

# School Malaise Trap Program

*Spring 2015  
Program Report*

The Spring 2015 [School Malaise Trap Program](#) was a huge success and your participation made it happen. This short report summarizes the program — its procedures and results — and all of the interesting discoveries from your work. Before we get to the results, let's review what the School Malaise Trap Program was all about and how we worked together to complete it.

The [Biodiversity Institute of Ontario](#) (BIO), at the University of Guelph, is a research institute dedicated to rapidly identifying and documenting life in Canada and in the world. This is no easy job since there are millions of different species of animals and plants across the globe, and about 100,000 of them occur in Canada. In addition, it's often difficult to separate closely related species by their appearance, even for experts. Fortunately, BIO has developed a new tool that makes identifying species quick and easy — it's called DNA barcoding. Just like a can of beans in a grocery store, where the barcode lets the cashier quickly know it is different from a can of peas, each species has a small piece of DNA that can be used to distinguish it from other species. BIO is assembling a DNA barcode reference library for all of the world's species, called [Barcode of Life Data Systems](#), and we're doing it through a huge research project called the [International Barcode of Life](#) project. We need help to complete it, and that's where your class and the School Malaise Trap Program fit in.



# Collecting Specimens

In April 2015, we sent out Malaise trap kits to 63 schools and 5 outdoor education sites across Canada. Each kit included a Malaise trap and an instructional video that gave each class a lesson on biodiversity, DNA barcoding, and the star of our program — the Malaise trap. Because this tent-like apparatus is so effective at collecting insects we asked each school to set up its Malaise trap and collect insects during the same three weeks (April 20 — May 8). At the end of the three weeks, all traps and collection bottles were returned to BIO to allow analysis to begin.

## Sorting Specimens

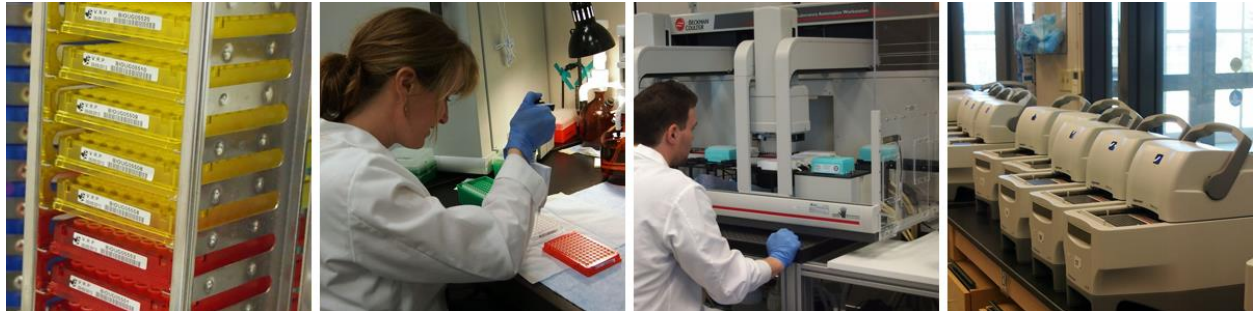
Once the collection bottles arrived, BIO staff recorded details on the collection locality from each bottle and compiled the weather data recorded by the students in each class. Next, the contents of each bottle were poured into a sorting dish, and, using a microscope, every specimen was counted in each trap. Our staff then attempted to pick as many different species as possible, selecting up to 285 animals to DNA barcode from each trap. Each selected specimen was then placed in an individual well of a DNA tissue plate. If a specimen was too large to fit in a well, one leg was removed and placed in the well. This process led to the assembly of 182 plates, with each full plate containing tissue from 95 specimens for a total sample size of 17,290 individuals! Once these plates were ready, they were transferred to the molecular laboratory for the next phase of barcode analysis.



## Sequencing Specimens

The first step in the laboratory was DNA extraction. All of the plates, each containing 95 specimens or legs, were incubated overnight in a special solution that extracts DNA out of the cells. The next day, the DNA was separated from other cell materials using one of our robots, lovingly called Franklin (after [Rosalind Franklin](#), who helped to discover the structure of DNA in the 1950s). The second step in our analysis employed a clever technique called the [polymerase chain reaction](#) or PCR. By adding a cocktail of reagents to the DNA, then rapidly heating and cooling it several times, we created millions of copies of the DNA barcode region for the sample of DNA in each well. All these copies are necessary for the

final laboratory step — DNA sequencing where each well was analyzed on one of our [DNA sequencers](#) that use a laser to read the letters (A, C, G, and T) of each DNA barcode. And there you have it, that's how we determined the DNA barcode for each insect (or other invertebrate) caught in your trap!



For a fun classroom activity that shows how to query a DNA barcode on Barcode of Life Data Systems, click [here](#).



## Analyzing the Sequences

Although the molecular work was complete, there was one more critical step — the analysis of your sequence results. Your DNA barcodes needed to be compared with the records in BOLD, the Barcode of Life Data Systems to obtain identifications. When one of your DNA barcodes matched a record in BOLD, we could confidently assign its source specimen to that species, for example, to the [European garden spider \(\*Araneus diadematus\*\)](#) or to the [Eastern ash bark beetle \(\*Hylesinus aculeatus\*\)](#). In other cases, BOLD indicated that your record derived from a distinct species, but it could only assign it to a group such as the [ichneumon wasps \(\*Ichneumonidae\*\)](#) or one genus of [tortricid moths \(\*Acleris\*\)](#). In some cases, your barcodes did not find a match; they were brand new DNA barcodes for BOLD! We will discuss these exciting discoveries later in this report. All of the identifications were then compiled for each trap to create the report that you are now reading. We're very excited to share the news, so let's get to the results.



European garden spider (*Araneus diadematus*)



Eastern ash bark beetle (*Hylesinus aculeatus*)



Ichneumon wasp (*Ichneumonidae*)



Tortricid moth (*Acleris* sp.)

# Spring 2015 Program Results

Drumroll please! It's time to share results for the Spring 2015 School Malaise Trap Program. Let's begin with a general summary. The Spring program involved 68 sites in 62 cities, 80 classrooms, and 2,302 amazing students. Your classroom's trap was one of 68 traps deployed from April 22 to May 8, 2015. Overall, we had relatively cool spring, especially during the first week of the trap deployment period. It was because of these cool temperatures and low specimen counts that the School Malaise Trap Program team decided to extend trapping from the original 2 week timeline to 3 weeks. Average daytime temperatures were 9.4°C for Week 1, 13.5°C for Week 2 and 17°C for Week 3.

To check out where all the schools and traps were located, play with the interactive map [here](#). Click on each of the icons to see the school name and the results from that trap.

The 68 traps collected an average of 555 specimens during Week 1 and 2 combined, and 352 specimens in Week 3, for an average total of 907 specimens for the collecting period. The total number of specimens showed substantial variation among traps, from a low of 18 to a high of 9,000 specimens. It might surprise you that so many insects were collected in your schoolyard. If so, remember that you only collected for three weeks while insects fly in many regions of Canada for eight months of the year!

The staff at BIO sorted the 61,776 specimens present in your 68 traps and selected 17,290 specimens for barcode analysis. When the molecular work was complete, 15,675 (91 %) of the specimens delivered a DNA barcode. Because we excluded a few short barcodes, the final dataset included 15,199 barcodes. The analysis of these barcodes revealed that you collected 2,968 species in just three weeks of sampling. That's very impressive because the estimated total number of terrestrial arthropod species found in Canada is 63,000, so you collected 4.71% of them. Some of these species were uncommon, with 1,912 species only being collected in a single trap. More excitingly, your collecting efforts provided the very first records for 308 species.

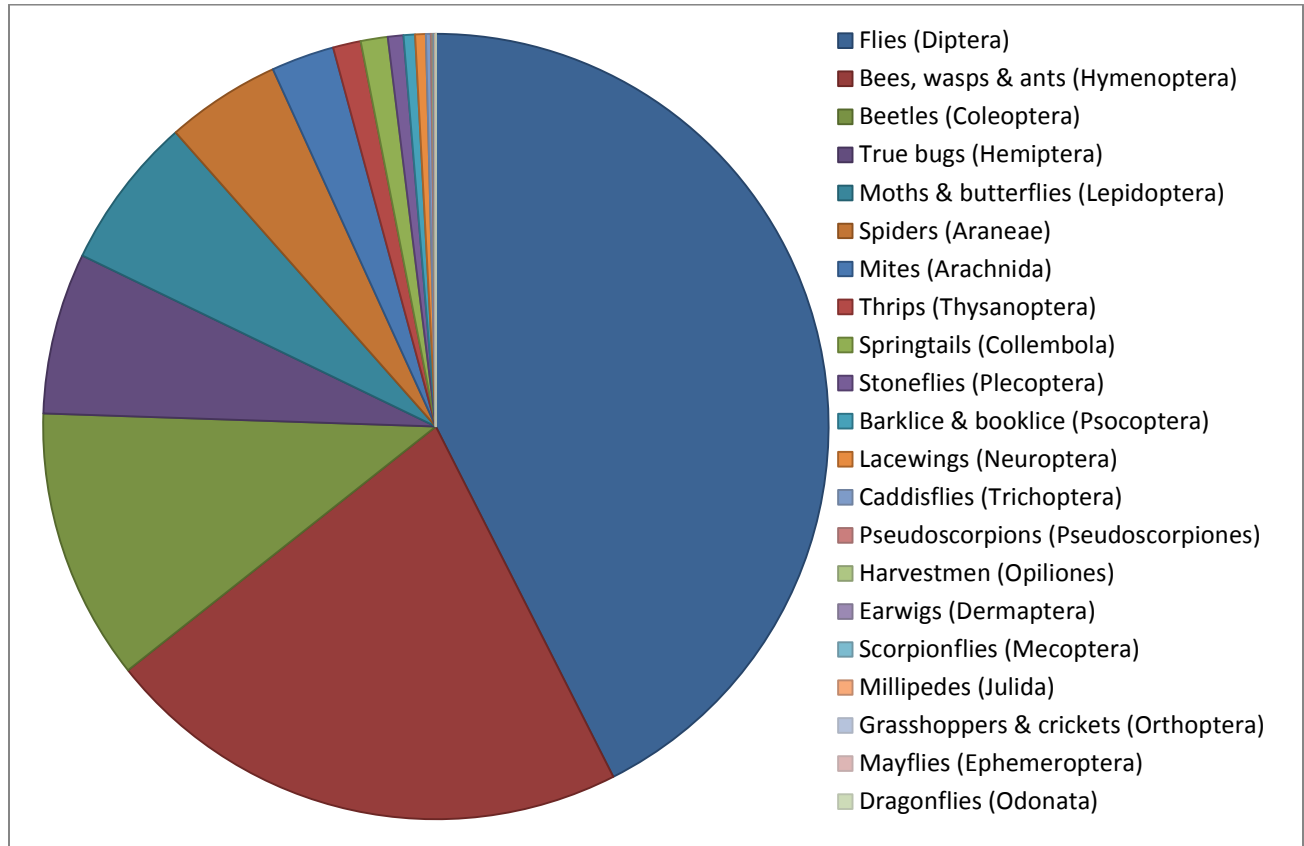
For an advanced classroom activity, it would be interesting to test these three hypotheses:

- 1) Were the number of individuals and species collected higher in Week 3 than in Week 1 & 2?
- 2) Were the number of individuals and species collected associated with the average daytime temperatures of the site?
- 3) Were the number of individuals and species collected associated with the population of the city/ town where the trap was deployed?

Furthermore, we are pleased to announce that since its inception in 2013, the School Malaise Trap Program has recently attained several incredible milestones through reaching approximately 10,000 students and educators from across Canada, representing nearly 250 schools and 13 comparison sites. All five of the programs considered, the School Malaise Trap Program Team has sorted through 274,403 specimens, barcoding a total of 68,929 selected specimens, which ultimately represented 6,484 species (this number does not include species overlap between programs). In total, 1,041 of these species were new to BIO's online barcode reference library, BOLD and several species collected by the sites were new records for Canada and a few are possibly new species to science! You, as citizen scientists, have made an enormous and extremely valuable contribution to the [International Barcode of Life Project](#) as well as to your local community and school. Congratulations to you all!



## Spring 2015 School Malaise Trap Program Overall Species Pie Chart



To see a list of all 2968 species collected in the Spring 2015 School Malaise Trap Program, click [here](#). To just see a picture of each species, click [here](#).



All of the 2,968 species that you collected were arthropods — invertebrates with a hard external skeleton. If you look at the pie chart above, you'll notice that many (43%) of the species were flies (scientific name: Diptera). Some groups of flies were particularly diverse; there were 316 species of midges (Chironomidae), 137 species of fungus gnats (Sciaridae), as well as 137 species of gall midges (Cecidomyiidae). In addition, just like the Fall 2014 and Spring 2014 programs, the most abundant species was a midge. After flies, the next most species diverse group was the bees, wasps, and ants (Hymenoptera), followed by the beetles (Coleoptera). Most of the species in these groups have wings, so it's not surprising that they were collected in your Malaise traps. However, you also collected some groups that don't fly such as springtails (Collembola), spiders (Araneae), and millipedes (Julida).

And now the section of the report that many of you have been waiting for — to see how your schoolyard compared with the other schools across Canada. There are many ways to measure biodiversity, but we have adopted four metrics for comparisons among the sites:

The simplest metric compares the number of specimens collected by each trap. The great advantage of this method is that anyone can do it — so long as you can count! In practice, it's not a very informative measure of biodiversity, since it can be affected by one or a few very common species. However, there was variation in the total number of specimens caught, ranging from a low of 18 individuals, to the winner for this category — [École Agnes Davidson Elementary School](#) in Lethbridge, Alberta, which had a catch of 9,000 specimens -- congratulations!

Click [here](#) to view the results from all 68 trap sites. In addition to the specimen and species counts, we've also compiled the weather and population data associated with each.



### Number of Specimens Caught – Top 3:

School/Comparison Site	Province/Territory	Trap #	Total Specimens
École Agnes Davidson Elementary School	Alberta	EQP-CLL-610	9000
Yellow Grass School	Saskatchewan	EQP-CLL-639	8900
Whitewood School	Saskatchewan	EQP-CLL-582	4710

If you would like to see how your school ranked in these four categories, click [here](#) for tables of all the results.



The second way to compare biodiversity, and certainly one of the best ways, is to count the total number of species in a sample. By using DNA barcoding, we were able to quickly determine the number of species at each site, even if some could not be assigned to a particular species. The total species count varied among sites. The winner for the most species collected, with an extraordinary 186, was [Camp Heidelberg Nature Centre](#) in Waterloo, Ontario.

### Number of Species Caught – Top 3:

School/Comparison Site	Province/Territory	Trap #	Species Count
Camp Heidelberg Nature Centre	Ontario	EQP-CLL-812	186
Russell Public School	Ontario	EQP-CLL-906	160
Merritt Secondary School	British Columbia	EQP-CLL-555	158

A third way to compare biodiversity is to consider the rarity of the species that were collected. The [Barcode of Life Data Systems](#) (BOLD) has over 4 million DNA barcodes, including records for over 40,000

Canadian terrestrial arthropod species, so it is not very often that one is able to add coverage for a new species. As a result, we were amazed that 308 new species were detected in your collections. When we compared the number of new species detected at each site, the numbers were close — congratulations to our winner [Merritt Secondary School](#) in Merritt, British Columbia for collecting 24 species new to BOLD.

### Number of New Species Added to DNA Barcode Library – Top 3:

School/Comparison Site	Province/Territory	Trap #	Species New for BOLD
Merritt Secondary School	British Columbia	EQP-CLL-555	24
Queen Charlotte Secondary School	British Columbia	EQP-CLL-556	20
Clearwater Secondary School	British Columbia	EQP-CLL-549	15
George M. Dawson Secondary School	British Columbia	EQP-CLL-605	15

Finally, biodiversity between sites can be compared by examining the overlap in species among sites. With 68 traps deployed for the same period, any species that was only collected in a single trap is certainly a ‘rare’ species. In total, there were 1,912 rare species. [Clearwater Secondary School](#) in Clearwater, British Columbia had the lead in collecting rare species with 107. Let’s give them a big round of applause!

### Number of Species Unique to Trap – Top 3:

School/Comparison Site	Province/Territory	Trap #	Species Unique to Trap
Clearwater Secondary School	British Columbia	EQP-CLL-549	107
Merritt Secondary School	British Columbia	EQP-CLL-555	80
Queen Charlotte Secondary School	British Columbia	EQP-CLL-556	75





Did you know that the School Malaise Trap Program team is on [Facebook](#) and [Twitter](#)? Like or follow [SMTP Canada](#) so you can share in the [#bioSMTP experience](#).

## The Spring 2015 School Malaise Trap Program Team

We would like to conclude by thanking all of the participants in the Spring 2015 School Malaise Trap Program. This project would not have succeeded without the enthusiasm, curiosity, and dedication of every student, teacher, and colleague. Please check our [website](#) periodically for updates, and we'll be in touch when we roll out the Fall 2015 program!

### Some fun insect jokes to tell your friends in the schoolyard:

Q: Why did the fly never land on the computer?

A: He was afraid of the world-wide web!

Q: How do bees brush their hair?

A: With a honey comb!

Q: How do fireflies start a race?

A: Ready, Set, Glow!

Q: What do moths study in school?

A: Mothematics!

Q: What do you call a wasp?

A: A wanna-bee!

Q: Why wouldn't they let the butterfly into the dance?

A: Because it was a mothball.

Q: What creature is smarter than a talking parrot?

A: A spelling bee!





# School Malaise Trap Program

Discoveries for  
Spring 2015

## Sawflies (Order: Hymenoptera)



The Hymenoptera are one of the largest orders of insects, comprising the sawflies, wasps, bees and ants. Over 150,000 species are recognized, with many more remaining to be described. The name refers to the wings of the insects, and is derived from the Ancient Greek ὕμην (hymen): membrane and πτερόν (pteron): wing. During the Spring 2015 School Malaise Trap Program you collected 647 species of Hymenoptera across all participating schools. We have highlighted some of your interesting finds below.



Sawfly (*Acantholyda* sp.)

An interesting find was made by [North Addington Education Centre](#) in Cloyne, ON, who collected the only species of sawfly from the genus *Acantholyda* (Pine false webworms) during the Spring 2015 School Malaise Trap Program. Sawfly larvae often look like hairless caterpillars, yet have more prolegs than caterpillars. As adults, sawflies are distinguishable from most other hymenopterans by the broad connection between their abdomen and the thorax as well as their saw-like ovipositor which they use to cut into leaf edges or stems in order to lay their eggs.

Sawflies are mainly herbivores and most avid gardeners have witnessed the demise of a plant by a group of sawfly larvae that work diligently to consume the foliage - starting with the edges then moving on in. As such, large populations of certain sawfly species can cause substantial economic damage to forests and cultivated plants.



Sawfly Larvae

## Bees (Order: Hymenoptera)

Bees, like ants, are actually a specialized form of wasp. They play an important role in pollinating flowering plants. In July 2013 the world's 20,000th bee species was officially described by a researcher from York University in Toronto. Your Malaise traps collected 23 species of bees and among those were the tricoloured bumble bee (*Bombus ternarius*) and the western honey bee (*Apis mellifera*).

As its name suggests, the tricoloured bumble bee sports the usual yellow and black coat featuring a bright orange belt. *Bombus ternarius* is common throughout the northeastern United States and parts of Canada and was collected at three schools during the program - [J.H. Picard](#) in Alberta, [Spruce View School](#) in Alberta, and [Whitewood School](#) in Saskatchewan. The bumblebees are most successful in the northern, temperate climate and are rarely found farther south.



Tricoloured bumble bee (*Bombus ternarius*)

*Bombus ternarius* is fairly small and slender, and like other members of the genus, it exhibits a complex social structure with a reproductive queen and is also seasonal (the queen comes out of hibernation in late April to start a new colony).

Once she emerges in the spring from overwintering in leaf litter or loose soil, the queen will begin her search for a nesting site to start her colony. *Bombus ternarius* prefer to nest underground and often crevices and shallow cavities are chosen as the ideal site. Once the colony is formed, the tricoloured bumble bee will forage for its favorite foods which include eating the pollen and nectar from goldenrods and milkweeds.

## Ants (Order: Hymenoptera)

The other big group of social Hymenoptera is the ants. Ants form colonies that can range in size from a few dozen individuals living in small natural cavities to highly organized colonies that may occupy large territories and consist of millions of individuals. Ant societies are often very sophisticated. They have division of labour, communication between individuals, and an ability to solve complex problems. Overall you collected 23 species of ants in your Malaise traps.

Among those, a European fire ant (*Myrmica rubra*) was collected at the [Toronto Botanical Gardens](#).



European fire ant (*Myrmica rubra*)

The European fire ant (*Myrmica rubra*) is part of a genus of ant species which can be found all over Europe and in some parts of North America and Asia. They can be identified by their primarily red coloured bodies, with slightly darker pigmentation on the head. The first thought that likely comes to mind when you hear its common name has to do with the ant's ability to sting. *Myrmica rubra* are equipped with the ability to cause quite a painful sting and tend to attack rather than avoid confrontation.

*Myrmica rubra* are commonly found in Europe and like to live in meadows and gardens. In North American and Japan it is an invasive species and is currently the target of an innovative biological control program involving the importation of ant-decapitating flies from Brazil to the United States. These flies are parasitoids and use the ant as a host for its larvae. The presence of these flies effectively disrupts the European fire ant's ability to forage which gives native ants a competitive advantage.

## Beetles (Order: Coleoptera)

Beetles are the largest group in the animal kingdom. 25% of all known animal species are beetles. 400,000 species have been described so far and many scientists believe that there are as many as 1 million beetle species on Earth. Beetles have inhabited our planet for more than 300 million years which means they were around even before the dinosaurs.

Among the 332 beetle species caught in the Spring 2015 School Malaise Trap Program were quite a few pest beetle species, especially those of the leaf beetle family (Chrysomelidae), such as the strawberry rootworm (*Paria fragariae*). Beetles from this family are known to feed on particular fruits and vegetables as you can easily tell from their common name.



Strawberry rootworm (*Paria fragariae*)



Rove beetle (*Aleochara sp.*)

The most diverse group of beetles collected during the Spring 2015 School Malaise Trap Program were the rove beetles (family Staphylinidae). With approximately 58,000 species in thousands of genera, the group is currently recognized as the largest family of beetles. Just turn over a rock, or examine some decaying material, and you will be sure to spot this distinctively shaped insect. These elongated, short-winged beetles may appear almost scorpion-like due to the way they

hold the tip of their abdomen in the air, however are only dangerous to their insect prey, with some species merely feeding on pollen or fungal tissue. Due to their appetites for other insects, rove beetles are well-suited to be used as biological control agents against pests and are recognized as an important control group in the wild as well. Rove beetles were collected at 37 out of the 68 sampling sites during the Spring 2015 School Malaise Trap Program.

## True bugs (Order: Hemiptera)



True bugs are an insect order scientifically known as Hemiptera with about 80,000 species. You might know representatives such as cicadas, aphids, planthoppers, leafhoppers, and, most prominently, stink bugs and bed bugs. In the Spring 2015 School Malaise Trap Program, the leafhoppers (family Cicadellidae) were the most diverse group, with 86 species collected.

*Zelus luridus* is a unique species of Hemipteran that is part of the assassin bug family (Reduviidae). There are currently 60 described species, most of which are found in Central and South America, with only 5 species being present in North America. Congratulations to [North Addington Education Centre](#), [Teeterville Public School](#), and [The Riverwood Conservancy](#) for collecting specimens of *Zelus luridus*.



Assassin bug (*Zelus luridus*)

Assassin bugs are as deadly as they sound to their prey of aphids, caterpillars and other common garden insects. After patiently lying in wait to ambush their next meal, the assassin bug strikes quickly and accurately to paralyze its victim by injecting a toxin that dissolves tissue. The assassin bug then sucks up the other insect's tissue. Adult assassin bugs can measure up to 1 inch long, and have a cone-shaped head and wide curving beak which can cause a painful bite to humans if captured. Even though they have nasty bites, remember that these bugs play an important role in keeping pests under control.



Samples collected during the Spring 2015 School Malaise Trap Program



## Butterflies and moths (Order: *Lepidoptera*)



Diamondback moth (*Plutella xylostella*)

Another huge group of insects with perhaps 200,000 species worldwide are the moths and butterflies (together called *Lepidoptera*). Malaise traps are not the best traps for collecting lepidopterans, but a few always find their way into our traps. This spring, your traps collected 187 species - 30% more than were collected during the Fall 2014 program! Interestingly, just like last fall, the most common species was the diamondback moth, sometimes called the cabbage moth (*Plutella xylostella*). It was collected in 14 different traps.

One very interesting find from the Spring 2015 School Malaise Trap Program was the pigmy moth, *Bohemannia pulverosella*. Collected at [Suncrest Elementary](#) in Burnaby, BC, this catch represents one of the first records of this species in North America. This species is typically found in Europe and the only other North American record dates back to 1975, with specimens collected from the other side of Canada, in Nova Scotia. Based on these old and new records, we suspect that this moth has invaded Canada on both sides. These colonisations may have been facilitated by the primary mode of reproduction of this species: parthenogenesis. In parthenogenetic species, eggs can develop into adults without being fertilized. This means that a population of this species could originate with the introduction of a single female to Canada.



Pigmy moth (*Bohemannia pulverosella*)



Leaf mined by *Bohemannia pulverosella*

Another cause for concern with *Bohemannia pulverosella* is its food source. The larvae feed on the leaf tissue of apple trees, creating mines within the leaves. While the species is not a significant pest of apples in Europe, it is difficult to foresee how it will interact with its host plant in this new area.



## True flies (Order: Diptera)



Nonbiting Midge

Chironomidae, commonly known as nonbiting midges, are a family of flies which can be found all over the world. A species from the genus *Limnophyes* was the most common insect during the Spring 2015 School Malaise Trap Program with specimens being found in all 68 traps! These midges come from a very large family of insects; experts estimate that there are well over 10,000 different species of Chironomidae world-wide! Many of these species superficially resemble mosquitoes, but they lack the wing scales and elongated mouthparts which a mosquito uses to feed on blood. The larvae and pupae of nonbiting midges

are important food items for fish and other aquatic organisms. Furthermore, chironomids are important indicator organisms, meaning their presence or absence in a body of water can indicate whether pollutants are present or if environmental changes have taken place. This sensitivity to environmental changes also makes chironomids a potential source of information when reconstructing past climate. Lake sediments dating as far back as 10,000 years contain the head capsules shed by chironomid larvae during development. These head capsules allow for species identification and, because chironomid species differ in their tolerances to various environmental factors such as temperature and drought, the identity and abundance of chironomid species present in the sediment indicate the climate at that point in time.

Anthomyiidae is a large and diverse family of Muscoidea flies. In total, 27 species were collected from this family with 6 species being from the genus *Delia* which contains approximately 300–340 species worldwide (excluding Neotropical species). Some species in the genus *Delia* are considered to be significant agricultural pests as most members have larvae that feed on stems, flowers and fruits of plants. For example, the onion maggot fly (*Delia antiqua*) lays its eggs on onions, garlic and other bulbous plants, which are then destroyed by the maggots. Similarly, root maggot flies (including the turnip root fly and cabbage root fly) tunnel into the roots and stems of host plants, and can cause considerable agricultural yield losses. Each year several techniques including crop rotation, the use of seed dressings, early sowing or planting, and the survey and removal of infested plants, are utilized by the agricultural industry to mitigate crop damage.



Onion maggot fly (*Delia antiqua*)

## Spiders and their relatives (Class: Arachnida)

While Malaise traps are most useful for capturing flying species, 140 species collected in the Spring School Malaise Trap Program were spiders which certainly don't fly! These 140 spider species belonged to 75 different genera of 13 families - a very diverse group! [Camp Heidelberg Nature Centre](#) in Waterloo, Ontario collected the greatest number of spider species with 14.

Now for some even more exciting news - Congratulations to [Gary Allan High School](#) in Oakville, ON who found a new spider species to Canada!



Leafcurling sac spider (*Clubiona latericia*)

Belonging to the family Clubionidae, *Clubiona latericia* or the leafcurling sac spider was one of the more notable finds during the Spring 2015 School Malaise Trap Program. The sac spiders are wandering predators that build their silken sacs, usually located on plant terminals, between leaves, under bark or under rocks. So far, this species has only been reported from Russia and Alaska. However, judging by its previous distribution, it is likely that this species has lived in the territory of Canada for some time, but until now, no one had come across it or reported it. This finding clearly demonstrates how useful citizen science school programs can be for monitoring invasive species.

## Pseudoscorpions (Pseudoscorpiones)



Pseudoscorpion

Pseudoscorpions are a type of arachnid, meaning that they are not insects, but are closely related to spiders. They are named "*Pseudo*" scorpions because they have pincers that resemble scorpions, but do not have a tail and stinger. They can be found anywhere from a tree canopy, to somewhere in your home where they feed on the larvae of some household pests. They can also be found in leaf litter, where they feed on other tiny arthropods. Males use chemicals known as pheromones, and a fancy dancing behaviour, to attract females to mate. These arachnids construct a silken cocoon which they use to protect themselves during the winter. Pseudoscorpions

occur all over the planet, but are rarely collected in Malaise traps. In total, only two specimens were collected during the Spring 2015 School Malaise Trap Program, by [the Riverwood Conservancy](#) and [Camp Heidelberg Nature Centre](#). For an interesting video of a pseudoscorpion hunting, click [here](#).

## Scorpionflies (Order: Mecoptera)

For a fun classroom activity, you could write similar descriptions for the interesting discoveries your classroom made.



And now for an insect order never before collected by the School Malaise Trap Program! The Mecoptera are represented by five families in North America and they are often called scorpionflies but this name is based on the scorpion-like tail of species belonging to just one of these families. You might be asking, then how can we identify scorpionflies if not by the tail? One identifiable feature of all scorpionfly species are their long faces - take a close look at the photograph and compare it to other insects.

The scorpionfly collected at [Camp Heidelberg Nature Centre](#) in Waterloo, Ontario this spring was the Mid-winter Boreus (*Boreus brumalis*). This species belongs to the family Boreidae, which are called the snow scorpionflies. Snow scorpionflies are small black insects that walk on top of the snow on warmer winter days, searching for moss to eat. Their sun-absorbing colour is one feature that allows them to become active much earlier in the year than other insects, at temperatures as low as -6°C. While they might jump when you approach, they do not fly. Only the males have wings, which are bristle-like, and they are primarily used during mating. You will notice based on the wings that the specimen collected at Camp Heidelberg was a male. Congratulations to Camp Heidelberg for this exciting new find!



Mid-winter Boreus (*Boreus brumalis*)



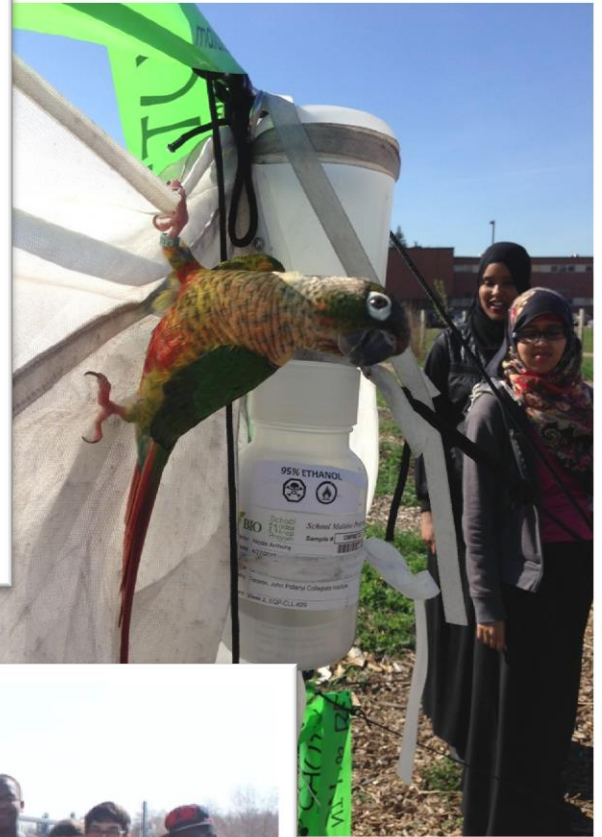


## *Spring 2015 School Malaise Trap Program Memorable Moments*



*Evelyn Richardson Memorial Elementary School*

*John Polanyi Collegiate Institute*



*J.H. Picard*

*Landmark Collegiate*





# *Spring 2015 School Malaise Trap Program Memorable Moments*

*George M. Dawson Secondary School*



*Chedabucto Education Centre*



*Shoal Lake School*



*École Précieux-Sang*



*Spruce View School*



# Spring 2015 School Malaise Trap Program Memorable Moments

*Citadel Middle School*



*Whitewood School*



*M.C. Knoll Elementary School*



*Silverheights Public School*



*St. Joseph's All Grade School*