LINC Lasqueti Island Nature Conservancy

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Dragonflies: Masters of Flight

by Dana Vasali

Dragonflies were named for their resemblance to dragons, likely due to their impressive flying abilities and the way their wings shimmer. Folklore and mythology also contributed to the name, with various cultures associating them with dragons, devils, or other supernatural creatures.

Shadow Darner, Photo Ken Lertzman

Dragonflies hunt other flying insects, so agility is key. To aid in this, dragonflies can move and rotate each of their four wings independently. Thanks to this unique ability, these insects can fly forwards, backwards, up and down, and upside down. They can turn on a dime and can hover at will, all contributing to their great flying abilities.

In a 2018 study, researchers captured dragonfly flight with high-speed cameras, revealing that the insects angle their bodies vertically, at a 90-degree angle to the horizon, to achieve backward flight. They're capable of independently moving and twisting each of their four wings to improve flight control. Dragonflies rank among the world's fastest flying insects, capable of reaching roughly 35 miles per hour.

While adults are master fliers, for the majority of their lives, most dragonflies are aquatic. Before growing into their familiar, flying form, juvenile dragonflies live in the water. In their larval stage, the aquatic dragonflies eat just about anything they can get their mandibles on: tadpoles, mosquitoes, small fish, other insect larvae and even each other. This phase typically lasts one to three years. Some species, however, are aquatic for just weeks or months, while others might remain as larvae for half a decade.

At the end of its larval stage, a dragonfly crawls out of the water; its exoskeleton cracks open and out comes its abdomen, which had been packed in like a telescope. Its four wings emerge, and the body dries and hardens over the next several hours. From there, most dragonflies live fast, so to speak; their adult life span is typically only one to three weeks, though some make it more than two months.

Their aerial prowess is a crucial survival skill. If a dragonfly can't fly, it will starve, because these insects only eat prey they catch while flying. But they are resilient: Studies have shown that a dragonfly can be missing an entire wing and still capture prey.

Dragonflies catch their insect prey by grabbing it with their feet or mandibles. They're so efficient in their hunting that, in one study, dragonflies captured approximately 95 percent of the prey released into their enclosure. That is wildly high compared to most predators. For comparison, certain birds of prey, like owls, falcons and hawks, catch prey only about 25 percent of the time.

A single adult dragonfly can eat up to 100 mosquitoes per day. The insects are such effective mosquito predators that they've earned the nickname 'mosquito hawks.' Even in their larval stage, dragonflies feast on mosquitoes; a nymph might eat up to 40 mosquito larvae daily.

When dragonflies mate, the pair forms a flying, loop-like structure known as a mating wheel or mating circle-'though some hopeless romantics,' noted one ecologist, 'call it a heart.

If a female doesn't consent to mating, she might play dead. Or, she might wrestle away her suitor-by twisting, shaking, flying backward or clinging to a reed to thwart a takeoff. In certain cases, the female might even take control of the flight, then dunk the male into a body of water, putting a chill on the romance.

With their enormous eyes, dragonflies have incredible panoramic vision that encompasses almost every angle, except for right behind them. Dragonflies actually have five eyes-two compound eyes, each with a remarkable 28,000 lenses in some species, and three simple eyes called ocelli, which have one light-detecting lens each.

Skimmer (dragonfly) mating in air. Photo Prasan Shrestha, Wikomedia Commons

Compared to the human perspective, which is based on three types of light-sensing cells called opsins that are sensitive to red, green and blue, a dragonfly's view of the world is powered by 11 to 30 opsins. This supercharged vision allows them to see ultraviolet colors and polarized light.

Despite its modest size of just two inches, a dragonfly called the globe skimmer has the longest migration of any insect; it flies up to 11,000 miles across multiple generations between India and Africa. Aided by winds, the tiny insects will traverse the Indian Ocean with stopovers on islands. Globe skimmers have even been spotted at altitudes of around 20,000 feet in the Himalayas. Their incredible migratory feat has been called the 'most extraordinary journey in nature.'

Lake Darner, photographed by Janet McIntyre after she rescued it from the water.

Dragonfly ancestors of record-breaking proportions flew in prehistoric times. Dragonfly-like creatures were some of the first winged insects to evolve, appearing on the scene roughly 300 million years ago. Modern dragonflies have wingspans of up to only about five inches, but an early relative of dragonflies in the fossil record-called Meganeuropsis permiana, has been found with a wingspan longer than two feet, and could have picked off small children. We can appreciate their dramatic and dynamic lives today, knowing that a primary food is mosquitos.

** Dana Vaseli is the edior of *The Methow Naturlist*, article reprinted with permission

Hikers in August

Above: Mystic Ridge Conservation Area. Photo Julia Waldomo

Below: Young Point Conservation Area, Photo Izzy Harrington

Jedediah Island - Celebrating 30 years!

It's been 30 years since Jedediah Island was purchased by BC Parks from Al and Mary Palmer, owners of the island since 1949. This year also marks the passing of Mary Palmer, whose book, *Jedidiah Days*, is a fascinating tale of island life in the second half of the last century.

The estate of the late Daniel Culver committed $1.1 million to Jedediah's preservation. In addition, the Friends of Jedediah (Lasquetians), the Marine Parks Forever Society, the Nature Trust of British Columbia, Pacific Marine Heritage Legacy, Mountain Equipment Coop, The Marine Trades Association, and Canada Trust contributed. Mary Palmer noted in her book that Bill Merilees and Rosalind Hildred were particularly helpful in ensuring that the island was conserved. The Palmers offered the property to the Province at well below market value, receiving a charitable donation for the difference. Many other island conservancies used the example of Jedediah as inspiration for their own fundraising for protection of areas on other islands.

In several areas, there is evidence of human settlements, including the large house at Home Bay, and the remains of another in Long Bay. Clam gardens have also been found in the rich marine enviornment that encircles Jedidiah Island.

The island was protected for its rich recreation opportunities in addition to the park's natural and cultural values. This marine park was protected in 1995, over 30 years ago, and the story of how it was protected is included in LINC's summer 2020 newsletter, viewable at linc.lasqueti.ca.

Top: Home Bay on Jedediah, Photo SHarrington
Above: clam bed on Jedediah, Photo Dana Lepofsky

Great Blue Heron at pond, Photo Deborah Freeman

Expand French Creek Estuary

Let's Protect the Herons and more!

The Save Estuary Land Society is launching a fundraising campaign to raise donations toward the acquisition of one hectare of land on Viking Way immediately adjacent to the French Creek Estuary Nature Preserve. There is a very successful Great Blue Heron colony on the one hectare which has fledged chicks since 2023 In 2025—22 chicks were fledged!

Great Blue Herons are a species at risk, yet development continues to threaten their breeding & forage habitat and success as a species. The Viking Way colony is vital to their population.

Our goal is for the land to be purchased and added to the French Creek Nature Preserve to protect the Heron Colony and ecological features of the Nature Preserve. To help or for more information please visit our website: Save Estuary Land Society

Sponges - Fascinating Marine Animals Surround Us

by Norm Stacey

A magical aspect of island life is being surrounded by a menagerie of fascinating marine animals (sea stars, urchins, anemones) with no counterparts on land. Sponges *Phylum Porifera* are a great example, with about 8,500 described species of an estimated 15,000. Some sponges live in freshwater, but most are found from the intertidal to the deep ocean. Sponges lack typical animal body symmetry, such as the radial symmetry of jellyfish and sea anemones or our bilateral symmetry: no head or tail, no left or right! In fact, sponges such as Lasqueti's breadcrumb sponge (*Halichondria panicea*; Figure 1) grow irregularly, conforming like moss to the shape of their rock substrate.

Sponges lack the complex structures of other animals and have less than 20 specialized cell types, whereas we have about 200. And sponge cells are not tightly joined like cells

Figure 1. The breadcrumb sponge, which often appears bright green due to symbiotic algae. Image: courtesy Keith Hiscock

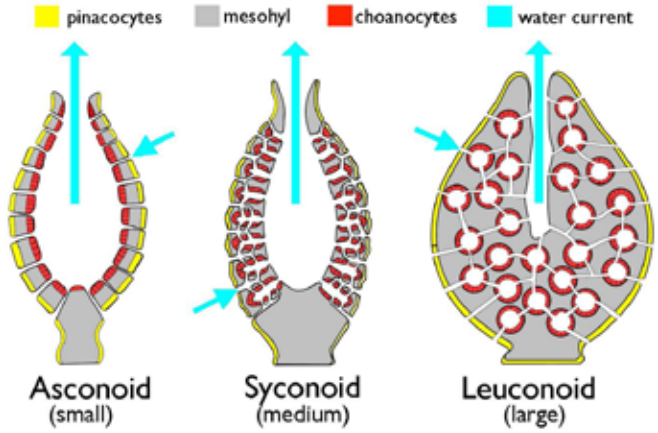
in our tissues. Some sponges can be pushed through a mesh to separate their cells, which then reaggregate to form new individuals, a capacity unique to sponges.

Sponges come in many shapes and colors and range in size from millimeters to meters (Figure 2 - above).

Almost all share a simple 3-layer structure: (i) simple 'skin' of pinacocytes outside, (ii) flow-through water channels inside, and (iii) jelly-like layer or *mesohyl* between. Beating of choanocyte flagella creates a water current that draws water in through many small ostia and out through one or more larger oscula. (Figure 3).

Left - Figure 2. Scuba divers inspect giant barrel sponges *Xestospongia muta* the world's largest sponge. Image Wikimedia Commons

Below - Figure 3. Image redrawn from Wikimedia Commons.



This 3-layered structure is clear in small, millimeter-scale sponges, but highly modified as body size increases.

This can be clearly seen in the complex architecture of the common bath sponge, *Spongia officinalis*

Right - Figure 4, bath sponge, Wikimedia Commons.

In encrusting species like the breadcrumb sponge, the mesohyl layer is sufficient to act as a skeleton. Whereas in species that rise above the substrate, like B.C.'s finger sponges (*Isodictya* spp.; Figure 5), the mesohyl contains strands of the protein *spongin,* or *spicules* of silicon dioxide (glass) or calcium carbonate for additional support.

Figure 5. A finger sponge, *Isodictya quatsinoensis,* found in BC
Image courtesy Neil McDaniel

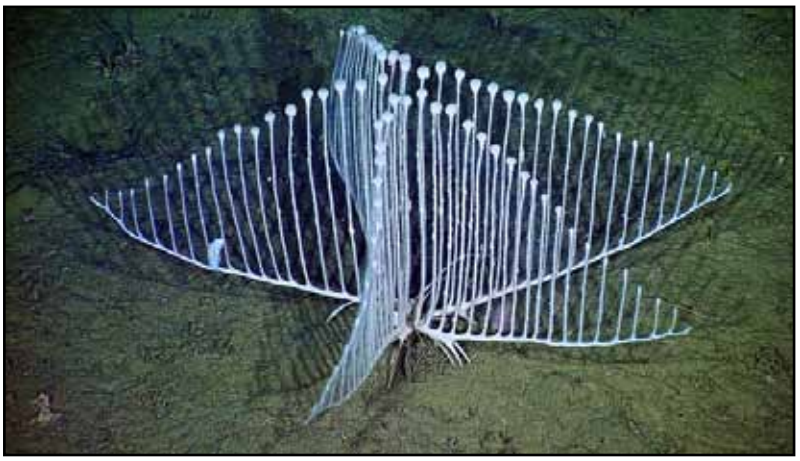


Figure 6. The carnivorous harp sponge *Chondrocladia lyra* photographed at a depth of 3 km off the California coast. Image: Monterey Bay Aquarium Research Institute

Some very deep-water species like the harp sponge (*Chondrocladia lyra*; Figure 6) are carnivorous. However, the great majority of sponges are filter feeders (like clams and oysters). These species draw water in through small holes (*ostia*) on the body surface, move it through cavities within the body, release it through much larger *oscula*, and in the process trap suspended bacteria and other *picoplankton* (Figure 3). The filter feeding currents are generated by the beating of flagella in *choanocytes* (*funnel cells*; Figure 7) which line the water cavities. Sponges are like old wood stoves, except instead of the fire drawing air in through gaps in the firebox and blowing it out the chimney, the choanocytes draw water in the ostia and blow it out the oscula.

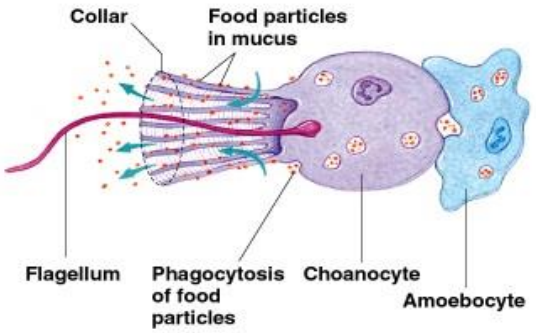


Figure 7. A sponge choanocyte. Image: swaggology.weebly.com

The choanocyte's beating flagella not only drive water through the sponge, but also through its sieve-like funnel. Beating of the flagellum draws water through the funnel, allowing suspended bacteria to be trapped and engulfed as food. (Figure 7).

Sponge filter feeding draws in not only food but also bacteria, fungi and algae that are not eaten but sometimes able to 'set up shop' in the the sponge body.

These symbiotic invaders, which can account for 50% of a sponge's weight, can provide the sponge with nutrients as well as chemicals that prevent predation or settlement of competing species. These chemicals are being currently studied to find novel antibiotics, anti-cancer drugs and industrial chemicals. Lasqueti's breadcrumb sponge is one of many species involved in this research.

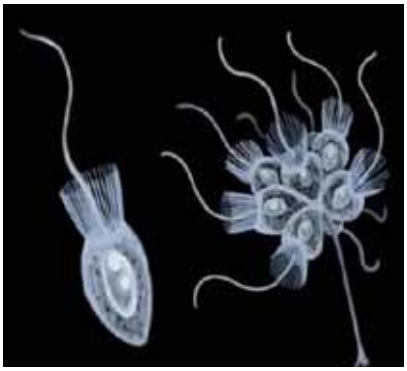


Fig. 8. Solitary and colonial choanoflagellates, the closest relatives of Kingdom Animalia. Image: Biology Notes Online

Fossils show that sponges arose about 900 million years ago, more than 300 million years before the 'Cambrian Explosion', when today's major animal groups first appeared. Sponges thus occupy a pivotal position in animal evolution - a link between unicellularity and multicellularity. For example, sponge choanocytes bear a striking resemblance to unicellular and colonial organisms appropriately called the choanoflagellates (Figure 8), which genetic studies show are the closest relatives of animals.

Also, sponges appear to be the basal animal group, the first branch to split from what evolved into the rest of the animal family tree. For these reasons, ongoing choanoflagellate and sponge research attempts to answer fundamental questions such as how multicellularity evolved from unicellularity, and how the complex tissues and organ of animals first arose.

The deep-water glass sponges (Figure 9), some of which might live longer than 15,000 years, differ from typical sponges because the body is not divided into individual cells but rather is a huge multinucleated cell or syncytium. In some of these sponges, the glass spicules are fused together, forming a rigid skeletal scaffold that persists after death, enabling generations of settling glass sponge larvae to create reefs, in the same way that coral reefs form.

Figure 9. The Venus Flower Basket (Euplectella aspergillum), a glass sponge. Image: NOAA Okeanos Explorer Program.

Though common as fossils from several hundred million years ago, glass sponge reefs were believed to have become extinct about 40 million years ago. However, a team of Canadian scientists mapping Hecate Strait in 1987 discovered living glass sponge reefs. These reefs are of great ecological and conservation significance because, like coral reefs, they support many fish and invertebrates. Therefore, in 2017, the Canadian government established the Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs Marine Protected Area - 2,400 square kilometers of seafloor closed to bottom trawling. Sponge reefs have now been found from Alaska to Washington state, with over 20 in Átl'ka7tsem Howe Sound and the Salish Sea (one just off Parksville). Tragically, some Salish Sea reefs are heavily damaged by trawling and one in the Broughton archipelago has been killed by fish farm sediment. To view sponge reefs in Hecate Strait see https://www.youtube.com/watch?v=5fYvVN91wf4 To view scuba divers on a relatively shallow sponge reef near Gambier and Bowen Islands see https://www.youtube.com/watch?v=me7QE9u5LQY.

Although sponges tend to be some of the out-of-sight, out-of-mind members of our intertidal community, I hope you'll take the time to search for a breadcrumb or other local sponge and pause to consider the truly remarkable group of animals these little creatures belong to, and what secrets they could reveal about how we came to be.

Root intelligence: How old trees learn to suck more CO2 from the air.

New research finds that centuries-old oaks can dynamically rewire how they absorb nutrients—suggesting forests may be more resilient allies in the climate fight than once believed. *Anthropocene Magazine, July 2025.*

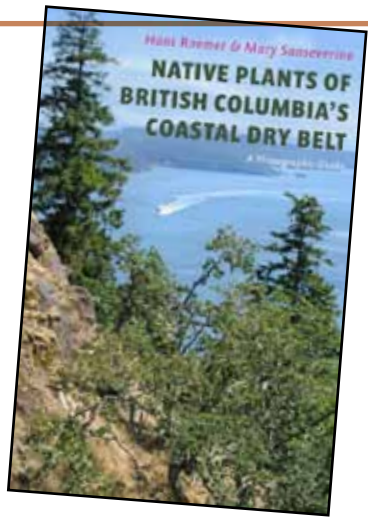
News of Note

Mexico, Belize, and Guatemala have announced the creation of a "biocultural" reserve to protect a trinational area corresponding with the borders of the classical Mayan empire.

The second-largest intact tropical rainforest in the Americas, the Maya Region stretches tens of millions of acres through southern Mexico and her two Central American neighbors.

"We should be proud to be able to tell the world [that] we have united our will to preserve and restore the legacy of this extraordinary biological and cultural wealth," Mexican President Claudia Sheinbaum said in a statement. "We are not only protecting an ecosystem, but also honoring the legacy of the civilization that once flourished in these territories." https://www.goodnewsnetwork.org/

Book Review



Native Plants of British Columbia's Coastal Dry Belt: A Photographic Guide. Hans Roemer and Mary Sanseverino

review by Ken Lertzman

There is a new field guide to plants of the Salish Sea that will be very useful to folks who are interested in natural history. It was written by well-known Victoria-based plant ecologist Hans Roemer and former computing science professor and photographer Mary Sanseverino. Roemer has played an important role in plant ecology and ecosystem conservation in BC for decades. For many years he was the ecologist for BC's Ecological Reserves program (starting in 1978). Though he lives in the Garry Oak ecosystem, he travelled all over the province for his ecological reserves work and has been to Lasqueti in that context.

By focussing on BC's coastal dry belt—essentially the lower elevation areas of the Salish Sea—Roemer and Sanseverino provide us with a tool that is tailor made for us. When they are talking about species that live in Douglas-fir forests, you don't need to worry about whether those species are restricted to Douglas-fir in coastal Oregon or the southern Interior of BC. Illustrated by gorgeous photos that are useful aids to identification, the book is intended for the average naturalist—not technical specialists—and the authors have tried to avoid jargon. Botanical terms that were considered necessary are defined in a glossary at the end of the book.

The most striking and distinct aspect of this guide is its focus on plant communities, rather than individual species. The book is organized by habitat (or ecosystem). Individual species are presented as part of its plant community characteristic for that habitat. The habitats will be familiar to most people in the Salish Sea who have an interest in natural history—such as Douglas-fir Forests, Douglas-fir/Arbutus Forest, Redcedar/Grand Fir – Bigleaf Maple Forest. Besides forested habitat types, they also cover a range of habitats characteristic of different types of wetlands and non-forested coastal areas.

Each section begins with a description of a particular habitat type, how to recognize it, and a photograph of representative vegetation, with some key species highlighted. They then provide a table showing characteristic plant species by layer (trees, shrubs, mosses, herbs, and non-native species) and typical percent abundance for each species. The abundance data are from Roemer's own field collections. This tells you not only what species to expect, but what their abundance might be like. After the table come the species photos for that habitat. Little attention is given to identifying characteristics, but key features are sometimes provided, and the species are often accompanied by notes about the kind of setting in which they are likely to be found.

They conclude the main part of the book with a section on plant species that don't easily fit in the earlier groupings – rarer species, plants that are characteristic of specialized microhabitats (such as rock faces), or those that are consistently found in fringing or transitional habitats. The Indian Paintbrush (Castilleja sp) that we are familiar with on coastal bluffs is in this latter category. Also included is an appendix focussing on common invasive species.

Because of overgrazing on many parts of Lasqueti, one may only see a subset of the native understory species that "should" be here. If you go to the offshore islands around Lasqueti, you can fill in some of the gaps, but those islets do not represent the full range of habitat types present on the larger islands.

This book is a very nice addition to the tools available for someone interested in learning more about our local plants. Moreover it will help us begin to see how plant species assemble into plant communities and how those communities are related to their environmental conditions.

Seen In Passing

Dyer's Polypore *Phaeolus schweinitzii* (also called velvet top) commonly found around Lasqueti - makes a rich golden dye. Photo Norm Stacey

Chorus Frog *Pseudacris*

Photo Elisabeth Eppich

Banana Slug taking a microdose of *Amanita muscaria*, commonly known as fly agaric. Photo Kathy Schultz

This group of five feral goats included two young kids seen on Bull Island. Photo James Schwartz

Deer Mouse A native species, is a significant mammal in the forest who disperses seeds and is food for owls and snakes. However, it can also carry Lyme disease and hantavirus. Photo Elisabeth Eppich

Drone, Hover or Flower Fly, commonly mistaken for a bee, is a major pollinator of primarily fowers with high nector content. Photo Elisabeth Eppich

LINC Lasqueti Island Nature Conservancy

Do you want to volunteer or donate to help conserve and steward nature on Lasqueti? Contact linc@lasqueti.ca for further information

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