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Island Insects
A Photographic Potpourri of Newfoundland 'Bugs'

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A Photographic Potpourri
of Newfoundland 'Bugs'

by Mardon Erbland

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About This Digital Edition

This book was originally published in 2008 as a full colour, perfect bound, paperback edition. The book was a 'labour of love' for the author / publisher. It provided an opportunity for him to combine his interest in macro photography, nature, computers and writing. The retail price was set at $24.95 (Canadian). One hundred twenty five copies were printed. By mid-2009 the initial print run was completely sold out.

The original paperback edition was a success in terms of both personal gratification for the author and positive reviews by readers. Financial success was more elusive.

Generating a profit was never the author's goal but neither was losing money. The idea was to create a quality book, printed on quality paper that could be sold for a high enough price to break even financially. Unfortunately this was not possible at the $24.95 price and the author felt a higher price would have killed sales.

A small print run, quality paper, and perfect binding turned out to be mutually exclusive with a break even retail price. The printing and binding costs alone came to slightly more than the $24.95 retail price. After absorbing the costs of a few complimentary copies for promotional purposes and paying sales commissions on about 30 books (the author sold the remainder himself), the project quickly went from break even to money losing.

From the foregoing explanation, it should be obvious why the original paperback edition is going to remain out-of-print. This is despite several suggestions to the author that he commission a second printing. That is not going to happen. Publishing books is fun but losing money is not.

Over the past couple of years, book publishing has been transformed. PDF and ePub documents are widespread. Digital books have zero printing and binding costs and PDF books are able to replicate formats once reserved for paper books.

It is these featurees that has led to the creation of ***Island Insects: a photographic potpourri of Newfoundland 'bugs' - Digital Edition***. This PDF book is the no-cost alternative to an expensive second print run of the original edition. Even better, the absence of printing and binding costs means that the break-even retail price for this Digital Edition is zero dollars ($0.00 - Free). In fact, readers are permitted to freely download, read and share this Digital Edition in accordance with the applicable Creative Commons license [BY-NC-ND] as defined on the copyright page.

Enjoy,

Mardon Erbland
Author / Publisher

PREFACE

Welcome to the world of tiny animals. Within this document you'll find photos of insects and other arthropods. These include spiders, bugs, caterpillars, moths and all kinds of small, yet fascinating creatures. Some walk, some crawl. Others fly or hop. Some even slither. For simplicity, I'll call all these things "bugs". This is not scientifically accurate but the word "bugs" is commonly used by nonscientists, so I'll be using it in this book too. This practice is even followed by the well-known entomology web site, BugGuide.net. That puts us in good company.

Despite the broad definition I've assigned to the word "bug", there is a scientifically rigorous method for naming plants and animals. It's a specialized field of scientific study called "taxonomy". This is the process of classifying plants and animals into a hierarchal naming structure that goes from Plant Kingdom and Animal Kingdom at the top level, down to a species name or even sub-species name at the lowest level. There are often two names for each animal within a given level; a scientific name and a common name. Scientific names are in Latin and common names are in English. The levels of the hierarchy itself also have names. These include Class, Order, Family, Genus, Species and others. There may be sub-level names as well. Within this structure, an ordinary dog carries the Latin sub-species name, Canis lupus familiaris, and the common name, Domestic Dog. Dogs belong to the Canidae Family which is part of the Order Carnivora. This is the same naming system that applies to insects, ants and spiders. This background is important because you'll see both the scientific name and the common name in many of the photo captions. These names might be at the species level but more often they will be at a higher level, such as the Genus or Family level. Enough said. Taxonomy can get complicated. It's a field of study unto itself.

Be careful not to let the size of the photographs fool you. Some of the images are enlarged as much as 50 times life size. Most of the actual 'bugs' are less than 1 cm in length. Some are as small as 1 mm. That is about the size of two grains of table salt placed side by side.

This book is not a field guide for identification purposes and readers should not treat it that way. I'm not a trained entomologist. I'm a photographer and an amateur naturalist. The focus of this book is the pictures, not the text. I'm grateful for the background information that has allowed me to write the captions and especially for the identification of individual 'bugs'. This information has come from other naturalists who freely share their knowledge and interest on the Internet; especially, the participants at www.BugGuide.net. Care has been taken to be as accurate as possible with the information and descriptions contained herein, but the identification of such small animals from photographs is always fraught with the possibility of error.

I hope this book leads you to share my fascination with these remarkable animals.

Meta ovalis

The Cave Orb Weaver spiders in the Genus Meta, of which this 11 mm long male spider is one, are known for liking to live in caves or cave-like habitats. This spider was hiding under an outside patio deck. The deck provided a dark and secluded place just like these spider like. In the past, this species has also been known as Meta menardi and Meta americana. This spider species builds webs and feeds on the prey that get caught.

Salticus scenicus
Zebra Spider

Zebra spiders are common around humans' homes. The are jumping spiders and do not build webs. They catch their prey by using their large eyes to find it and then pouncing quickly before the prey can escape. These spiders also have the reputation for liking to observe humans. As can be seen here, when a human is looking at them, or photographing them, Zebra Spiders tend to rise up on their front legs and stare directly at the human observer. If you have never looked closely at a Zebra spider, it is worth doing. You will get the spooky feeling that they are observing you more than vice versa. Zebra Spiders are 5 mm - 7 mm long.

Araneus diadematus
Cross Spider

This is an 8 mm long cross spider (a.k.a. European garden spider). It is a well-known member of the orb-weaver family (Araneidae) and a very common sight in Newfoundland. These spiders have been known to striduate when threatened. Striduation is the process of making sound by rubbing together certain body parts.
Some insects and spiders do this but not all.

Cross spiders will bite humans if really provoked but their bite is totally harmless. The enlarged 'knob' at the end of the front 'feelers' identify this individual as a male. The 'feelers' are correctly called pedipalps. The 'knob' at the end exists only on males. This is where they store their sperm.

Thymelicus lineola
European Skipper

The European Skipper (a.k.a. the Essex Skipper) is the only species of the genus Thymelicus to exist in North America. This butterfly is common in Newfoundland. Adults have a wingspan of 2.5 cm to 2.9 cm. Eggs are laid in strings on the stems of grassy plants where they remain over the winter. Caterpillars emerge in the spring and feed until late June before forming shelters from leaves tied with silk at the base of the plant to pupate (to become a cacoon). Like most skippers, this species is most active during daylight hours, although they are occassionally seen at night. This butterfly species was accidentally introduced to North America in 1910 near London, Ontario. Note the proboscides (tubes) for sucking nectar.

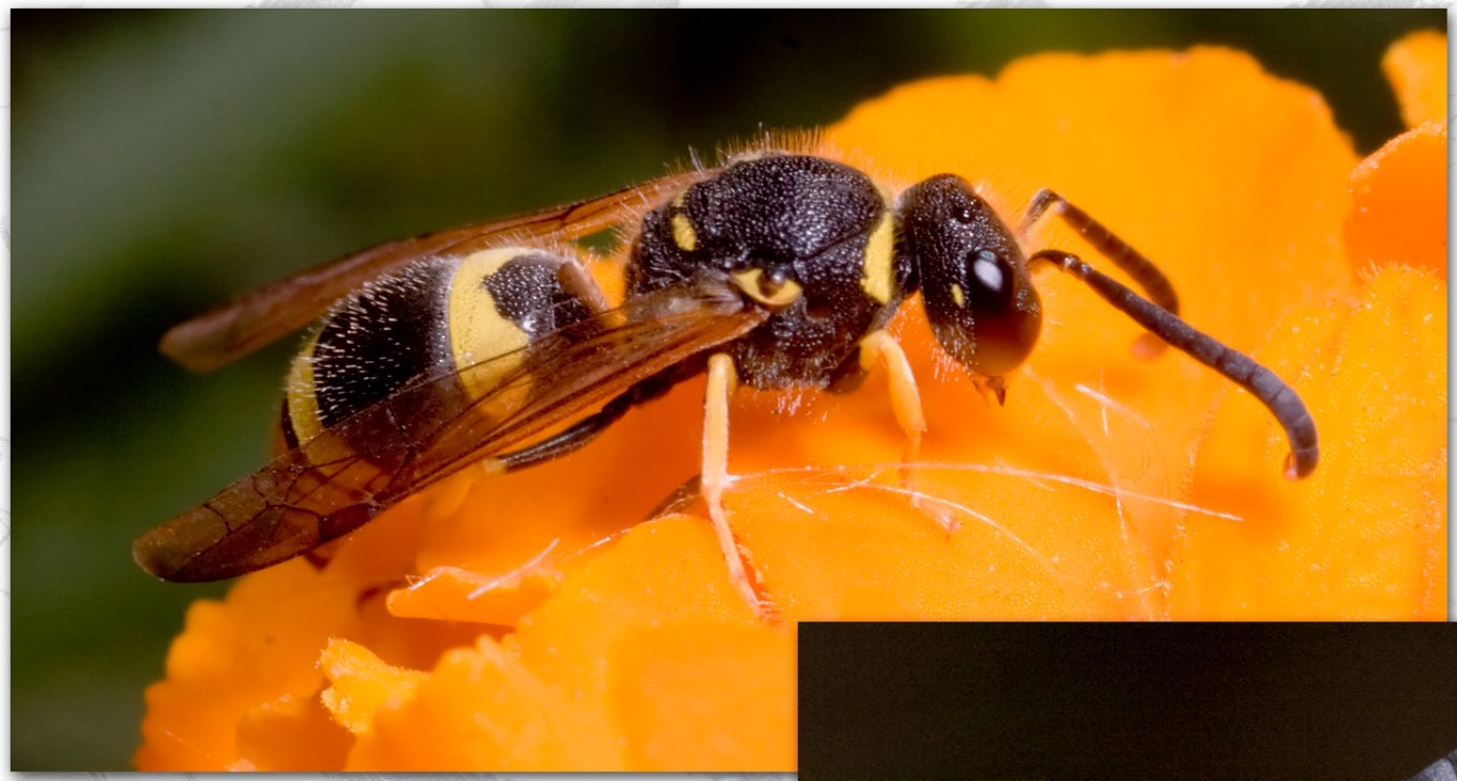
Family Aphididae
Aphids

Aphids are also known as plant lice. They suck juices from plants and may be quite damaging. They range in size from 1 mm to 10 mm long. The wingless ones shown in these photos are 1 mm and the winged one is 3 mm. Aphids are distributed world-wide, but are most common in temperate zones.

Genus Formica, fusca group Ants

Formica is a Latin word for "ant". This is a 5 mm long worker ant. Since it is hardly conceivable that a single worker could subdue a healthy spider, this ant probably scavenged its cargo. Ants of this group forage most often signally, and are unlikely to gather around a big prey; except sometimes earthworms. Formica worker ants of the fusca group usually run like crazy when they see a camera getting close. But when they are carrying food, they almost never drop the food to allow them to escape faster. They are very shy when going around "empty", but when they have even the smallest piece of food, they won't give it up.

Fusca group nests are usually found in rotten tree stumps or under stones in clearcut areas and along woodland borders and hedgerows. These nests are usually 'small', containing 500-2,000 workers.



Genus Ancistrocerus Male Wasp

This 1 cm long wasp was using the afternoon sun of a late September day to feed on the nectar from plants located in front of the old Colonial Building in St. John's. Its species is probably A. parietum but could also be A. gazella. These two closely related species of Ancistrocerus were introduced to North America from Europe. A microscope is needed to to positively distinguish between males of these two species.

Vespula vulgaris
Common Yellowjacket

This yellowjacket was 14 mm long. It was taking in some late afternoon, September sun in Shoal Harbour, T.B. Yellowjackets don't just sting; they both bite and sting; and sting repeatedly. That said, yellowjackets are defensive and never attack unprovoked. Nests are usually subterranean but are sometimes built in rotten logs, stumps, hollow walls, or even aloft in trees or under the eaves of buildings. They feed mostly on insects, especially flies.

Family Oniscidae
Sowbug

Sowbugs, better known to Newfoundlanders as "Carpenters", are members of the Order Isopoda. In other parts of the world they are called woodlice or even potato bugs. They can be confused with pill bugs. If the creature rolls up when you poke it, it's a pillbug (family Armadillididae). If it doesn't, it's a sowbug. Female isopods have a marsupium, i.e. a brood pouch in which the eggs are incubated until they hatch.

Sowbugs have backs that consist of a number of overlapping, articulating plates. They have 7 pairs of legs, and antennae which reach about half the body length. Most are slate gray in colour, and may reach about 15 mm long and 8 mm wide, which was the approximate size of this individual.

Genus Steatoda
Cobweb Spider

It is easy to tell that this spider is a male because of his swollen pedipalps, the appendages that look like small 'arms'. In males, the pedipalps include organs to transfer sperm to the female spider during mating. This individual is an immature Steatoda sp., most likely Steatoda bipunc tata, but the specific identity of an immature spider is never 100% certain. Steatoda sp. spiders are often found in the corners of garages and sheds. Their webs are a tangle of crisscrossed threads

Family Aphididae
Aphid

Aphids are usually quite small. The one shown here is 'large', with a body length of 3 mm. The life cycle of aphids is somewhat unusual. Within ten days of being born some females can give birth (to mostly female offspring) without mating. This process can continue all summer. In the fall, winged males are produced to mate with females who then lay eggs that do not hatch until the following spring. The ability of aphids to reproduce asexually (that is, without a mate) can result in a high reproductive rate and large colonies of aphids.

Araneus diadematus
Cross Spider

Most spiders have eight eyes but a small percentage have six, or even fewer. The pattern formed by the location of the eyes can be used as a clue in identifying the type of spider; especially from photographs. This 8 mm long female has tiny eyes. Like all spiders of this species, she does not depend too much on her eyesight to catch prey. Instead, she senses the movement of her web to tell when prey is near. There are 2 types of eyes; main and secondary. The main eyes are always in the middle.

Spiders do not have ears. Spiders sense sound waves with tiny hairs on their legs. These hairs can even localize the origin of the sound. Legs hairs also act as a sort of 'nose' to detect scents. Spiders have no sense of taste in their mouths. The leg hairs are sensitive to different chemical compounds and help the spider distinguish prey that is edible from that which is not.

Sitona lepidus
Broad-nosed Weevil

A weevil is any beetle from the Curculionoidea superfamily. The species shown here belongs to the genus Sitona in the family Curculionidae. This species is also known as the clover root weevil and can damage lawns or fields of clover. This weevil was 5.5 mm in body length.

Simuliidae
Black Flies

Black flies are notorious for their aggressive biting. They often make warm summer days in the Newfoundland woods an experience that requires treatment with Calamine lotion.

This Black Fly was obviously in distress. The author found it on his bathroom floor after he had come in from outside and changed his clothes. The fly probably tagged along as a hitch-hiker and got injured in the process.

Tasgius ater
Rove Beetle

Rove beetles can be mistaken for earwigs because their long, thin body is fairly unique for a beetle. They often get into houses but outdoors they are found under rocks and logs or on decaying material. Adult rove beetles feed on other invertebrates. They are noted for their short elytra (modified, hardened forewings).

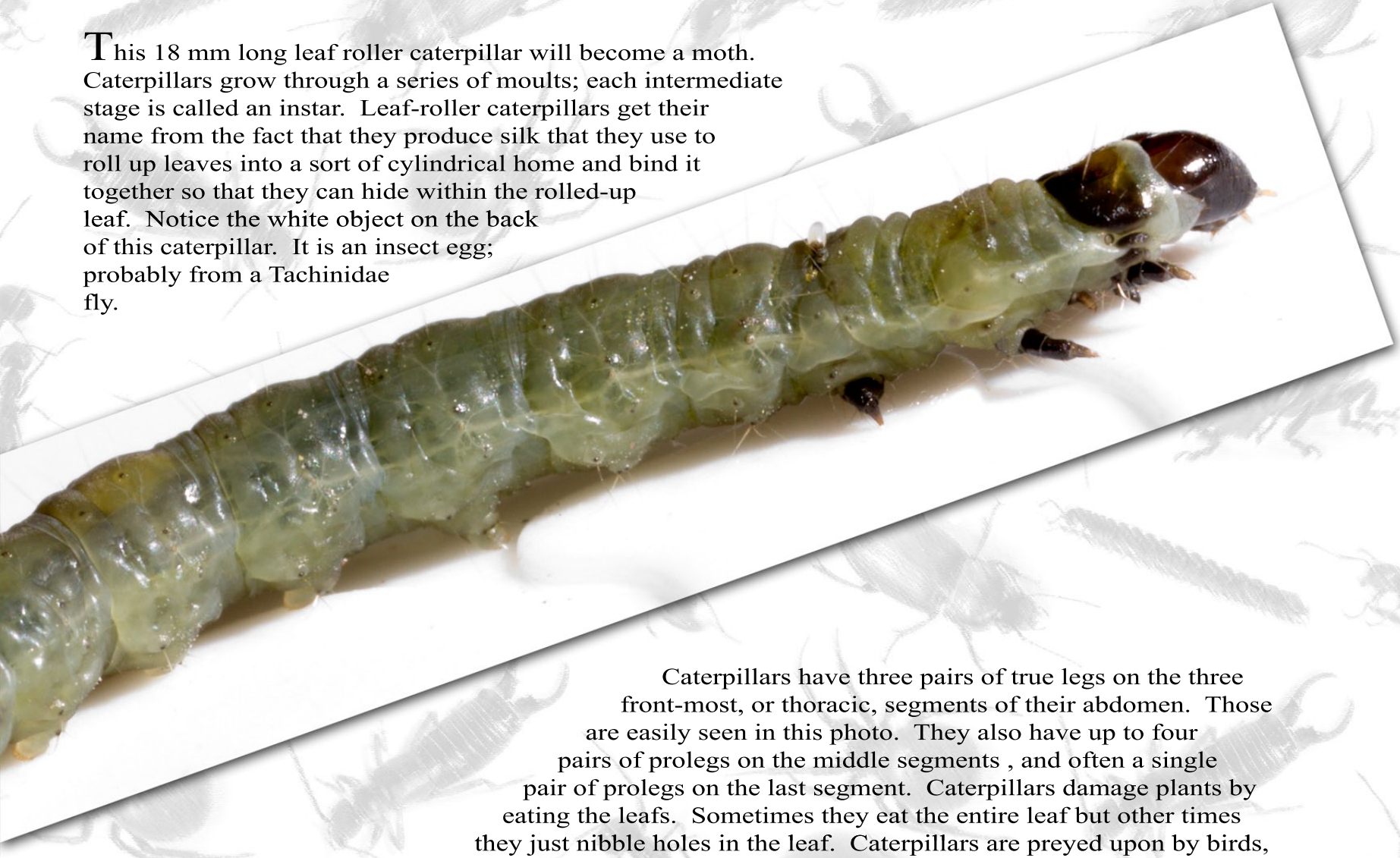
This rove beetle was 17 mm in body length. It was found inside a house in early June.

Philaenus spumarius
Meadow Spittlebug

This spittlebug had an 8 mm body length. It was found sitting on a leaf . The Meadow spittlebug was introduced to North America from Europe. These insects can jump easily, making an audible thump in the process. If they exist in sufficent numbers, they can damage crops like alfalfa and clover. They suck the sap from plants, thereby stunting plant growth. These insects have one generation per year. Spittlebugs overwinter in the egg stage. The name comes from the froth or spittle that often marks their location.

Leaf Roller Caterpillar

This 18 mm long leaf roller caterpillar will become a moth. Caterpillars grow through a series of moults; each intermediate stage is called an instar. Leaf-roller caterpillars get their name from the fact that they produce silk that they use to roll up leaves into a sort of cylindrical home and bind it together so that they can hide within the rolled-up leaf. Notice the white object on the back of this caterpillar. It is an insect egg; probably from a Tachinidae fly.



Caterpillars have three pairs of true legs on the three front-most, or thoracic, segments of their abdomen. Those are easily seen in this photo. They also have up to four pairs of prolegs on the middle segments , and often a single pair of prolegs on the last segment. Caterpillars damage plants by eating the leafs. Sometimes they eat the entire leaf but other times they just nibble holes in the leaf. Caterpillars are preyed upon by birds, small mammals and insects.

Family Pyralidae
Pyralid Moths
Leaf Roller Caterpillar

Order Trichoptera
Caddisflies

Caddisflies are moth-like insects that have hairy wings instead of scaly ones like moths. Adult caddisflies are very short lived. Two weeks is typical but it can extend to as long as two months. Adults do not eat. Their only purpose in life is to mate and reproduce.

Order Diptera
Flies

Many different species of flies can be seen 'blowing bubbles' if you watch them closely. Syrphid flies seem to be one of the few groups that do not do this. The bubbles range in colour from clear to slightly darker than the one shown here. When files do this, they generally blow the bubble and then suck it back, repeating this sequence as many as half a dozen times or more. There seems to be no definitive explanation of why they do this. Speculation ranges from it being an aid to digestion through to the idea that it may help keep them warm.

Elasmostethus cruciatus
Red-Cross Shield Bug

At last we get to some photos of a "True Bug"; insects which belong to the Order Hemiptera, Suborder Heteroptera. This species ranges in size from 8 mm to 10 mm and lives on shrubs and trees. During the winter, adults live under bark and leaf litter.

Family Tachinidae

There are over 8,200 species of tachina flies (a.k.a. tachinids) and over 1,300 of those are known to live in North America. Almost all tachinids are bristly and stockier than house flies or blow-flies. Tachinids can be regarded as helpful in controlling certain types of insect pests. Their eggs are often deposited inside a living host; generally killing the host. If that host is known to damage crops or ornamental plants, then the tachnids are viewed as helpful. In fact, many species of tachinids have been intentionally brought to North America because of their ability to act as biocontrols and kill unwanted pests. Tachinid flies have antennae that are divided into three segments. Many adult tachinids feed on pollen from plants and can help with pollination. They will also eat aphid honeydew, a residue left by on plants by aphids.

Orphulella speciosa (Right)
Slantfaced Pasture Grasshopper

Chorthippus curtipennis (Below)
Marsh Meadow Grasshopper

There are not nearly as many grasshopper species in Newfoundland as in most other parts of North America.

The grasshopper above is only 1.5 cm long. It's small size is typical of its species.

The grasshopper to the left is a female, about 3.5 cm long, which is large for this species.

Tipula paludosa
European marsh crane fly

European crane flies were first reported in Canada in 1955 on Cape Breton Island. The larvae of these files are known as leatherjackets. The adults do not cause damage but the larvae can do serious damage. They feed on the roots of seedlings and can be serious pests to lawns, golf courses and nurseries. These flies do especially well in wet conditions. Some people think they look like giant mosquitoes. Birds are one of their predators.

Family Miridae
Plant Bugs

This is the nymph of a true bug from the Genus Prepops. Nymphs are immature insects which undergo an incomplete metamorphosis before becoming adults. Unlike larvae, the overall form of a nymph resembles that of the adult. Nymphs moult but never enter a pupal stage. The final moult results in an adult insect.

Family Carabidae
Ground Beetles

Ground beetles are difficult to photograph because many of them have heads and elytra (hardened wing casings) with shiny, often iridescent, bumpy surfaces that reflect light and cause glare. The surface can also take on different colour casts, depending on the lighting and the viewing angle. This 23 mm long beetle was found 'inspecting' some new laminate flooring in an apartment that was under renovation. Ground beetles usually lay their eggs just below the surface of the soil. The 'babies' (larvae) go through three stages (known as instars) before they emerge into adult beetles. Most ground beetles get around by walking rather than flying. Ground beetles typically live only one year.

Carabus nemoralis
European Ground beetle

Carabus nemoralis is known to live in every Canadian province except Manitoba. Like most ground beetles, it is a beneficial insect to have around because it does not do damage to crops or lawns but it eats things that do. Unfortunately, this beetle species is very susceptible to insecticides.

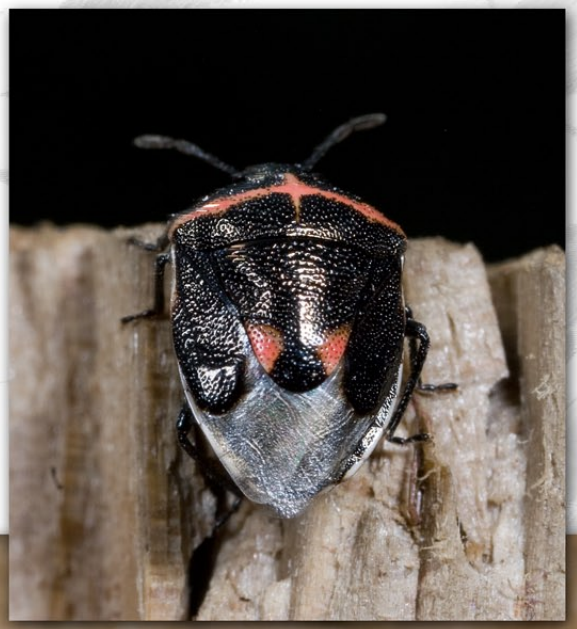
The live aphid (below) is where the wasp egg gets laid. Notice how the live aphid is not bloated like the mummy.

Aphid Mummies

This 1 mm long empty 'casing' is sitting on a clover leaf. Unless you have looked closely, you may have never seen the little 'hairs' sticking up all over the surface of a clover leaf. The 'casing' is actually an aphid shell. These casings are known as "Aphid Mummies". They are created when a parasitic wasp lays a single egg inside the body of a live aphid. The egg hatches and the resulting larva kills the aphid by feeding on its internal organs. The hole in the mummy is where the newly hatched adult wasp has chewed its way out of the aphid's shell. Even though the external surface of a live aphid is soft, it hardens during the mummification process. The mummy can be either white or brown and is 'bloated' in shape.

Psocoptera
Barklice and Booklice

This bark louse nymph (a small winged adult) is 2 mm in length. The darkish purple pads seen in the photos will become future wings. The faces of bark lice are unique and show a distinct bulge. These tiny insects feed on lichens and fungi that they find on tree bark. They like moisture and tend to live in humid places. They sometimes get into homes where they can become real pests. Psocoptera even eat paper and book bindings. Their lifespan is between one to four months.



Cosmopepla lintneriana
Twice-stabbed Stink Bug

This species of stink bug is fairly small, from 5 mm to 7 mm. The one shown here was on a wooden fence post but most are found on trees, shrubs, weeds or crops. The host plants provide juices that the bugs suck in as food. The adults survive winter by hiding beneath leaf litter. And "Yes," they can make a stink when disturbed.

Leucoma salicis
8319 White Satin Moth

Moths are referenced not only by Latin names and common names, but also by a check list number. The North American check list (1983) assigns number "8319" to the species Leucoma salicis. These are also known as "Hodges Numbers" after Ronald W. Hodges who is primarily responsible for creating them.

Bucculatrix canadensisella
Birch Skeletonizer Moth

These moths live principally on and around white birch trees. The larvae of this species can cause considerable damage to the birch because the trees' leaves provide their food. The adults lay a single egg on the surface of a leaf. It can be either the top or bottom surface. About two weeks after the eggs are laid, the larvae appear. They begin eating the leaf and in about a month they chew a hole entirely through the leaf. The larvae then spin webs in the hole that they have created. The web is where they hide to molt. After another month or so, they fall to the ground where they form pupae. A pupa is a transformation stage between being a larva and being an adult. The pupae do not feed. These moths survive through the winter as pupae in the ground debris. In the spring they become adult moths and can fly. This moth was 4 mm long. Damage from the larvae shows itself as the affected trees experience premature loss of their leaves. The molting webs can also be seen by mid-summer and by late summer, the leaves will have developed noticeably visible holes.

Family Chironomidae
Midges

Other names for this Family of insects are Non-biting Midges and Blind Mosquitoes. They are in the taxonomic Order Diptera (Flies). This midge was 2 mm in length. It is shown here perched on the needle of a spruce tree. Midges tend to travel in swarms as was the case here. This was just one of many that were flying all around this spruce tree.

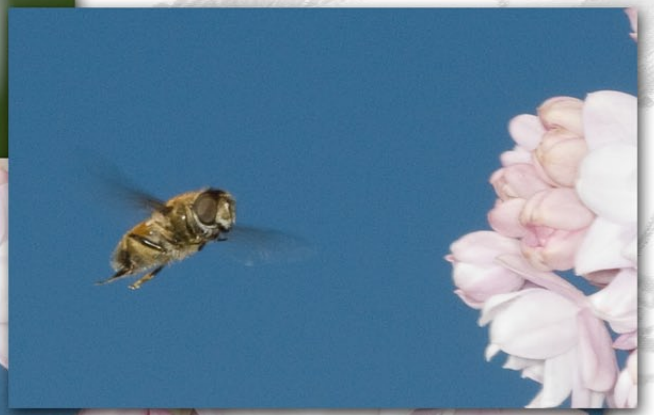
This is a male as indicated by the feathery antennae. Entomologists refer to this type of antennae as "plumose." Adult midges never eat anything. The larvae of most midges live in water or very damp locations. There are over 5000 species from this Family world-wide and 700 of those live in North America. In some parts of Canada these are know as "Lake Flies" but this name is not used in Newfoundland. The larvae are sometimes called, "bloodworms". Fossils of midges are occasionally used to track environmental change over geological (very long) time spans.

Genus Misumenops Flower Spiders

This 4 mm long Flower Spider was sitting on a wild daisy petal when found. Flower spiders are also called “crab spiders”. There are over 100 different species in North America.

Genus Camponotus
Carpenter Ants

Carpenter ants are amazing creatures. They live in social groups called “colonies.” These start out with only 20 or so individuals which are called “workers.” They are all females but undeveloped sexually. The colony also has a single sexually developed female known as a “Queen”. All of the ants are wingless. The colonies grow rapidly. They eventually become large enough to produce a few ants with wings; some male and some female. These are known as “swarmers”. In Newfoundland, these swarmers leave the nest in late June or early July to go on what is known as a “mating flight”. After mating, the males die. The females lose their wings and find a location to start a new colony. They build these colonies (sometimes called “nests”) in wood. This might be living trees, hollow logs or even the wood in houses. They do not eat the wood. They consume other ‘bugs’ and vegetable matter. The colonies can grow to over a couple of thousand individuals. These photos all show Queens soon after a swarm. The Queens lose their wings very soon after landing.



Family Syrphidae
Hover Flies or Flower Flies

These flies mimic the appearance of bees. Some even buzz like bees. They are generally seen around flowers. Syrphid flies often hover in mid-air (see upper right photo). This family can be identified by an extra wing vein that they possess. To learn more about this, research 'wing venation". It's a entomological sub-speciality unto itself.

Family Erythraeidae

These mites are the smallest bugs pictured in this book. Three are under 0.5 mm long. That's about the diameter of a grain of table salt. That's also why the images are fuzzy. Their tiny size makes them very difficult to photograph while they are alive. Adult Erythraeidae mites are predators. The larvae are parasitic and bite into the bugs to which they are attached. They then drain the host's bodily fluids, thereby killing it. Erythraeidae belong to the Order Trombidiformes. Trombidiformes have been used in some jurisdictions as a biological control agent against Note that the darker mite (1 mm length) is carrying some food Mites are more closely related to spiders than to insects. The scientific discipline devoted to the study of ticks and mites is acarology.

'Bug' Preditors

If you're a squeamish naturalist, you may want to skip this page. These images show toad feces. A live ant (below) from the genus formica is inspecting the feces' contents. Among what can be seen are the live ant's partially digested cousins. A female American Toad (Bufo Americanus) is shown opposite. Toads like this one eat insects, but only the fleshy parts. The exoskeletons are passed through in the toad's excrement where they are easily identifiable.

Family Pentatomidae
Stink Bugs

This 7 mm long stink bug is probably from the genus Podisus, perhaps the species Podisus brevispinus. In two of the photos the bug was crawling on the top side of the author's hand. Fortunately, the bug did not produce any bad order as it is capable of doing. The genus Podisus consists of predatory bugs, that is, they eat other bugs. The most widespread species in this genus is Podisus maculiventris, also known as the "spined soldier bug".

Subfamily Polyommatinae
Blues

This butterfly is most likely a well-worn member of the species Celastrina lucia, also known as an Eastern Spring Azure. Polyommatinae are a subfamily of the butterfly family Lycaenidae. The butterfly shown here was seen flying in a jerky fashion around the grass in the author's backyard. It occasionally landed on the grass but didn't rest long. This photo was taken after it landed on the soil under a shrub.

The family Lycaenidae is the second-largest family of butterflies. It contains approximately 6000 different species. Members of this family are also known as gossamer-winged butterflies. These are relatively small butterflies. This one had a body length of approximately 12 mm. The subfamily Polyomma tinae is a bit of a 'catch-all' category and may undergo some rather extensive revisions in the future.

Forficula auricularia
European Earwigs

No book on Newfoundland bugs would be complete without every Newfoundlander's favorite: the European Earwig. According to the Memorial University Gazette of Jan. 9, 1977, Dr. David Larson is quoted as saying that "European earwigs set up shop in Newfoundland in the late 1940s." The article goes on to say, "They are omnivorous creatures which feed mostly on plant material ... But also, a significant portion of their diet is small insects." The males have larger pincers than the females. Earwigs become unwanted winter house guests because Newfoundland's winters would be hard for them to survive outside.

Dermestes lardarius
Larder Beetle

This beetle species is generally between 5 mm and 10 mm in body length. Unfortunately, they like to live around humans. They live outside in summer and come inside for the winter. Once inside, they look for oily meats like bacon, ham, sausage, pet food and even items made of leather. Females lay their eggs in their food. The larvae are hairy and brown. They bury themselves into the meat or other food until it is time for metamorphosis. Their life-cycle from egg to adult is temperature dependent; usually less than 4 months.

Andrena wilkella

This bee species is a member of the Subfamily Andreninae, which are known as "Mining Bees". Andrena wilkella was introduced to North America from Europe. It is not known if Newfoundland was its first point of entry to the North American continent. These bees feed mostly on the pollen from clover or sweet clover as seen here.

This species tends to fly later in the year than the other species of genus Andrena that are native to North American. The pale basitarsus is typical of this species. The basitarsus is part of a bee's leg. Starting at the end of the hindmost leg, at the end farthest away from the body, the leg parts are: the tarsi, the basitarsus, the tibia (where the pollen basket is located) , the femur, the trochanter and the coxa, which attaches to the bee's main body.

Genus Urophora
Gall Flies

There are approximately 120 species in this genus. The flies shown here are probably Urophora Cardui (Canada thistle gall fly), but that is not certain. This mating pair was photographed in mid-July. The female lays up to 30 eggs on the stem of a Canada thistle plant. As the larvae grow, they cause a swelling (gall) on the stem of the host plant. The larvae spend the winter inside the gall and transform to flies before exiting the next year.

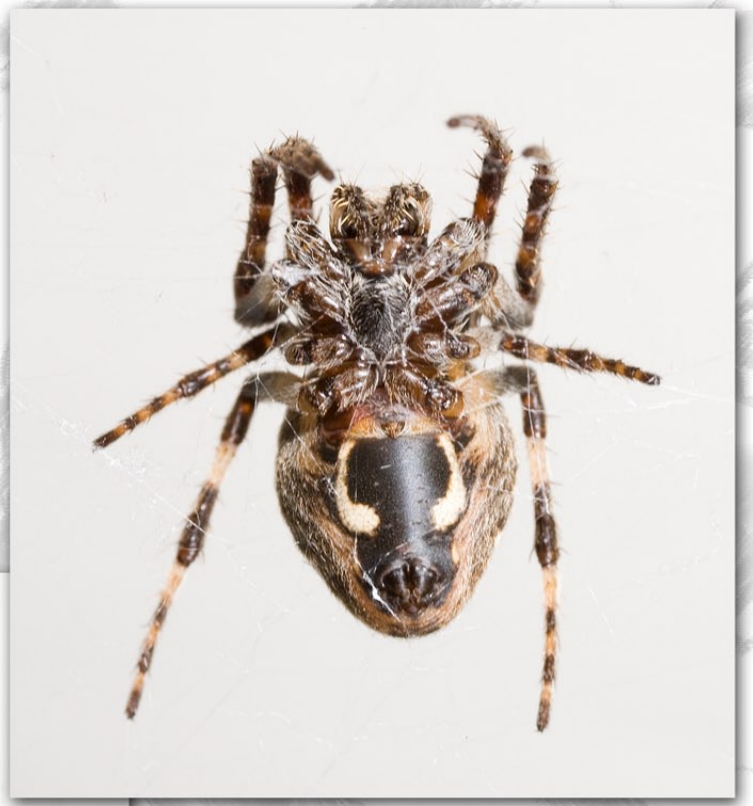
Family Lonchopteridae
Pointed-winged Flies
Spear-winged flies

Genus Lonchoptera

There are only 4 known North American species within the Family Lonchopteridae and they are all within the Genus Lonchoptera. All of them share the characteristic of having uniquely pointed wings. This shape is what gives them their common names: "pointed-wing" or "spear-wing". Lonchopteridae also have a distinct arrangement to their wing veins. The female fly shown here has a 3 mm body length. It is probably the species Lonchoptera furcata but that is not definite. Lonchopteridae tend to live in shady, grassy areas. This one was climbing on a concrete retaining wall in Clarenville when photographed. Males are rarely seen. The larvae live in decaying vegetation.

Genus Larinioides
Furrow spiders

This 1.5 cm long female spider is an Orb Weaver, that is, a member of the Family Araneidae. The species may be Larinioides sclopetarius (Bridge Spiders). Bridge Spiders prefer to live on man-made structures and avoid vegetation. Its common name derives from the spiders' affinity for steel bridges as a place to live. The spider shown in these photos was on the side of a house with its web built between the electric meter box and an aluminum downspout. All orb weavers build their webs in the shape of a traditional "spider's web". The webs are made of sticky silk that traps any prey that touches it. When this happens, the orb weaver comes out and makes a quick bite into the prey to kill it.



Family Phryganeidae
Giant Casemakers

This family of insects is part of the Order Trichoptera, common name, Caddisflies. You'll notice that they resemble small moths. The family phryganeidae is one of 18 caddisfly families known to live in North America. The individual shown here is 14 mm head to wing tips which is on the small side for this family. The common name of these insects comes from the fact that their larvae construct spirally arranged cylinders made of vegetative matter. They live in or near water. Fly fisherman sometimes use flies designed to mimic this insect.

Genus Carabus

This beetle is probably a member of the species Carabus granulatus, common name: Granulated Carabid. This 23 mm long individual was found by the author's mother-in-law on the floor of a basement apartment that was being renovated in Clarenville. These beetles like damp locations. Both the adults and the larvae eat other insects. The adults can survive Newfoundland winters outside by hibernating. Females lay about 40 eggs. They deposit these into a small depression in the ground. The larvae generally live underground. Carabus granulatus is not native to North America. It was introduced from European origins.

Scopula junctaria
Simple Wave Moth

Simple Wave Moths are part of the Family Geometridae (geometrid moths), Subfamily Sterrhinae and Tribe Scopulini. They are Hodges #7164. Scopula junctaria live in all provinces of Canada as well as in much of the United States. These moths produce one generation each year. The larvae of geometrid moths are often called "inch worms" because they have only two legs and, unlike larvae with five pairs of legs, they have to 'hump up' their bodies in order to move. The larvae feed on clover and other plants. As can be seen here, moths like to perch with their wings spread open and the tops visible. Butterflies tend to close their wings so that only the undersides can be seen when they are resting.

Family Chrysopidae
Green Lacewings

Lacewings get their name from the delicate structure of their wings. Their lacy wings, copper coloured eyes and long slim antennae are all characteristics of Chrysopidae. They can be found in grass or weeds or on leafs of shrubs like where this one was found. The larvae of Green Lacewings are sometimes called aphidlions because they like to eat aphids. After the eggs are laid, the larvae live in cocoons made of silk that are attached to the underside of leaves. Some species of Green Lacewings become brownish after surviving a winter.

Suborder Heteroptera
True Bugs

Here is another tiny insect that is actually a True Bug. There are about 40,000 species worldwide in the Sub-order Heteroptera. The term "Heteroptera" can be confusing because its place in taxonomy has changed over time. It was original used at the level of an Order and only recently changed to a Sub-order level. The term "True Bugs" can also be confusing because some people use this term to refer to everything within the Order Hemiptera. Regardless of the taxonomical complexities, there are lots of True Bugs in Newfoundland.

Genus Geomyza

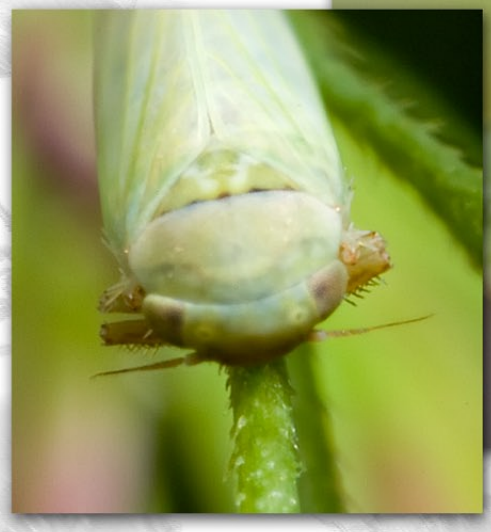
Perhaps this fly is the European species, Geomyza tripunctata. Geomyza tripunctata is known to have arrived in North America by at least 1999, so it is possible that this individual is indeed a member of that species. This Genus is part of the Family Opomyzidae. All Opomyzidae have cloudy or spotted wings. This individual was 4 mm in body length. It was sitting on a painted concrete wall.

Family Muscidae
House Flies and kin

Muscidae flies can be found worldwide and almost always near humans. Adult Muscidae of many species serve to spread disease. They are very short-lived, usually less than 2 weeks. The females can lay as many as 500 eggs. The larvae like to live in rotting material or animal dung.

Balclutha impicta Leafhopper

Leafhoppers (Family Cicadellidae) are small insects that jump much like grasshoppers. Leafhoppers all have spines on their hind tibiae (legs). Most are less than 13 mm long. This one, was only 7 mm. Leafhoppers can produce sound with special organs known as tymbals, although the sound is usually too faint to hear. These insects feed on sap obtained from the stems and leaves of plants. In some cases, this can cause damage to agricultural crops.



Family Pyralidae – Pyralid Moths

This moth had a 24 mm wingspan. The photo was taken at night. The moth had flown to a lit porch light and then sat on the side of the house. No one knows for certain why lights attract moths. One unproven theory is that moths navigate using the moon and stars and that artificial light interferes with this system.

Subfamily Andreninae
Mining Bees

Mining bees get their name because they dig their nests in the ground. Unlike many bees, they are not social and do not form large colonies. This subfamily of bees can sting but they are not easily provoked. Although they have protruding mouth parts for collecting pollen and nectar from flowers, the protrusion is shorter than honey bees. This leads to an alternate name of "short-tongued bees".

Tribe Pterostichini
Woodland Ground Beetles

This 17 mm long beetle is almost certainly a member of the Genus Pterostichus. This genus has the most members of any ground beetle genera, with over 200 species world-wide. The individual shown here may well be the species Pterostichus melanarius , which is known to live in Newfoundland. This beetle was found in the vicinity of lots of sawdust, which is common for this type of beetle.

Fly: Syritta pipiens
Spider: Misumena vatia

Here is a story of "the spider and the fly". As you can see, nature can be harsh. The unsuspecting fly landed on a daisy to collect some nectar and pollen. Little did it know that a Goldenrod Crab Spider (a.k.a. Flower Spider) was waiting in ambush. When the spider saw its chance, it left its hiding place beneath the flower and emerged from the petals to grab the fly. In less than a few seconds the fly had become dinner for the spider. These photos were taken beside the road leading to the Clarenville landfill.

1. The spider waits.

2. The fly lands

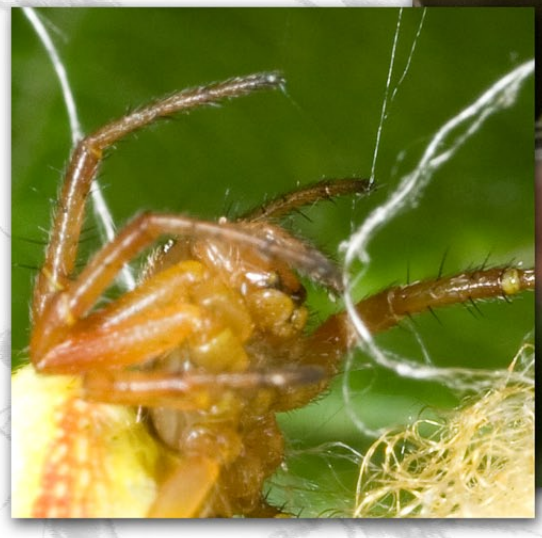
3. The spider sees its chance.

4. The spider attacks.

5. Meal time.

Araniella displicata
Sixspotted Orbweaver

This female spider seems to be carrying a large amount of eggs based on her bloated body appearence. She is working on building an egg sac out of spider silk that she has produced. It's thought that spiders that construct egg sacs do so to reduce the ability of predators and parasites to get at the eggs. The females die fairly soon after laying their eggs. This spider was 7 mm. The normal range for this species is 6 mm to 11 mm. The bright orange band seen here is typical of females in this species.

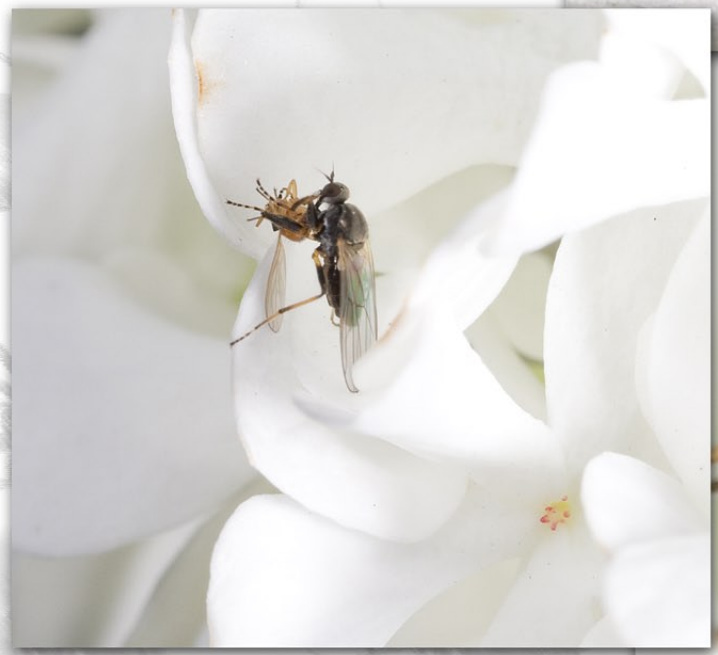


Family Perlodidae
Perlodid Stoneflies

Perhaps this 11 mm stonefly is the species Isoperla transmarina (a.k.a. Isoperla ventralis) but that is not certain. It was found sitting on a concrete driveway in Logy Bay. There are 124 perlodid species in North America.

Family Hybotidae
Hybotid Dance Flies

The 4 mm fly shown here is a member of the Genus Platypalpus. It was sitting on the petal of a flowering snowball bush and holding a dead fly it had captured. Some male Dance Flies wrap silk around a captured insect and offer it to females as part of their mating ritual. Dance Flies get their name from the fact that they form large swarms, usually at night, and the individual flies within the swarm move up and down in unison, creating a sort of 'dancing' swarm effect.



Family Chloropidae
Frit Flies
Genus Meromyza

Frit flies are attracted to human eyes and as a result are sometimes called “Eye gnats”. Other names include Grass Flies and Stem-miner Flies. They are capable of spreading human eye diseases, including pink eye and yaws disease. The larvae of frit flies feed on the stems of grasses and some grass-like crops. In agricultural situations they can become serious pests.

Tribe Alticini
Flea Beetles
Genus Longitarsus

This 2 mm long flea beetle was walking up the side of a garage when found. There are at least four species from this genus known to exist in Newfoundland, so this might be any one of them. Most flea beetles are tropical so only about 10% of them live north of Mexico. The enlarged hind femora (part of the leg) that can be seen in these photos is typical of flea beetles. They get their name because they can jump very well, like fleas.

Adalia bipunctata
Two spotted ladybeetle

Adalia bipunctata is a species within the well-known Ladybug family, Coccinellidae, a.k.a. Ladybird Beetles. Adult beetles of this species survive the winter by gathering in groups under leaves or other debries. They eat aphids and other small insects, including mites and insect eggs. This is probably what leads to their reputaion as a 'good' bug to have around.

Evodinus monticola, one of the Flower Longhorn Beetles

Flower Longhorns is the common name for the Longhorn Beetle Subfamily Lepturinae. The shape seen here is characteristic of the beetles in this subfamily; especially the 'wide shouldered look' caused by the elytra (wing casings) being much wider than the pronotum (the area seen here between the head and the elytra.) The sloping forehead and long antennae are also characteristic of this subfamily. The larvae of Longhorn Beetles can cause damage by boring into the wood of trees and shrubs. Flower Longhorns feed on pollen and nectar.

Genus Pollenia
Cluster flies

Cluster Flies look a lot like House Flies (Family Muscidae, Species Musca domestica) except Cluster Flies are larger and narrower. The yellow-golden hairs seen here on the thorax is typical of Cluster Flies. These flies lay their eggs in the soil of lawns in late summer or early fall. After the eggs hatch, the larvae are parasites and spend the winter inside the body of earthworms. In spring, the larvae feed on the worm's internals before entering the soil to pupate, after which they become adult flies.

Family Miridae
Plant Bugs

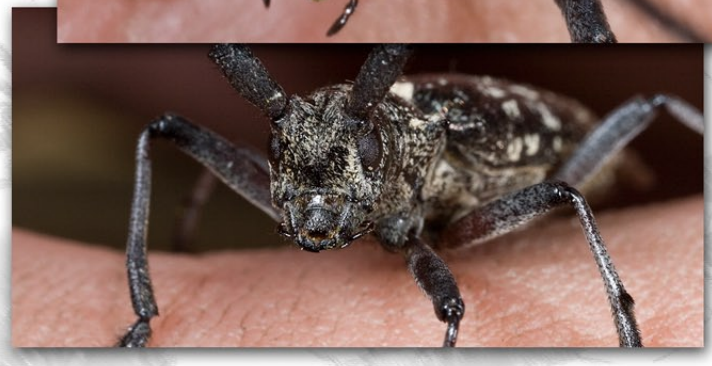
It is a good bet that this is the species Lygocoris pabulinus, a.k.a. the Common Green Capsid. It was 6 mm long (head to wing tips). Lygocoris pabulinus is active both day and night. This one was found mid-morning on the side of a house. At night, they are attracted to lights. The adults feed on leaves of crops such as potatoes and strawberries. They produce 2 generations per year. The females lay as many as 200 eggs, in batches of up to 6 per day.

Genus Idiocerus

Leafhoppers in this genus are part of the Family Cicadellidae. Species in the Genus Idiocerus all have heads that are very broad and rounded in front. Many species are specific to their host plant and live only on that specific host. They also feed on the host's foliage. These were in a bayleaf willow. It is very hard to distinguish between the various species of hoppers within this genus. Knowing the host plant species is important for correctly identifying the insect species. Many of the species in this genus have never been photographed. Because these 'bugs' are so plant-specific, they can become endangered if their host plant habitats are destroyed by human development or other reasons.

Family Ichneumonidae
Ichneumon Wasps

This 12 mm wasp was sitting on a concrete reatining wall. This family of wasps is also called "Ichneumon flies", even though they are actually wasps. It is one of the largest Families of insects, containing over 60,000 known species worldwide. Some Ichneumonids attack spiders.



Monochamus scutellatus
Whitespotted Sawyer

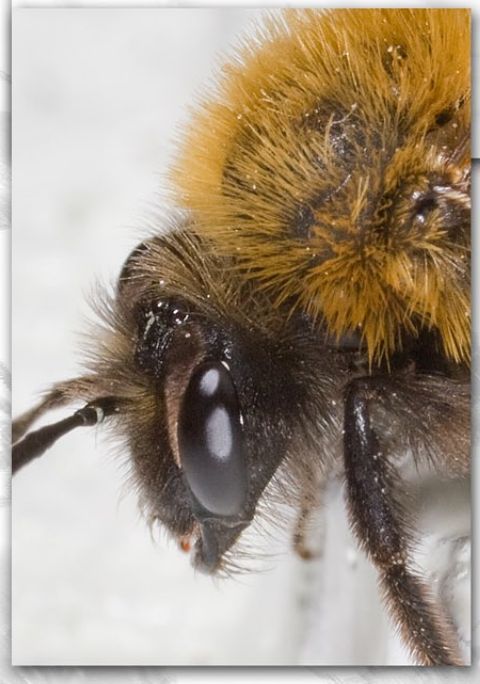
A little white triangle-like spot at the front of the elytra (wing covers) is an important clue to differentiating this species from other species in the Genus Monochamus. These beetles like to live in or near coniferous forests. They have a 2-year life cycle. The larvae live inside openings created in fir, pine or spruce trees. This individual crawled around the author's left hand while he photographed it with his right. It finally decided to fly away. Be aware that it's impossible to keep your fingers clean and look for beetles at the same time.

Family Simuliidae
Black Flies

Shown here is a much healthier Black Fly than the one that can be seen on page 19. The Biological Survey of Canada lists 25 species of Simuliidae that are known to live in the province of Newfoundland and Labrador. The survey does not distinguish between Labrador species and Island species. This 4 mm fly is shown filling itself with blood from the author's hand. On the facing page, the same fly is shown excreting some of the liquid that is left over after the blood has been digested.

Family Chloropidae
Frit Flies

This tiny, 2 mm long fly is black in colour but it is not a 'Black Fly'. Instead, it's a Frit Fly (a.k.a. Chloropid Fly) and probably a member of the Subfamily Oscinellinae. You may remember another Frit Fly from page 74. That one was from the Genus Meromyza and a member of the Subfamily Chloropinae . The most noticeable physical characteristic that these two 'cousins' share in common is the large, almost protruding eyes. Notice this one sitting beside the author's wedding ring.



Andrena milwaukeensis

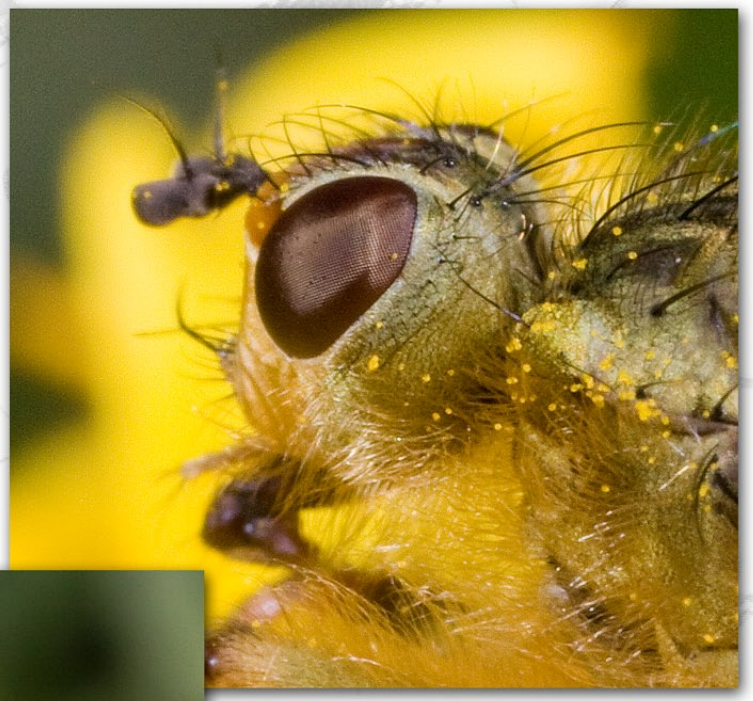
As you might guess, this bee species was named after the city of Milwaukee, Wisconsin, USA, where it was first found by its taxon author, Graenicher, 1903. Shown here is a 13 mm female, photographed in Clarenville. The distinctively coloured 'fur coat' is unique to the females of this species. These bees usually inhabit wooded areas. They are fairly common but not in large groups.

Subfamily Gelinae

By looks alone, it would be easy to mistake this 3 mm long wasp for an ant. The tell-tale sign that it's not an ant is the short ovipositor. The ovipositor of wasps is also known as the 'stinger'. It's the pointed appendage that can be seen protruding from the rear of this wasp. It serves the dual purposes of laying eggs and paralyzing prey. Because this wasp is wingless, it has to be a female.

Genus Scathophaga
One of the Dung Flies

This may be the species Scathophaga stercoraria, also known as the "Common Yellow Dung Fly". Dung flies get their name because they are often found on the dung of horses and cows. This one was about average length at 8 mm. It was sitting on a dandelion. It may look like this fly was eating nectar or pollen, but these flies are predators, so chances are that it was hunting other smaller flies as prey. Scathophaga stercoraria produce several generations per season. The females like to lay their eggs on the feces of large mammals. The eggs develop into larvae which feed on the dung for about 3 weeks before burrowing into the ground where they pupate and then become adults.



Genus Suillia

Both adults and larvae are attracted to decaying plant and animal matter. The larvae feed on this material. The technical term for this is "saprophagous". Approximately 100 species from the Family Heleomyzidae are found in North America. This individual was 8 mm in length. The orangish colour is typical of Heleomyzidae. They can range from yellow to reddish-yellow or reddish-brown and black. The larvae of this genus like to live in borer tunnels in trees. The spines along the leading edges of the wings are distinctive features of Heleomyzidae.

Genus Tetragnatha
Stretch Spiders

This genus gets its common name from the spiders' elongated body and the way they like to rest with their legs stretched directly in front of them. Tetragnathae are part of the Family Tetragnathidae, Longjawed Orb Weavers. The name "Orb Weaver" refers to the wheel-like (orb), spoked web that these spiders weave. Members of this genus like to live in the long grassy weeds near damp areas. They are predators that primarily eat small insects. These spiders will bite humans, although their bite is not dangerous.

Family Sciaridae
Dark-winged Fungus Gnats

Flies from the Family Sciaridae are usually quite small. Almost all are under 5 mm. The individual seen in these photos was only 1.5 mm in length.

Sciarid flies like to stay around damp, shady places. The larvae feed on the roots of plants as well as decaying vegetation. This fly was found walking on the soil of a potted plant in the author's house. They are considered pests since the larvae damage the host plants. Adults live only one week and do not cause any damage. Adults are also weak fliers and will often be seen walking on the soil under plants (as this one was when found) rather than flying. Females produce up to 200 eggs each.

Genus Dolerus
One of the Sawflies

One of the distinguishing characteristics of sawflies is that they have a rectangular shaped head when viewed from above. The long antennae distinguish Dolerus Sp. from another black sawfly genus, Arge, whose mem bers have short antennae. Dolerus sp. flies like lush grass which is a good place to look for them. This one was found on concrete but it was near grass.

Chrysops sordidus

Chrysops sordidus is part of the Sub-family Chrysopsinae, a.k.a. Deer Flies. The black oval between the eyes (facing page) is called the "callus". The white triangle below the antennae is called the frontoclypeus. These features are all common to Deer Flies, as are the multi-coloured eyes. These flies can have a vicious bite and they will bite humans as well as other large animals.

Araneus diadematus
Cross Spider

This is a female Cross Spider of the same species as shown on page 4. She is obviously having a bite to eat. They start the season light in colour (almost yellowish) and gradually get darker.

Family Clubionidae
Sac Spiders

Only two genera of Sac Spiders are known to exist in North America: Clubiona and Elaver. This one is probably a member of the Genus Elaver. It was found resting within its sac, inside the hollow centre of a dead twig that was still attached to the tree. They make these sacs (also called "tubes") instead of webs. This behaviour is how they got their name. This individual had a body length of 18 mm.

Afterword

If I were to be granted three wishes as to what this book might accomplish, here's what I'd ask.

First, I'd wish that at least one person would have their childhood delight with bugs rekindled by my photographs. Most children seem to have an innate fascination with insects and dinosaurs. It's almost like children have a built-in understanding of the importance of nature's hidden world of unusual animals. As adults, we often lose this interest amoung other things that we deem to be more important. We rarely take the time to see what marvelous little creatures might be crawling in the grass or sitting on a leaf. If just one person looks at nature more closely because of this book, my first wish will have been fulfilled.

Second, I'd ask that anyone who reads this book, or even just looks at the pictures, would come away with a better appreciation of the complexity of nature. It's not known how many animal species exist. According to the Encyclopedia Britannica online edition, the estimates for insect species alone range from 10 million to 100 million. That makes us humans only one animal species out of perhaps 100 million or more. Each and every animal has its own way of eating, reproducing, and surviving. Each one looks unique and has its own unique DNA. If the photographs in this book have helped to convey a sense of this complexity, then my second wish will have been fulfilled.

Third, I'd wish for children and adults to enjoy this book equally; perhaps even together. If just one child were to add the phrase, "Let's look at the 'bug book' tonight," to their bedtime request list, then my third, and most important wish, will have been fulfilled.

Let me leave you with this thought. The fascinating world of bugs and insects is available to us all; free of charge. Sometimes it really is true that the best things in life are free. The amazing world of tiny animals is one of those things. To open the door to that world, you just have to take the time to look. They are all around you.

And finally, I dedicate this book to my grandchildren, Marissa and Nate. Although their entire family loves being outdoors and are avid campers, Marissa in particular shares my fascination with bugs. When Nate and Marissa become adults themselves, perhaps they'll share this book with their own children. That would be a real wish come true.

Mardon Erbland

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