LINC Lasqueti Island Nature Conservancy

Newtletter - Volume 35, Summer 2026

Birding by Ear

with Pierre Geoffray

Wilson's Warbler, Photo Pierre Geoffray

I always enjoy going out on a bird walk with other people. It is a privilege to be able to share the things I so care about and that I have spent a fair part of my life wondering about. It is wonderful listening to the forest as a group. So different from walking noisily, talking, oblivious of the marvels of nature surrounding us. It connects us to Mother Earth and to each other. Sometimes we are lucky and we get to see a particularly cute little bird like the Wilson Warbler that kindly paused for us this year. Sometimes it is a new song coming from deep within the trees, reminding us spring is beating strong and nothing can stop it. Sometimes I witness the sparks of curiosity light up in the eyes of a participant, and I know that a new Birder is being born. I am reminded how extraordinary and complex the world is, just outside my door. Sharing with others also means that I get to learn something new each time, seeing and hearing familiar birds through the eyes and ears of others. So thank you Lasqueti!

This year, on our walk I was happy to see how keen and focused everyone was. Out of the many questions we discussed, two of them resonated with me. As I tried to answer them briefly, I found they deserved a more in-depth approach. The first question was why are certain songs very short and simple while others are very long and complex?

Let's look at the Classification of Birds for an answer. Often ignored by bird watchers, Systematics (of which Classification is one of three main branches) is the wonderful science that looks into past evolutions to infer answers about the world as we see it and how it came to be. What can we see from the family tree?

All birds sing but not all birds are songbirds. Only about half of all species have evolved to that level.

The first half, (many Orders from Ostriches to Petrels), have a limited vocal arsenal which can include anything from simple grunts, caws and coos to more elaborate near-songs like those of the pigeons. I will focus on the more recent splits in the evolutionary tree: the songbirds.

The second half of all the birds are the Order Passeriformes (literally 'sparrow shaped' and also called the 'perching birds') and are more generally referred to as the passerines. Comprising many families, they are the result of fairly recent branchings in the evolutionary tree, They all share some novel improvements in the form of a distinct appendage in the throat, the syrinx, and special muscles to produce songs. Their brain is also more complex as a result, to allow for processing of the sounds.

This order is in turn separated into 2 suborders:

The Tyranii or Suboscines with about 1500 species concentrated mainly in the Western Hemisphere, including our flycatchers, kingbirds, and phoebes. They have a simple syrinx with only one or two forks (pairs) and their songs are simple and usually short. They have a relatively small brain and they are born knowing their species song. It is imprinted in their genes. In this group, a baby born without contact with members of its own species will always sing its own species' song and no other.

The songs of birds in this group are often confused for calls by casual listeners, but they are not and each species has characteristic calls that are different than their songs.

During our walk we listened to the short 3-part songs of the Hammond's and the 2 parts of the Western Flycatcher in the forest section of our walk.

The Passerii or Oscines, sometimes called 'true' singing birds, contain the vast majority of the Passerines, comprising about 4500 species. In this group, the birds have to learn their songs. An egg isolated from its parents will give birth to a bird with no knowledge of its own specie's song. The birds sing incredibly complex and varied songs produced by a syrinx with multiple pairs of forks and their forebrain is more developed, resulting in their head being generally more rounded, especially in the front (robins, warblers, chickadees…). The Oscines learn many songs by listening to their parents or neighbours, often adding imitations taken from other species. A well-known example of a bird in this category is the male Mockingbird, who can learn up to 2000 songs in a lifetime and remember them!

It is thought that the ability to learn new songs and subsequently create local dialects is a driving factor in the oscines massive global diversity and success.

Red-winged Blackbird photo Pierre Geoffray

A note about songs. The total of an unbroken vocalization emitted by a bird is casually called a song. Scientists, however, break this further into distinct sentences -recognizable series of patterns that, put together, form the various songs of individual birds. Take a robin for example. At first glance, all robins seem to sing the same Cheery, Cheerup, Cheery Cheerup Cheeryo with an upslurred ending. It is a good description of the song and is usually enough to identify a hidden robin singing among the foliage. Listening with more care and focusing on one individual, you will start to notice differences. Sometimes this bird will do this same Cheery, Cheerup, Cheery Cheerup pattern (A) twice and add a nasal Zee-o-see pattern (B) then back to pattern A, B again before it pauses for a few seconds. Then it starts again. Same pattern A (a favourite of this particular individual), B,A, and then a new pattern (C) Cheery, Cheery-o B, A,A, C and a pause. Listening to different birds close by, we will notice other sentences added to it D, E… Some birds will not use A or D.

This apparent individual's choice of sentences represents their repertoire—their songs. All robins sound similar when listening with less focus, as they all share the same rolling happy quality and tone. This is what we call the species song.

I was also asked the difference between birds' calls and songs.To simplify, we could say that the generally lengthy, loud and bright bird vocalizations we hear on the breeding grounds during the reproductive cycle are songs, and the short calls that are being used all year to stay in touch, warn of danger or communicate between various individuals are the calls.

Keep in mind that the timing of reproduction varies greatly between species. On a sunny day, in early February, the bright, long-winded song of the Pacific Wren reverberates through the forest, owls hoot and breed in late winter, and the tiny Anna's Hummingbird sings and often broods its young under cover of a snowy leaf in late January, while immature birds will sometimes be heard trying their voice and newly acquired repertoire throughout the fall.

So, what is a song and how does it differ from a call?

For this we must look at the purpose behind the vocalizations. In the wild, life is tough. One must find enough food daily to feed a fast growing family and survive as an individual. With no supermarket to turn to in case of duress and no medical care to help heal wounds, any mistake can be fatal. Each year, a male bird must secure a territory, defend it against competition, and attract a female partner for the season, all the while staying out of trouble. Each aggressive encounter can result in harm to the body, with the immediate failure to provide for the family and likely death as a consequence. At the same time, one must be able to protect its territory and stand up to its competitors.

To solve this complicated equation, birds have evolved a unique system of vocal dueling: the *song*, in which the quality of a male's vocalizations (or female's in some species) will determine its ability to hold territory and breed. This in turn will serve the betterment of the species as only the stronger and fitter individuals will be able to contribute to the next generation's gene pool. Using voice over physical fight is a much safer way to compete.

Junco Eggs in nest on ground, James Schwartz

This system is not without flaws, however, as there are many predators on the look-out for a meal and a loud repeated song can also become an easy giveaway and guide them to their prey. It is a risk birds must weigh at all times. It is also why they avoid singing unnecessarily and stop as soon as the job is done and the brood is safely out of the nest and the territory is vacant. They are also silent when the female is brooding in order not to attract too much attention, breaking into song only when necessary and in the morning, to inform neighbours that the territory is still defended.

Songs are species-specific and can be used by trained listeners for identification.

Calls by contrast are generally discreet unless they are alarm calls. They are comprised of short and soft whispered syllables with many variations of "tick, twick, tchi, tchit, spit, chit, tchit… sounds that are overall quite distinctive but extremely difficult for the average human ears to tell apart. The purpose of the calls are to keep contact between members of a foraging family, warn of danger, guide others while moving from tree to tree in unfamiliar surroundings during migration. By design, because of the constant dangers small birds have to face from predators, the calls do not carry far. Unlike songs, which are usually learned from parents during a critical period of development, calls tend to be instinctive or innate.There are probably a lot more meanings to calls than we understand, and the language behind them is certainly very rich and complex. It is an important theme of research for ornithologists around the world.

For the purpose of bird-watching, we simplify the calls into 3 types: alarm, contact and flight calls. Fortunately, the Merlin app can be a good help to train our ears to the minute variations of bird calls as we can follow them on our screen while they chirp and pip. Look at the shapes of the sonograms. I find it helps me remember if I can visualize the sounds…

I recommend the book by expert ornithologist Donald Kroodsma: *The Singing Life Of Birds.* The author is a rigorous field researcher with a knack for enlivening his subjects with personal anecdotes. Most importantly a man full of poetry and appreciation for the world.

Birds Recorded on our Walk

May 2, 2026

1. Canada Goose
2. Wood Duck
3. Virginia Rail
4. Hairy Woodpecker
5. Hammond's Flycatcher
6. Western Flycatcher
7. Hutton's Vireo
8. Cassin's Vireo
9. Western Warbling Vireo
10. Red breasted Nuthatch
11. Chestnut-backed Chickadee
12. Violet-green Swallow
13. Brown Creeper
14. American Robin
15. Purple Finch
16. Pine Siskin
17. Chipping Sparrow
18. Dark-eyed Junco
19. Song Sparrow
20. Spotted Towhee
21. Red-winged Blackbird
22. Orange-crowned Warbler
23. Common Yellowthroat
24. Yellow-rumped Warbler
25. Black-throated Gray Warbler
26. Townsend's Warbler
27. Wilson's Warble

Species info can be found at https://ebird.org/home

by Norm Stacey

Anyone who's stepped outside recently will have realized pretty quickly that it's a banner year for pollen. And things aren't likely to get much better because numerous studies have shown that, for decades, rising global temperatures are leading to earlier and longer pollen seasons and higher levels of peak pollen production. In fact, a recent report from Ontario-based Aerobiology Research Laboratories[1], with over 30 pollen monitoring stations across Canada, states that, primarily because of our mild winters, the Vancouver-Victoria area is Canada's pollen hotspot—not good news for local pollen allergy sufferers. But those sufferers can be thankful they don't live in Japan, where oil and gas shortages during WWII led first to massive deforestation for fuels, and then to massive reforestation with two conifer species that are heavy pollen producers. As those forests now reach maturity, and produce ever more pollen, Japan is experiencing an annual health crisis with more than 40% of the population experiencing medium to severe pollen-induced allergies[2].

It's unfortunate that pollen's negative attributes—the allergies, scratchy eyes, dirty windows—so easily distract us from appreciating pollen's fascinating biology. For example, I suspect most of us have forgotten, or perhaps never knew, that each pollen grain is actually a tiny male plant whose sole function is to pollinate, and thereby produce a new seed. The word seed is important here, because pollen is produced only by plants that produce seeds: *i.e.* the flowering plants (Angiosperms - referring to seeds enclosed in a fruit) and the cone-bearing plants (Gymnosperms - literally *naked seed*). The mosses, as we'll see,have quite different reproductive tactics.

Plants, unlike animals, don't move around, and so they have evolved two techniques to ensure their pollen reaches an appropriate flower or cone: pollen transport by animals, or **entomophily** (literally *insect loving*) and transport by wind or **anemophily** (literally *wind loving*). Interestingly, virtually all of the conifers and other gymnosperms are anemophilous, and therefore the major source of allergenic wind-borne pollen, whereas roughly 90% of the flowering plants are entomophilous. However, some entomophilous flowers that produce lots of light pollen can also be sources of allergenic wind-blown pollen, many members of the aster family (asters, chrysanthemums, daisies, sunflowers), being prime examples.

Because wind pollination is far less efficient than animal-assisted pollination, it seems perfectly logical that the pollen-to-seed ratios of anemophilous plants are usually far, far greater than those of entomophilous species. The clouds of pollen in conifer forests and the thick dusting of pollen on every outdoor surface seem to be clear evidence of the penalty paid by anemophilous species for not co-opting animals for pollination.

This logic is well worn - here's how Charles Darwin summed it up in 1867: "*As a large quantity of pollen is wasted by anemophilous plants, it is surprising that so many vigorous species of this kind, abounding with individuals, should exist in any part of the world; for if they had been rendered entomophilous, their pollen would have been transported by the aid of the senses and appetites of insects with incomparably greater safety than by the wind*."

Despite this seemingly reasonable logic, however, recent theoretical work[3] suggests that the high pollen production of wind-pollinated species is not a compensation for pollination inefficiency, but instead results from the large increase in male mating opportunities that occurs when pollen can be carried by

winds over hundreds of kilometers. And this perspective is supported by the fact that many species of wind-pollinated flowering plants have evolved from insect-pollinated ancestors. So, counter-intuitively, perhaps wind pollination should be seen not as an ancestral, inefficient reproductive method, but rather an advantageous method that allows species to increase the pool of potential reproductive partners, and also to inhabit locations where animal pollinators are absent or ineffective. Not surprisingly, the pollen of anemophilous plants is specialized for transport in air currents: it is usually smaller (typically 20-40 micrometers) and less dense than entomophilous pollen and lacks the complex outer surface and lipid coating that helps entomophilous pollen attach to animal vectors. But how can it be that each pollen grain is a tiny male plant, when pollen is produced by a larger plant? The answer lies in the fact that, unlike us animals, all land plants (mosses, ferns, gymnosperms and angiosperms) have two multicellular stages in their life cycles.

Figure 2. Anemophilous and entomophilous pollen. Anemophilous pollen (A - alder, B, - grass, C - ponderosa pine), primarily carried by wind, is usually smaller and less dense than entomophilous pollen (D - daisy) carried by animals and has a less intricate exterior. Pine pollen (C) also has air-filled sacs that further reduce density.

(A, B, and D from Amusing Planet [https://www.amusingplanet.com/2011/03/pollen-grains-under-microscope.html)]; C from U.S National Park Service [https://www.nps.gov/romo/microscopic_pine_pollen.htm]).

Animals start life when our ***gametes*** (sperm and egg) fuse to form a ***zygote***, which then starts dividing by ***mitosis*** to create a multicellular embryo (Figure 3A). The egg and sperm are ***haploid*** (one set of chromosomes) and the developing embryo is ***diploid*** (two sets of chromosomes). When the embryo becomes a mature adult, special cells divide by ***meiosis*** to produce haploid sperm or eggs, and on it goes.

Plants are more complicated (Figure 3B). Like us, sperm and egg join to form a multicellular diploid plant. But unlike us, meiosis produces haploid ***spores*** instead of eggs and sperm - and so this diploid plant is called the ***sporophyte*** (literally *spore plant*). The spores then divide by mitosis to produce small, multicellular, haploid plants in which special cells divide by mitosis to produce the gametes (eggs or sperm) - and so these little haploid plants are called ***gametophytes***.

One reason this is confusing is because the haploid gametophytes of the flowering and cone-bearing plants aren't at all obvious - they develop within, and are dependent on, the very much larger sporophyte. In flowering plants, for example, the female (egg producing) gametophytes are held within the ovary of the flower (Figure 4A) and produce seeds if fertilized; the male gametophytes that we call pollen develop within the flower's anthers.

In mosses, which represent the primitive or ancestral condition of land plants, the sporophyte-gametophyte situation is completely reversed. Here, many haploid gametophytes form the green carpet of moss and are the dominant stage of the life cycle; the sporophyte is a small unbranched thread that emerges from the gametophyte and releases spores that become the next gametophyte generation (Figure 5). Mosses don't produce pollen and instead reproduce by sperm that swim in water from the male gametophyte to the female gametophyte, a holdover from their algae ancestors.

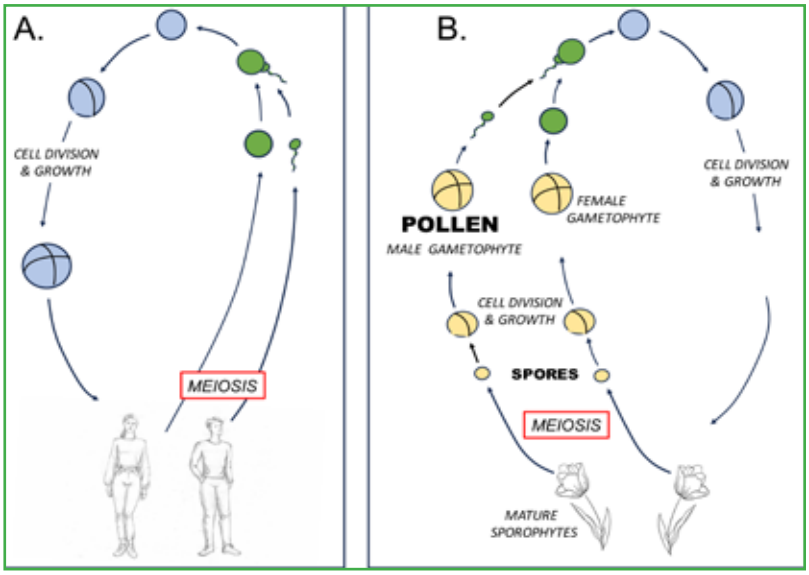

Figure 3. Comparison of animal (A) and flowering plant (B) life cycles: blue = diploid cells; yellow and green = haploid cells. As explained in the text, plant life cycles are more complex because they have a multicellular haploid stage (yellow) which is absent from animal life cycles.

Inside a mature pollen grain of a typical flowering plant are two cell types: a **tube cell** which will produce a tube that enters the female tissues, and a **generative cell** that divides to produce sperm. When a wind-blown pollen grain lands on a flower's **stigma** (the pollen-receiving part of the female reproductive structures), pollination has occurred, but a complex sequence of steps must then take place if fertilization is to occur. First, if the stigma determines that the pollen is compatible, the pollen hydrates and then **germinates** (Figure 4B).

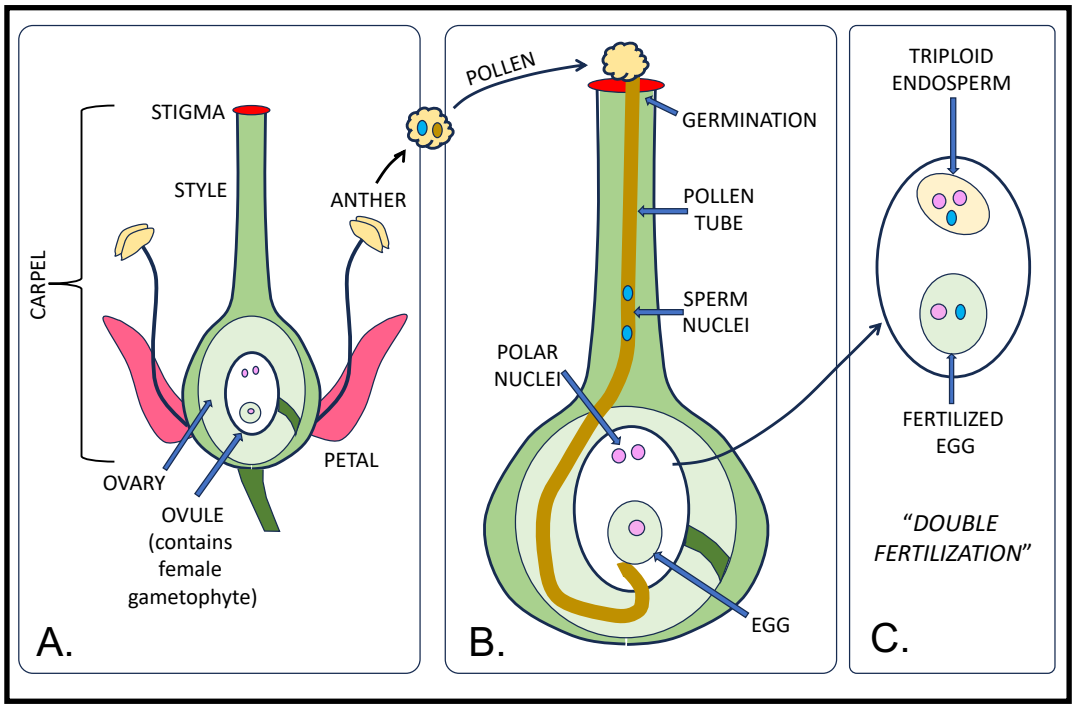

Figure 4. Highly schematic diagram of a hermaphroditic flower, such as a tulip, with both male and female reproductive structure on the same flower. **A**. The ovary contains the ovules which in turn contain an egg and two polar nuclei. The anthers produce numerous male gametophytes - pollen grains - each containing a generative cell and a tube cell. **B**. Pollination (adherence of a pollen grain to the stigma) leads to germination, in which the tube cell pushes through the pollen wall, down the interior of the style, and into the ovule. During tube elongation, the generative cell divides to produce two sperm nuclei, which are carried down the pollen tube. **C**. Double fertilization occurs when the sperm nuclei enter the ovule, one fertilizing the egg, and the other uniting with the polar nuclei to form the endosperm, the food supply for the developing embryo.

At germination, the tube cell begins to form its tube, which pushes through a thin part of the pollen wall, enters the stigma tissues, and continues to elongate as it follows chemical signals that lead it to the female gametophyte containing the egg cell. And tube cells can complete this process remarkably quickly. In a corn cob, for example, the silky threads you pull off prior to eating are the extensions of individual female carpels, each with a sticky stigma at its exposed end and an egg at the internal end on the cob. When a pollen grain attaches to the stigma, it can extend its pollen tube into the silk thread at the rate of a centimeter per hour, completing what can be a foot-long journey in just a day.

While the pollen tube is growing, the generative cell divides to form 2 sperm nuclei which are carried down the elongating tube and released in the female gametophyte (Figure 4B). At this point, one sperm nucleus fertilizes the egg, and the other unites with 2 polar nuclei to create a special triploid tissue, the **endosperm**, which is an energy-rich food supply for the growing embryo (Figure 4C). This **double fertilization**, unique to the flowering plants, ensures that only fertilized eggs are supplied with the energetically expensive food stores in the developing seed. From pollination to fertilization only takes 1-2 days in dandelions and sunflowers, a week or so in orchids and some lilies, a year in some species of oak and beech, and from 1 - 2 years in conifers.

The intricate geometric patterns of pollen's outer coat (Figure 6) are species-specific and formed from a class of compounds called sporopollenins which also are found in the spores of moss and ferns and have the reputation of being the toughest material in the plant kingdom. Their resistance to degradation is such that pollens are readily preserved in marine and freshwater sediments and sedimentary rocks and thereby play important roles in the interdisciplinary field of **palynology** which has an amazing diversity of practical applications including:

Forensic Palynology: Because it is inconspicuous, seasonally variable, often location-specific and easily transported on many surfaces, pollen is a valuable forensic tool. Numerous crimes have been solved because pollen analysis revealed: a unique pollen profile on a suspect's clothing or hair; the season a crime occurred; where illegal drugs were manufactured; whether "Canadian honey" really is from Canada. Pollen analysis is currently being used to identify a woman found drowned in English Bay in 2022[4].

Paleoclimate reconstruction: Pollen palynology is a powerful tool for understanding how past climatic changes impacted regional and global ecosystems and thus predicting the future effects of current climate change.

Development of Agriculture: Numerous studies of pollen deposited over the last 5,000 years have greatly increased understanding of when and where food plant cultivation originated and how that impacted pre-cultivation ecosystems.

Conservation and Restoration Biology: Identifying the pollen types in relatively recent sediments enables researchers to reconstruct the species composition of past plant communities, thus assisting both conservation strategies and efforts to restore degraded habitats. Sediment samples from Lasqueti's lakes, for example, could reveal how Lasqueti's ecosystems have been impacted both by its first human inhabitants and the much more recent settlement. Such samples might also tell us whether or not this really is a banner year for pollen after all.

[1] https://www.cbc.ca/news/canada/british-columbia/vancouver-victoria-allergies-9.7172725

[2] https://www.bbc.com/future/article/20260515-the-1950s-blunder-which-causes-mass-hay-fever-in-japan

[3] **https://doi.org/10.1111/nph.19929**

[4] https://www.cbc.ca/news/canada/british-columbia/spanish-banks-drowning-victim-woman-photo-vpd-reappeal-9.7211474

Figure 5. Moss gametophytes and sporophytes. Unlike flowering plants, the haploid gametophyte generation is the dominant stage of the life cycle, and the sporophyte is small and dependent. From Ohio Moss and Lichen Association (https://ohiomosslichen.org/bryology-101/).

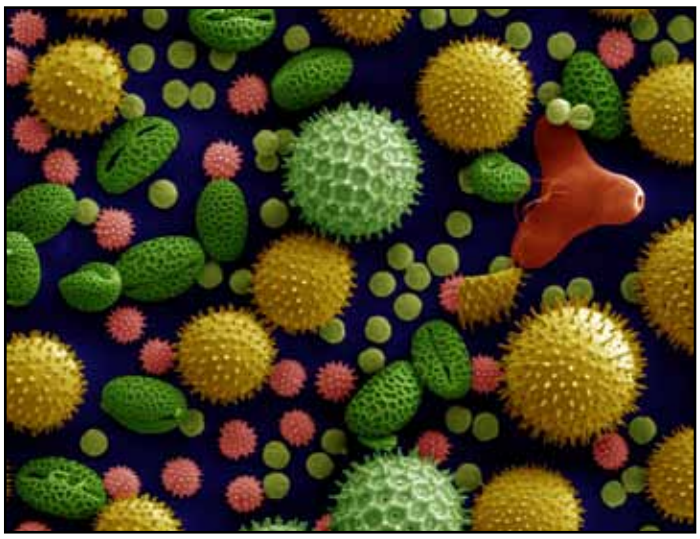

Figure 6. Pollen come in a great array of species-specific sizes and shapes and are highly resistant to degradation. These features make pollen extremely important in the interdisciplinary science of palynology, which applies studies of living and fossil pollen, spores and other microscopic organic materials to such fields as paleontology, archaeology, climatology, forensics, and allergy studies. From Dartmouth Electron Microscope Facility.

Stewardship and Monitoring Lasqueti's Protected Sites

article and photos by Charlene Lloyd, Stewardship Coordinator

When I stepped into the role of Stewardship Coordinator with the Lasqueti Island Nature Conservancy (LINC) in October 2025, I knew I would be spending more time outdoors—but I didn't anticipate how deeply the work would connect me to this island.

Much of my work has involved our contracts with the BC Parks Foundation (BCPF) and Island's Trust Conservancy (ITC), focusing on monitoring, restoration, and building a clearer ecological picture of several protected properties on Lasqueti Island.

I have assisted with Species-at-Risk monitoring at Point Young Conservation Area, Mount Trematon Nature Reserve and other properties, checking artificial cover objects (ACOs) for the elusive Sharp-tailed snake. Regular surveys have revealed a diversity of reptiles and amphibians—three species of garter snakes, northern alligator lizards, Pacific chorus frogs, and rough-skinned newts have all been found making use of our ACOs.

Seeing individuals of varying ages has confirmed that these areas are healthy habitats, even if the Sharp-tailed snakes remain hidden. There's exciting news that other Sharp-tailed snake populations have been found outside of the original location of the first observation in 2023. If you think you've found a Sharp-tailed Snake on your property, please try to get a picture and reach out to us so we can update their known extent across the island. A big part of my role has involved setting up and maintaining monitoring equipment. Many days were spent moving autonomous recording units (ARUs) and remote cameras between sites—troubleshooting faulty units, updating firmware, and making sure we're capturing useful data. These tools are quietly gathering information on bird, bat and amphibian calls and wildlife movement and activity.

BCPF has the software needed to assess the hours of audio that have been collected so far, and it's exciting to learn what species have been recorded. Camera images are easier to assess. So far the results are unsurprising. Lasqueti is home to a lot of sheep! Don't worry, no personal information is collected when humans are caught on camera. LINC advocates for trail access to protected sites.

Volunteer at Salish View, photo by Ken Lertzman

I've also been mapping and assessing riparian areas across multiple conservation properties, identifying 17 ponds and wetlands and evaluating their potential as breeding habitat for species like the at-risk Northern Red-legged frog and Western Toad. This work has revealed how many natural systems have been altered and how restoration, rather than just protection, may be key to supporting these species.

Point Young herbaceous plot

Death Camas at Salish View

otter at Marine Island, webcam shot

Species Recorded via Remote Cameras June 2025 - March 2026

Species Captured	Cat	Deer	Dog	Human	Bird	Otter	Raccoon	Sheep	Grand Total
Total Captured	10	74	21	42	18	3	9	363	517
Percent	1.9	14.3	4.1	8.1	3.5	0.6	1.7	70.2	100

More recently, We established our first long-term forest monitoring plot, measuring tree size, species diversity, regeneration and overall forest health. It's detailed work, but it lays the foundation for understanding how these ecosystems change over time. LINC is hoping this will be the first of many forest plots monitored across Lasqueti Island.

Alongside all this, I've joined volunteer work parties—building and maintaining trails, removing invasive species, and sharing meals (the delicious lunches provided by Suzie) that make the work feel grounded in community. These events remind me that stewardship isn't just about data collection or restoration—it's collective care. The knowledge, time, and energy that people bring to these events is indicative of people's support and care of these protected areas.

As I go about my tasks in the field, I alter my route, so that I become more familiar with the properties and am more likely to find something new. iNaturalist is an important platform for recording the many plants and animals I find. This is a useful way to track species presence and can contribute to general biodiversity information for Lasqueti Island, including many ongoing and future projects. Want to see what I've been finding? Follow me on iNaturalist as linconservancy and join LINC's projects, **Xwe'etay/Lasqueti Bumble Bee Project** and LINC - **Lasqueti Island Nature Conservancy** to see what else has been found across the island. I've also been contributing to BCPF's Large, Old Trees of BC project on iNaturalist - photographing and measuring the DBH (diameter at breast height) of large trees I come across on my travels through their properties. This has me thinking that we should start yet another iNaturalist project to catalogue Lasqueti's namesake tree - the Pacific Yew. The largest I've measured had a DBH of 70 cm and I'm sure there are larger ones elsewhere on the Island.

As I continue in this role, I feel grateful to be part of a community that values and actively participates in caring for the natural world. Stewardship is ongoing work, and there is always more to do—but it is meaningful, collaborative, and, at its heart, hopeful.

Neruda:

"Perhaps the earth can teach us

as when everything seems dead in winter

and later proves to be alive."

(Neruda, Keeping Quiet)

Invasive Species
Some Questions and Answers

by Peter W. Sorensen

Government agencies, their research councils, and many academic scientists have identified invasive species as a serious threat to our economy, ecosystems, agriculture, and even ways of life. Across the world, billions of dollars are spent annually on controlling them and studying ways to remedy the problems they cause. At the local level, volunteers spend countless hours removing invasive plants and other organisms. But many people are confused about what invasive species are and whether the efforts to try and control them are worth it, given that success stories are not common and species spread is a natural process.

In an attempt to reduce confusion about this complex issue, I've put together answers to some common questions about invasive species, which I've studied for over three decades. This is the first in a series of articles about invasives and other non-native species on Lasqueti.

What is an "invasive" species?

That depends largely on who you ask and where you live. There is so single scientific definition. Many scientists simply think of invasive species as having been either purposefully or accidentally introduced by mankind and become self-sustaining but others require that they alter ecosystem function. Meanwhile, government agencies taxed with the legal responsibility of identifying invasive species and regulating them while also funding their control, usually specify that introduced species must also have a "negative impact" or cause "damage" to the environment and/or economy, or "threaten" to do so. Not surprisingly, these definitions vary by local ideology and circumstance. They are typically accompanied by long lists of species of regional importance. In some ways, these lists are the bottom line because they specify how certain species are to be treated. While this strategy is sensible in many ways, it often causes confusion. Species selection criteria vary with location, time, and according to the priorities of the local experts that create them. Remote locations may not be considered. Metrics are rarely provided to help ascertain what exactly "damage" is or how it might be objectively measured, except perhaps for impacts on agricultural crops and human health. Finally, whether only species introduced recently (i.e., since settlement) should be considered invasive, is rarely explicit. To simply state that a species is invasive (or not) on lands or waters that are not managed by the government because that species is found on a list (or not) is inadequate (ex. Italian arum). Some type of objective local evaluation is needed.

How does the B.C. government define and identify invasive species?

The B.C. Inter-Ministry Invasive Species Working Group operates in a manner typical to many. This group states: "*Invasive species are plants or animals that are not native to the province, or are outside of their natural distribution. Invasive species negatively impact British Columbia's environment, people and/or economy.*" It then lists over 200 species as a priority based on a "science-based risk assessment process." Notably, the B.C. Invasive Species Council, a non-profit organization dedicated to invasive species control, uses a slightly different definition and identifies far fewer species. Exact selection criteria are not clear, but many of the species included (such as Spurge-Laurel, American Bullfrog, Himalayan Blackberry, Bohemian Knotweed, Goldfish) are on both lists. Microbes, agricultural, and naturalized species are also rarely addressed, perhaps because it's more than the province can (or should) manage.

How much damage do invasive species cause?

That depends very much on how you (or an agency) define "damage" and local circumstance. In most cases, it's clear that invasive species thrive at the expense of

Daphne Spuge Laurel - left young plants, right invading the forest

Spurge-Laurel (Daphne laureola) is highly toxic and extremely hardy in the Pacific Northwest, where it lacks native predators and is spread by birds that eat its fruit. It has been identified as an invasive by both the B.C. Inter-Ministry Invasive Species Working Group and the B.C. Invasive Species Council. On Lasqueti it grows densely and excludes native plants.

Spurge Laurel is considered a "toxic plant", "noxious weed", "non-native", "alien" and "ornamental" by legal entities across the world, except within its native range in southern Europe. In B.C. it cannot be legally sold but it is not illegal to possess it on private property, except where local bylaws prohibit it. LINC is actively involved in Spurge Laurel control in protected areas on the island.

local species, which may be traditionally valued as food and/or habitat for other living things while the new (invasive) species is not. Many invasive species may even be toxic to local organisms including people. In some instances, invasive species can also cause local extinctions or a loss in biodiversity (a favored metric but also one difficult to measure objectively). A few invasive species function as "ecosystem engineers", remaking entire ecosystems in ways that are new and often not considered desirable. Spurge-Laurel meets all of these criteria in B.C.

Can invasive species also have beneficial properties?

Most, if not all, species labelled as invasive in one location originally came from places where they fit into ecosystems in ways that benefited organisms there (ex. providing forage or habitat). Sometimes some of these benefits carry over to new locations (ex. Eurasian Milfoil, an invasive aquatic plant can provide valuable cover for fish where none may exist). Some invasives also might have valuable medicinal properties (ex. Foxglove) or value as food for humans or wildlife (ex. various grasses). Some invasives may have been domesticated at their original location (ex. feral pigs, invasive carps) and would have high value too at their new location but cultural values differ. Often a variety of these criteria fit, and agencies must decide whether positive aspects of a new species outweigh negative aspects. Local residents may understandably disagree with at least some of these judgement calls, sparking understandable confusion and dismay.

Are invasive species really a significant threat to conservation and our ecosystems?

Absolutely. By definition, invasive species can and often do greatly modify or disrupt ecosystems and can have long-lasting effects that prevent these systems from returning to their unmodified state, even if invasive species are removed. Of course, climate change, development and pollution can facilitate the presence of invasive species while exerting their own effects, driving ecosystem structure in novel and sometimes sustainable ways that preclude restoration to its starting state as baselines shift. Invasive species are both a symptom and cause of mankind's ever-growing effect on natural systems.

Why do invasive species do so well when they come up against pre-existing/native species that have had considerable time to adapt to local conditions?

The overarching answer might be circumstances. First, local conditions may have been altered because of climate change and other human-induced factors, so species from elsewhere are simply becoming better suited to a changing world. Second, places like islands (which generally have simple ecosystems and low biodiversity) may have empty niches where invasives can take hold. Third, introduced species generally lack the predators and pathogens encountered in their home ranges. At least a few endangered species have become invasive when introduced into new ecosystems (ex. Invasive Sea Lamprey in the Great Lakes are endangered in much of their native habitat in Europe). Invasiveness is usually determined equally by the biology of the species and the ecosystem it finds itself in.

Aren't invasive species really just part of a natural process?

Maybe. Species spread is a natural process which mankind is now accelerating. But this doesn't negate the importance of invasive species control and of taking responsibility for our actions in introducing them, whether it be by accident or on purpose. Volunteer efforts to remove and eradicate invasive species may not eliminate

them, but reducing their spread can help buy important time for research to develop control strategies to reduce the ecosystem instability these species can cause.

Rachel Carson, founder of the environmental movement, noted that *"Man's attitude toward nature is today critically important simply because we have now acquired a fateful power to alter and destroy nature, but man is part of nature, and his war against nature is inevitably a war against himself."*

How can people address this threat and preserve the environment?

Several approaches to invasive species control have proven successful. Quarantine has resulted in the number of incoming invasive species dropping greatly in many locations. Rapid response and elimination of newly introduced species have also shown great promise. And research has identified several other control approaches that are remarkably successful. These include introduction of highly specific parasitic or foraging insects, various pathogens, selective but large-scale removal of adult invasives, selective poisons, and introducing sterile adults or genetic modification or combinations of these, a strategy known as integrated pest management (IPM). Holding populations of invasive species in check increases the likelihood of their eventual control if appropriate research can be conducted.

An intriguing alternative to ecological restoration and traditional invasive species control is *permaculture*. This approach originated in Tasmania, an island challenged by climate change and invasive species. Permaculture overtly recognizes the prevailing influence of people on ecosystems and how they are changing. It seeks to manage landscapes and settlement design in sustainable arrangements that mimic natural ecosystems with a broad range of species and approaches. Biodiversity is typically a goal, but it can include non-natives and species some might consider invasive.

While permaculture recognizes that many species, especially new arrivals, are often highly undesirable, it also recognizes that some may not be, and that some old (native) species might be less valuable/desirable in the ecosystems we are now creating. Permaculture actively seeks ways that our species can live in harmony with other species, rather than apart from them, irrespective of their past.

What's next?

We live in unprecedented times. Wise decisions require a good understanding of the complexity of the issues we face and the trade-offs implicit to them. In future articles, I will look at the effects of "invasive" and other "non-native" species introduced to Lasqueti and how these might be objectively evaluated and possibly managed in a way that is beneficial to both our local environment and those living here.

Italian Arum, *Arum italicum*, is a concerning invasive species found at the Point Young Conservation Area. This plant has spread dramatically over the past few years, It spreads by tubers and seeds, and a few seedlings have already been found outside of the homestead area. It is a moisture loving plant and could have a negative impact on any wetland areas once it becomes established. If you are out for a walk, feel free to clip off any flowers you see. This will help to deplete the bulbs and reduce seed production, but be careful to wear gloves as this plant is highly toxic and may cause skin irritation. Want to learn more? https://fviss.ca/invasive-plant/italian-arum.

If you're interested in learning more:

Carson, R. 1962. *Silent Spring*. Houghton Mifflen, NY

Elton, C. 1958. *The Ecology of Invasions by Animals and Plants*. Chicago University Press, Chicago.

Mollison, B.C., Holmgren, D. 1978. *Permaculture One: A perennial agriculture for human settlements.* Transworld Publishers, UK.

Orion, T. 2015. *Beyond the war on invasive species. A permaculture approach of ecosystem restoration*. Chelsea Green Publishing. VT, USA

Simberloff, D. 2013. *Invasive Species: What everyone needs to know*. Oxford Press, UK

When cutting a tree, consider leaving the stump at least 3' high. This allows for growth of needed understory, above the "sheep browse height" on top of the stump especially at the south end.

Native Plants

Bitter Cherry (*Prunus emarginata)*

T'ulum in Hul'q'umi'num'

One day I was up on Quadra Island walking in one of my favorite places, Rebecca Spit, and found it was filled with fruit laden trees – much of it from the Bitter Cherry tree that is common on Lasqueti. The leaves are short stalked, tapered with fine teeth. The bark is a red-grey colour, with a tough horizontal peeling nature. Lischiim notes that cherry bark was peeled off a tree and used to wrap bows and decorate split cedar-root baskets. Both the tree and bark have medicinal qualities, used alone for coughs or mixed with other ingredients, such as yew wood or bark and red alder, as a wash for external or internal wounds. The tree is very aromatic, and branches were often used as walking sticks, reported to bring healing to the walker. The bright red fruit is bitter, but I enjoyed it on the hot summer day I came across it up on Quadra Island. It is not easy or impossible to grow from seed, but if there are sprouts of it coming from the tree or if you put a belt around it, and wait a while. It will grow sprouts, thinking it is going to die, which you can use as cuttings.

Lischiim's Plants, Traditional Indigenous Foods, Materials and Medicines, Dr. Luschiim Arvid Charlie and Nancy J. Turner, Harbour Publishing, 2021 is a great source of information on plants found in our area.

- editor

News from LINC

Just Released new video

The John Osland Nature Reserve, A Story of Change

We are excited to announce the release of a 12 minute video that tells the story of how Johnny Osland came to donate his land to the Islands Trust Conservancy, and what has happened since. Directed by Sheila Harrington and edited with video and drone footage by Sue Ashcroft. Donald Gordon and Wendy Schneible add their experiences to the narrated story, with historical photos included. Thanks to Johnny Osland for creating an amazing and ever-changing Nature Reserve. See the full video at:

https://youtu.be/5qgjfKbhLMY?si=fSNB3_OcuB7riqP4

https://www.youtube.com/@LINC_BC

left: *Andrena prunorum,* the Prunus Miner bee. It is a solitary, ground nesting bee active early in spring, pollinating early blooming plants of the Rosacea famly, like cherries, plums and other fruit trees.

On Sunday, May 31 LINC held our 2026 Annual General Meeting at the Judith Fisher Centre. It was attended by about 26 members. We reviewed LINC's activities and finances over the prevous year and discussed plans for the coming year. The Xwe'etay Bumble bee project has 34 community members reporting 362 bee observations representing 22 species. We elected our 2026-27 directors. The meeting concluded with a viewing of the just released video, *The John Osland Nature Reserve, A Story of Change.* After the meeting we hiked to the newly completed loop trail at the Island reserve which goes from the lake up to

EcoWest News, a weekly round-up of news and resources that you can put to use in addressing environmental issues and protecting the wild in your community.

https://ecofriendlywest.ca/ecowest-news-may-26-2026/

Seen In Passing

C A black morph snake, Charlene Lloyd

Hermaphroditic banana slugs mating, Heather Crawford

Northern Alligator Lizard hiding under leaves in the greenhouse, Izzy Harrington

Pacific choralroot Gordon Scott

otter at my pond eating a bullfrog, James Schwartz

red urchin & frilled dog winkle Ken Lertzman

Gastropod Snail, Izzy Harrington

giant Reishi mushroom on fallen tree, Heather Crawford

LINC Lasqueti Island Nature Conservancy

Volunteer or donate to help conserve and steward nature on Lasqueti
Contact linc@lasqueti.ca for further information

Newtletter Editor & Layout: *Izzy (Sheila) Harrington*
Editorial Assistance: *Norm Stacey*

All past Newtletters and more are on our website: https://linc.lasqueti.ca

Engage in conservation. Give a donation. Share your photos. Become a member: $10-$20 annually.

Contact us: linc@lasqueti.ca 250-333-8754 Website: https://linc.lasqueti.ca/

www.facebook.com/LINCBC Youtube channel: https://www.youtube.com/@LINC_BC

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