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Eyes on Ecology

VEON

Phenology

It's About Time

While we humans may still be in lockdown, nature gets no such downtime – ever! Not even at the weekends! Just as within our own lives, the rest of the natural world has a schedule too; places to be and times to be there. And often, like us, with strict dress codes and adequate resources at hand (or claw).

The study of timeframes within nature is referred to as 'Phenology', which is derived from the Greek word meaning "to appear". It primarily concerns the periodic events in biological life cycles and how they are influenced both by seasonal variations in climate and habitat factors.

" There is an appointed time for everything in nature"

Examples of seasonal biological events include the dates of the first (and last) buds, leaves, and flowers in plants; the emergence and secession of pollinators; the arrival and departure of summer and winter migratory birds; the breeding, nesting, and egg-laying of birds, amphibians, and pollinators; when bats awaken from and return to hibernation; and the changes in colouring and subsequent fall of the leaves of deciduous trees.

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Highlights

The Natural Calendar

January

Red Squirrel breeding season starts
Alder's male catkins appear
Jelly-ear Fungus at its peak
Badger start giving birth to young
Lesser Celandine in bloom
Snowdrops in flower
Primroses starting to bloom

February

Frog breeding season starts
Hazel catkins appear
Colts foot flowers appear
Bramblings migrate to Ireland
Elder buds starting to flower
Bumblebee Queens emerge from hibernation

March

Dandelions appear
Tadpoles hatching
Wood Anemones in bloom
Irish Hare Breeding season
Bird Breeding season begins
Horse chestnut buds starting to leaf
Willows starting to bloom

April

Ladybirds emerging
Terns (Sandwich, Artic, Common & Roseate) arriving in Ireland
Curlews lying eggs
Buttercups appear
Marsh Marigold in flower
Housemartins return from Africa
Duckling season
Bluebells in Flower

For Every Season There Is A Reason

There is an appointed time for everything in nature; the scheduling of which was set in motion long before mankind ever made its first significant impacts upon the planet. 'Phenological events' provide indications of the progress of the natural world's calendar. They have been observed and recorded by humans since ancient times, and as such, over the eons, different cultures have developed their own traditional phenological proverbs and sayings.

For instance, the European adage "Plant potatoes when the first dandelions bloom", or the Chinese proverb, "Spring is sooner recognised by plants than by men", or the Latin maxim "The blossoms in the spring are the fruit in autumn."

"The blossoms in the spring are the fruit in autumn."

This cyclical synchronicity with the planet's rhythms is repeated not only on land, but across the seas, and in the air. Insects, for example, have inhabited earth for millions of years, over which time they have developed and perfected (what we humans might call) 'schedules'; their body and life-cycles harmonised through evolution for that optimum moment of emergence from dormancy and the start of reproduction.

Ideally for any given species, this would be at a stage when the balance between the resources needed to survive are at their highest and potential predation is at its lowest. However, life drives life, and just as plants and pollinators have co-evolved through mutualism to optimise their proliferation, predators too have synchronised their own lifecycles to capitalise on this abundance.

A classic example being Blue tits (*Cyanistes caeruleus*) 'timing' the hatching of their young to coincide with an annual abundance of caterpillars – the larval stage of Moths and Butterflies (*Lepidoptera spp.*).

But this is just one of the multitudes of food chains that currently exist in nature.

Observations

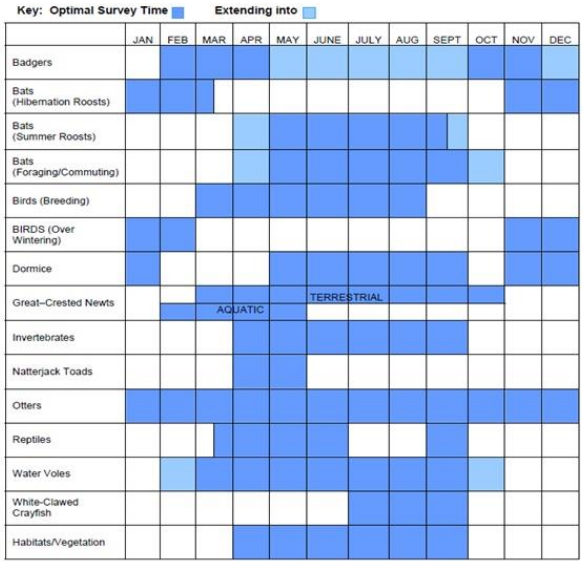
Phenological observations have been used for centuries by farmers to help them maximise their crop productions, while for ecologists, an appreciation of phenology has given lead to our knowledge of optimal survey times for species of ecological interest.

By observing Phenology events, for example, we know that the best time to survey bats is from late April to late September, as during the remaining months they are typically in hibernation. This peak in bat activity also coincides with the optimal survey time for invertebrates (April to September), including flying insects, which are the staple food source for bats - a predator-prey food chain interaction.

The same can be said for optimal habitats and vegetation surveying time (for plants and flowers), again April to September, and the abundance of pollinators (most of which are invertebrates) – a mutualism food chain interaction.

So, for every season, there is a reason; as The Byrd's famously sang with their song "Turn! Turn! (To Everything There Is a Season)" - admittedly borrowing very liberally from Ecclesiastes 3:1-8.

Observing nature and its synchronicity is not exclusive to any one profession. We can all take opportunities during this lockdown to witness nature's timetable in action. Our sidebar calendar shows the various phenology events that can be observed within Ireland in a month-on-month basis, while the table below shows the times when our ecologists would seek to survey various species and their habitats.



ECOLOGICAL SURVEY SEASONS (CIEEM 2021)

Food Webs

When all the food chains in an ecosystem are joined up together, they form a food web. One of the fundamental drivers of every food chain, and therefore every web, is Phenology. Life can be defined, sustained, flourish or decline then based not only on 'what' it eats, but also 'when' it eats.

Any given ecosystem is made of a diverse (food) web of interactions among all

May

Hawthorn in flower

Whimbrels arriving

Swifts arriving

Bats coming out of hibernation

Kittiwakes returning from sea to form cliff colonies

Wild Garlic in flower

Holly in bloom

Juvenile House sparrows fledging

June

Creeping buttercup in flower

Pine Marten kits emerging

Meadowsweet flowers appearing

Yellow Rattle starting to bloom

Juvenile Robins Fledging

Beech trees in flower

Water lilies in bloom

Ragwort in bloom

July

Bog Violet in bloom

Fox cubs foraging with parents

Dragonflies & Damselflies in flight

Flying Ant season begins

Lavender in season

Bindweed in full bloom

Bog Cotton seed heads

Foxgloves in bloom

August

Teasel in flower

Fruit flies at peak abundance

Manx Shearwater breeding begins

Swifts start to leave Ireland

Honeysuckle in full bloom

Marsh Fritillary Butterfly eggs hatch into caterpillars

Rowan Berries turning red

Purple Loose Strife in flower

September

Fly Agaric appearing in woodlands

Barn Swallows leaving Ireland

Meadow Pipits migrating

Brent Geese arrive from Greenland & Iceland

Blackberry season

Dunlins migrating

October

Spindle Berries fruiting

Whitebeam berries fruiting

Amethyst Deceivers appearing

Yew tree berries appearing

Whooper Swans arriving

Redwings arriving

Hedgehogs beginning to hibernate

Red deer breeding season peaks

Larch changes colour from green to golden yellow

November

Beech trees dropping leaves

Wigeons arriving

Over-wintering Blackcaps arriving

Ivy is in bloom

Oak leaves dropping

Shelducks arriving

Winter heliotrope in flower

December

Hawfinches arriving from Central Europe

Fox Mating Season Starts

Deciduous trees have shed all leaves

Snails start to hibernate

Holly Berries fully ripe

Yarrow in flower

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the species within it - its 'biodiversity'. These intrinsic interactions and interconnections drive, and in turn are driven by, the natural calendar and the success adaptation of and to these interactions applies to long-term survival of every living creature on the planet.

As such, it should come as no surprise then that the persistence our own human society not only mirrors - but is crucially dependent on - the intricacies of the punctuality and efficacy of the natural world around us; because the slightest change in phenological events can lead to significant and direct impact on our lives as well.

Our food supply, for instance, depends on the timing of certain phenological events taking place, such as when flowers bloom and when the bees begin pollinating them.

Photosynthesis is the most important biological phenomenon occurring on earth. Plants form the base of many food webs, and factors that affect plants will usually have a larger knock-on effect up the chain and across the web to impact on the wider ecosystem.

Biological phenomena are very sensitive to small variations not only in terms of climate - for example temperature and/or available sunlight - but also habitat factors. As already discussed, many plants cannot survive on their own without the presence of pollinators, albeit insects, birds, or animals.

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A Note on the Author

Daniel Connell is Senior Ecologist with Veon Ecology, the ecology and environmental services division of Veon Ltd.

Prior to joining Veon Ecology, Daniel worked for many years as a Freelance Ecologist and Environmental Correspondent. He has experience working on large infrastructural projects including flood relief schemes, forestry, road projects and oil & gas exploration. He has overseen various projects as Ecological Clerk of Works and has carried out extensive terrestrial, freshwater, and marine ecology fieldwork. Daniel has a comprehensive understanding of environmental law and an in-depth knowledge of coastal, wetlands, freshwater, and woodland ecosystems and the respective botanical, avian, invertebrate, and mammal species