity of wildflowers increases so does the variety of moths and butterflies, each preferring a different plants for feeding on nectar and for egg laying (the caterpillar stage of these insects eat leaves often of only one type of plant eg the Dark Green Fritillary requires Dog Violets, Peacocks and Small Tortoiseshells need Nettles).

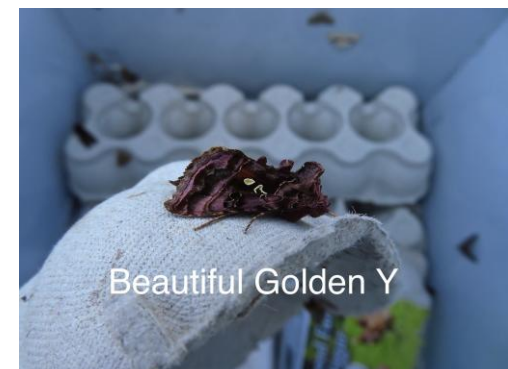
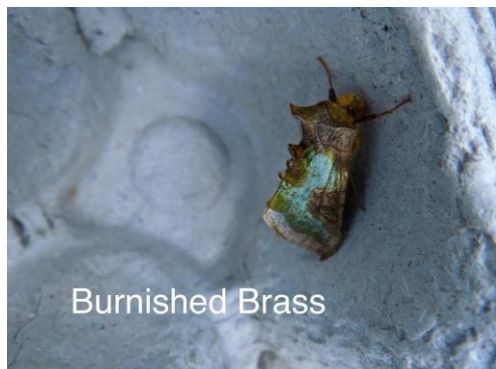




Moths differ subtly from butterflies most species being nocturnal - but a number of species can be spotted during the day on walks at Broughtonknowe including the striking Five Spot Burnet and Cinnabar.



Other species can be discovered at night using a 'moth trap' - a bright light attracts them to a funnel and they slip down the sides into a box. After examination they are released unharmed.



Appendix 2 is a comprehensive list of moth trap data for Broughtonknowe - butterflies encountered are also included.

## Know your 'Knowe. Damselflies

I've been checking out the mating behaviour / strategy of damselflies! They are really quite amazing.

The males have reproductive organs at the end of their long abdomens - but they have an accessory set of structures, including a 'penis' at the front end! They package sperm at their rear end and then transfer it to the front - and go looking for females.

If they are lucky and find a suitable partner she is grabbed by the back of her neck using appendages at the end of his abdomen. She then reaches forward with her reproductive opening to the front of the male where the 'penis' is located. Once inserted the male uses this to clear out any sperm that may already be present from previous matings - and then inserts his own sperm package.

At this stage the two bodies form a distinctive heart shape.

The male has a strong desire to remain 'coupled' by his neck grab! - this will prevent any other males from mating with her. She is compliant and they fly off together for egg laying. During this process the males are bolt upright as the females deposit their eggs on submerged aquatic plants (sometimes she might be completely under water!). The male is on duty - if he spots a potential predator he will lift her out of the water (by the scruff of her neck!) and fly off.

Some carry on! The photos show mating Azure Damselflies at B'knowe and a synchronised egg laying! at the Skirling pond.









## SEPTEMBER

What to Spot. - Fungi.

- The onset of autumn is heralded by the appearance of Fungi throughout the woodland and grassland but predominantly under the conifers at Broughtonknowe.
- The poisonous Fly Agaric is probably the most spectacular - there are many other species some are edible (but take care!).



Know your 'Knowe. Fungi - nature's recyclers.

They are not plants, they do not contain chlorophyll. They are a unique group of organisms that have been distinct from plants and animals for millions of years. The toadstools and mushrooms we are familiar with are just a seasonal manifestation for reproduction, the major part of fungal structure consists of thread like growth through soil, leaf litter or rotting wood called a mycelium. These threads or hyphae release enzymes that digest their surroundings, they then absorb the digestion products. In this way they cause decay. This process is essential in all ecosystems in the natural recycling of materials. Without decay we would be immersed in the debris of spent life i.e. leaves, branches, fallen trees and all our organic rubbish. They are assisted in this vital task by bacteria - the majority of which also live free in the soil.



The mushrooms and toadstools we are familiar with produce spores (leave one on a sheet of paper and it will produce a spore print that can assist ID). The millions of microscopic spores that are produced are dispersed by autumn breezes, in this way fungi are spread throughout suitable habitat.

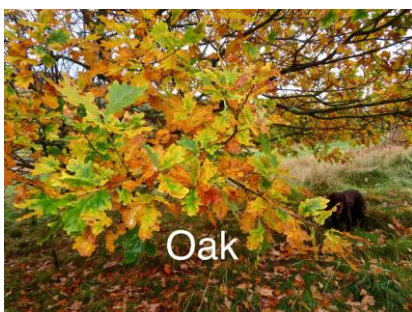
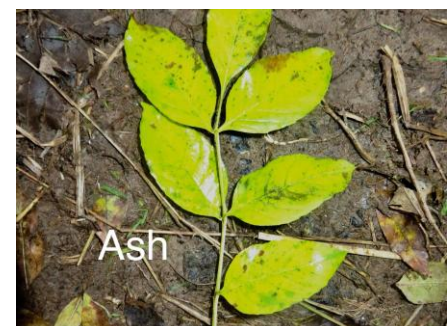




## OCTOBER

What to spot. - Autumn Colours.

- What lovely colours there are at Broughtonknowe at this time of year - and an opportunity to become more familiar with some of the different tree species in the woodland.
- The labelled photos show some of the species to look out for. Note that the Sycamore leaves have 'Tar Spot' fungus on them - this is another indicator of clean air (as is the presence of Lichen which grow in profusion on some of the Rowan trees). The Rowan photographed here is unusual in having white / cream berries - it is a different variety.





Know your 'Knowe.

## Autumn Leaves.

In the autumn the deciduous trees prepare for winter dormancy. Leaves are no longer necessary for photosynthesis so the chlorophyll is broken down and any valuable components (minerals, etc.) are transported away for storage. The remaining chlorophyll components are still coloured - but no longer green. In addition the plants use this opportunity to transport into their leaves the waste molecules of their summer metabolism. So when the leaves fall off they are getting rid of accumulated waste products. All very clever!

Provided there are no extreme weather events (gales, frosts) this process should run to completion around about now. Leaf drop - abscission, is brought about by the production of cork molecules across the base of the leaf stalk. This terminates any further transport and is the point of separation from the tree. An obvious 'leaf scar' is left in many species - e.g. in Horse Chestnut they look like mini horseshoes!



Anyway science lesson over (can't resist it - sorry!).

It is good though to follow the lives of trees throughout the year from their winter dormancy, the swelling buds of spring then flowering (usually small and green but lots of pollen and nectar), then the full canopy and finally the autumn colours.

## NOVEMBER

What to spot. - Roe Deer



Know your 'Knowe - Life Cycles - Roe Deer.

- A family group is re-established in the woodland after the buck has followed a solitary life during the summer months and the doe has given birth and brought up one or two fawns. The maximum group size now will consist of: a buck (male), a doe (female) and one or two fawns.
- This unit will stay together throughout the winter, the youngsters eventually being driven away in the spring before the next generation is born.



- Mating occurs in late July / early August so when the family groups re-establish the male is basically protecting his pregnant female (and his previous years offspring).
- Delayed implantation of the embryo occurs ensuring that development does not proceed until late December.
- Development in the womb then takes five months - so the next generation will be born in late May.
- They just leave their fawns to lie still in long grass visiting occasionally to suckle. (The Hare leverets are the same - being left hidden above ground throughout the day).

\*We must be vigilant with our dog control - particularly in the spring!\*





## DECEMBER

What to spot. - Tracks and Signs.



- Tracks in mud and snow - Badger, Fox and Roe Deer. (Badger in the photo above).
- Poo! - Fox droppings have a distinctive pointed shape, Badgers tend to use localised 'latrines' along their regular nocturnal perambulations. Both are very smelly! being used for territory marking.
- Owl pellets. Owls and other birds of prey cough up the indigestible remains of their prey. You can learn a lot about a predator's diet from analysis of pellets, they contain a lot of bones even complete small skulls! - you can also gain insight into what small mammals live within its hunting range.
- Artefacts - like a thrush's anvil may give insight into diet - and maybe a lot more!



Know your 'Knowe. - Thrush's anvils

This is where a Song Thrush breaks open collected snails. The snails they prefer are 'banded land snails' (*Cepaea nemoralis*) - a very variable species in both colour and banding. The thrush predate the ones it can spot - those with the best camouflage survive the longest / leave most offspring. Natural Selection in action!

(Interestingly in different habitats different colours / banding patterns predominate. This has been well studied - but makes a good project for more critical observation next spring!).

