

# The Maine Entomologist

A forum for students, professionals and amateurs  
in the Pine Tree State

The Official Newsletter of the Maine Entomological Society

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## Coronavirus Is Not the ONLY Exotic Threat to Maine

by Allison Kanoti, Maine State Entomologist

As we experience a novel health threat to our own species, I have been reflecting even more on the novel health threats our trees are experiencing here in Maine. It is hard not to compare the parallel language of human and forest epidemics.

Following are brief updates on the familiar threats that have arrived in Maine - an alphabetical list of that alphabet soup (see [www.maine.gov/forestpests](http://www.maine.gov/forestpests) for links to more information).



Caterpillars of browntail moth.

- Photo by Andrea Battisti, Universita di Padova, Bugwood.org



Adult browntail moths.

- Photo by Jan Samanek, Phytosanitary Administration,  
Bugwood.org

Browntail moth (BTM) caterpillars have experienced high levels of disease in parts of its southern distribution in Maine; however this pest is still at levels that can cause human discomfort over a broad swath of the state. You can see the new risk map, the winter web survey map and aerial survey data from 2019 as well as a slew of FAQ's at: [https://www.maine.gov/dacf/mfs/forest\\_health/invasive\\_threats/browntail\\_moth\\_info.htm](https://www.maine.gov/dacf/mfs/forest_health/invasive_threats/browntail_moth_info.htm).



Elongate hemlock scale on the underside of needles.

- Photo by Lorraine Graney, Bartlett Tree Experts, Bugwood.org

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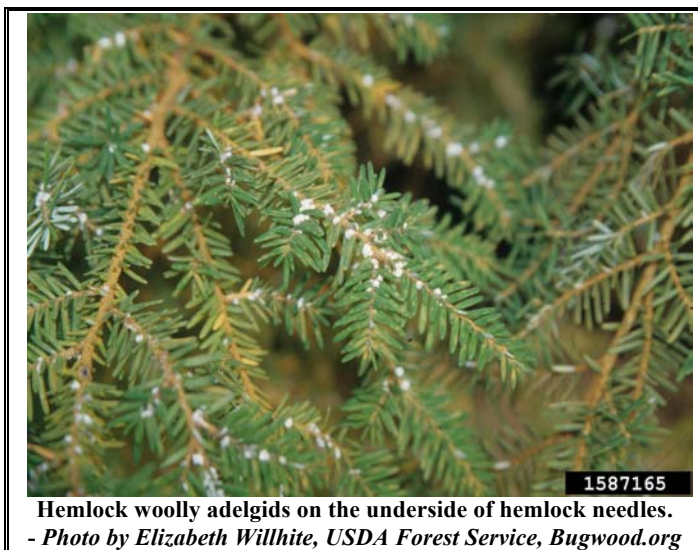


**Exotic threats (cont.)**

Elongate hemlock scale (EHS) seems to be spreading readily from planted trees into natural conifers in the forest. This elusive invader is associated with significant hemlock decline throughout southern New England. It can arrive on planted fir, hemlock and other conifers, as well as through natural spread.



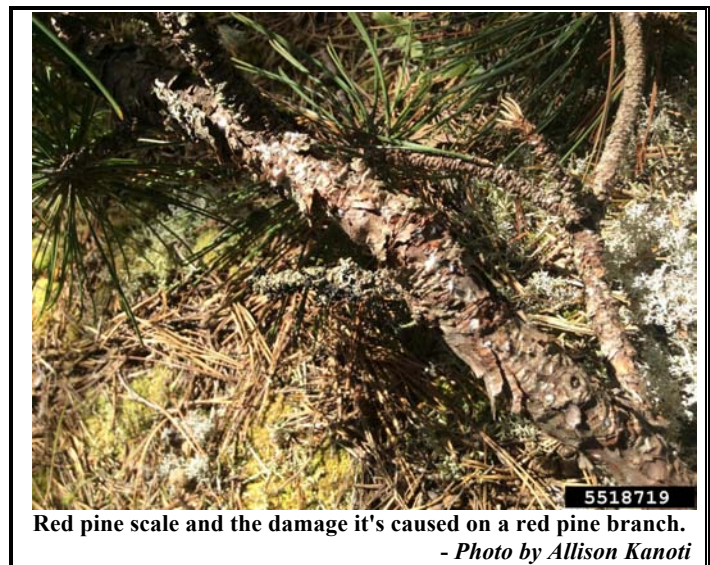
Emerald ash borer (EAB) was found in several towns in York County last fall through girdled tree surveys and in Portland on a purple trap. A new, larger quarantine area went into effect this spring. Maine Forest Service released three species of parasitic wasps at sites in Northern Aroostook County this year. You can read more about the detections and releases at (this is a downloadable pdf file): [https://www.maine.gov/dacf/mfs/forest\\_health/documents/2019MaineForestHealthHighlightsForUSFS.pdf](https://www.maine.gov/dacf/mfs/forest_health/documents/2019MaineForestHealthHighlightsForUSFS.pdf) and current information on EAB is always at [www.maine.gov/eab](http://www.maine.gov/eab).



Hemlock woolly adelgid (HWA) is now associated with severe decline of hemlock in many coastal areas. Several dry growing seasons, thin soils and warmer winter climate likely

contributed to the accelerated deterioration of hemlock health in these areas. Contrary to popular literature, hemlocks in the Northeast have been surviving with adelgid for decades, but additional stressors, such as poor site conditions, adverse weather (warm winters, dry growing seasons) and additional pests can cause rapid mortality of this sensitive species.

This past winter, MFS recorded about 65 percent winter mortality of HWA across six sites in the infested area. With this parthenogenetic species, we look for more than 90% winter mortality to provide some relief to the trees and slow the spread of the pest. Right now, you can spread hemlock woolly adelgids - eggs and crawlers can be picked up on your clothing, field gear, vehicle, and on yourself and your pets, and then carried to uninfested hemlocks. Be mindful of this when out in infested areas: [https://www.maine.gov/dacf/mfs/forest\\_health/insects/hemlock\\_woolly\\_adelgid\\_overview.htm](https://www.maine.gov/dacf/mfs/forest_health/insects/hemlock_woolly_adelgid_overview.htm)



Red pine scale (RPS) was found in southern York County and in additional towns in Hancock County over the past year. This cryptic invader along with chronic shoot diseases are associated with region-wide decline of red pine.

Winter moth (WM) provides a ray of hope and positivity in this depressing litany. Populations of winter moth appear down from past years and there has been successful establishment of the parasitic fly, *Cyzenis albicans*, that, along with native ground-dwelling predators, provides enough control of WM to allow the trees to tolerate it. However, MFS still encourages taking measures to reduce spread of WM—such as avoiding moving soil and plants from infested areas.

Not on this list yet, and hopefully never, is a beetle that the department received at this time last year. The pinned specimen was in the collection of an amateur collector and while displaying this collection at a public event, someone mentioned the striking resemblance of this specimen to Asian longhorned beetle (ALB), *Anoplophora glabripennis*. Upon learning that ALB was not yet known to be established in Maine, the collector contacted the State Survey Coordinator and MES member, Karen Coluzzi.

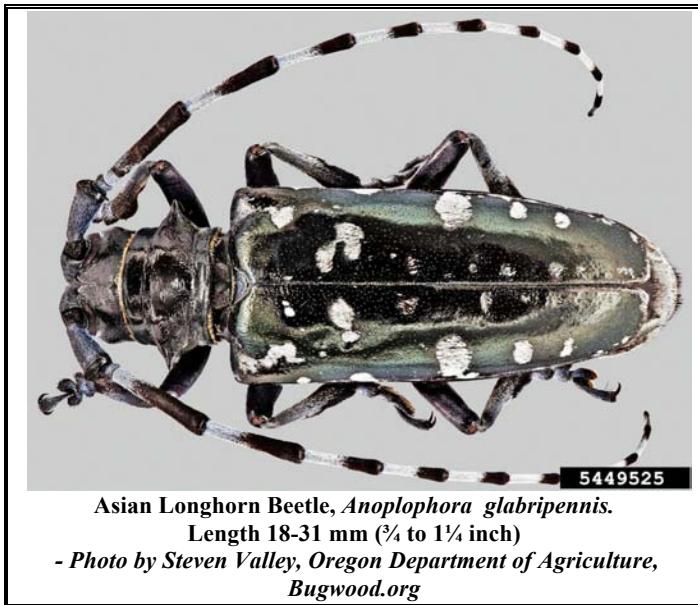
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**Exotic threats (cont.)**

Unfortunately, the specimen lacked standard collection data. However, the beetle was reported to have been collected in North Berwick, Maine between two and five years ago.

After examination by USDA Animal and Plant Health Inspection Service (APHIS) and *Anoplophora* experts, the specimen was determined to be *Anoplophora macularia*, a close relative of ALB. There is very little information available about this species and to our knowledge it has never been previously intercepted in the United States. A multiagency team from DACF MFS and Horticulture and USDA APHIS and Forest Service performed intensive ground surveys and conducted a trapping program in nearby forested, nursery, and industrial areas in York County. No additional specimens or damage directly attributable to *A. macularia* have been found to date, but surveys will continue this summer.



This episode points out the importance of citizens, especially MES members, as part of a network of first detectors for novel forest health threats. We welcome your help in finding new arrivals in Maine's insect community—not just the pests—and hope that as you do your collecting you document your specimens with all the appropriate information to make them useful to science.

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**How Did *Dipogon sayi* Get There?**

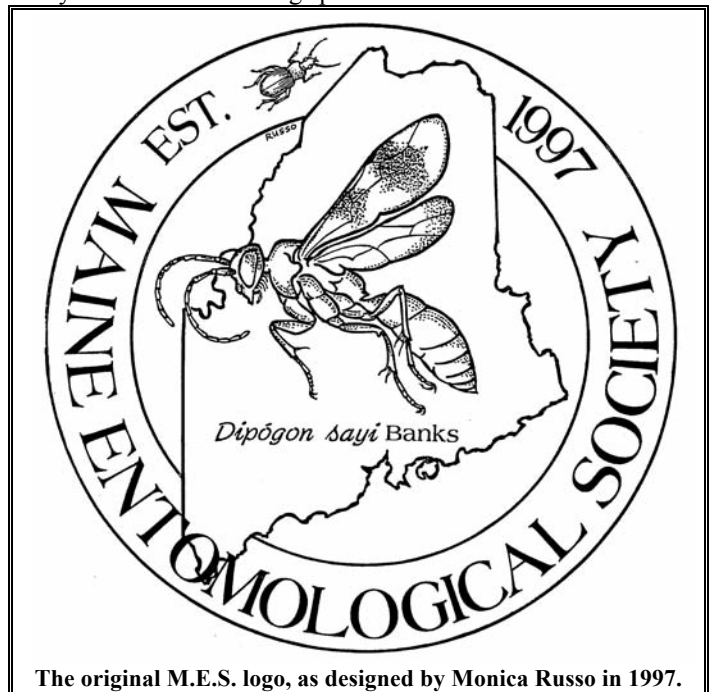
by Monica Russo

The first newsletter for the Maine Entomological Society came out in the spring of 1997. *Dipogon sayi* appears on that very first newsletter.

Three years earlier I had had a neat experience while closely observing the species at a nesting block set up on the log-ends of our small cabin. My field notes for June 19, 1994, show that a banded-winged Pompilid wasp was inspecting the drilled-hole woodblock set on the log ends of our cabin, going in and out of the holes. Further notes show that I had caught banded-wing Pompilids previously.

Over the years, I have used "garden pollinator houses" (a.k.a. "bee hotels") of different types: commercial houses that are canisters filled with straws for native bees or wasps, and also tried short sections of old 2x4s that Kevin drilled with rows of ¼" diameter holes. Dana Michaud also has told me that he is using the dried hollow stalks of *Monarda*, bundled together. The hefty squarish stems should be just the right size.

In M.E.S. newsletter number 3, from the summer of 1998, I wrote that female *Dipogon* wasps "stuff their nursery cells with spiders, and they are quite interesting to watch as they roam around hunting spiders."



*Dipogon* can be attracted to "trap nests" of vespiaries. You can simply drill a series of ¼" diameter holes in some old pine boards and stack them up at eye level around the garden or garage, and you'll get all sorts of solitary wasps and bees -- pollinators! You might also even get a *Dipogon*.



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*Dipogon sayi* (cont.)

These interesting wasps are members of the family Pompilidae, which also includes the "tarantula hawks" of the West. Most Pompilids hunt on the ground, but *Dipogon* often scrambles over tree bark, logs and stumps looking for prey.

In the November, 1999, M.E.S. newsletter, our logo shows *Dipogon* in the center of a circle for the first time, with the lettering for the Society. The lettering was hand-set with "cold type" - from transfer sheets.

In the August, 2002, newsletter, I described a *Dipogon* carrying a spider over a flat, sandy walkway, and then over rocks, and over curled-up oak leaves, until she finally came to our woodpile - and continued to drag her prey about 30 inches upwards. Yikes!

If you'd like to read more about *Dipogon*, I recommend the book *Wasp Farm* by Howard Ensign Evans, published by Comstock/Cornell, originally published in 1963 but reprinted in 1985.

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**Do Insects Spread "Blackleg" Disease in Maine Potatoes?**

(a 2019 University of Maine M.S. thesis summary)  
by Jonas Insinga

Potatoes, like other crops, are attacked by several species of insects. Some of these, like aphids, harm plants not only through their injurious feeding but also by transmitting diseases in much the same way as mosquitoes and biting flies do among humans and livestock.

Farmers in Maine and several other states across the Northeast are currently working to combat outbreaks of a lethal potato disease characterized by the appearance of tuber necrosis, black stem lesions, and wilting leaves. Known as "blackleg", the condition is caused by several different bacteria, with the recent outbreaks in Maine having been tied to *Dickeya dianthicola*, a species first recorded in the state in 2014.



"Blackleg Disease" affecting a Maine potato plant stem.  
- Photo by Jonas Insinga

Little is known about this specific bacterium, but work with related species has suggested that it may be vectored by insects. My research at the University of Maine assessed whether Colorado potato beetles (*Leptinotarsa decemlineata*) or green peach aphids (*Myzus persicae*) might spread *D. dianthicola* within potato fields. While neither species has *The Maine Entomologist*

been directly implicated in blackleg transmission, both are related to insects with known relationships to other pathogenic bacteria.

As some bacteria and viruses are known to modify the odor and color of their hosts to better attract prospective vectors, and as blackleg lesions give off a compost-like smell, I wanted to know if the presence of such infections can influence the behavior of either beetles or aphids. This involved testing odors against these insects as well as offering them a choice between infected and uninfected plants to feed on. Afterward, I evaluated the actual ability of these insects to spread *D. dianthicola*. In the lab, insects were fed infected plants and transferred to uninfected ones to see if the disease would follow. Then, at the Aroostook Research Farm in Presque Isle, I looked at whether control of either insect correlated with a difference in the number of plants and tubers which contracted the bacterium.



*Leptinotarsa decemlineata*, the Colorado Potato Beetle. Despite the havoc this species may wreak on potatoes, eggplant, and even pepper plants in Maine, the species does not transmit "Blackleg Disease" in potato plants. It's possible the blackleg bacteria may actually repel the beetles. - Photo from Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

In the end, my work did not show either green peach aphids or Colorado potato beetles to be able to acquire and spread *D. dianthicola*, nor did control of these insects in the field influence the abundance of infections among plants and tubers. However, choice experiments did show that the bacterium can influence the behavior of these two insects, though the effect was small and mostly repellent.

While not dramatic, these results are important as they support other studies that point to irrigation water, aerosols, farm equipment, and asymptomatic seed tubers as primary routes in the spread of this bacterium.

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**Notes on A Few Early Spring Hymenoptera**  
by Monica Russo

While we see most bees, wasps and ants during the summer, I have some early spring observations in Arundel that I thought are interesting and would be worth sharing with the larger M.E.S. community.

Listed here are some dated sightings, given in order of the earliest seen active individuals, by month and day. (The year probably is not as important, although this may be a clue

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*Early spring Hymenoptera (cont.)*

to general environmental changes.) I've also indicated the air temperature recorded at the time, in degrees Fahrenheit.



A wasp of the genus *Crabro*. Below, a tumulus (mound) surrounding the excavated burrow.

-Photos by Kevin Byron



The Allegheny Mound Ants are *Formica exsectoides*. The wasps are very likely *Crabro* species, fossorial digger wasps that excavate burrows in sandy soil, making a tumulus (mound) about 5 to 6 cm across and with a round central entrance, thus looking like a tiny volcano. Adult wasps of *Crabro* look very similar to adults of *Ectemnius*, but almost all species of the latter do not create tumuli. In my notes, it's always been *Crabro* wasps that have been caught near any tumuli. The bumblebees, of course, are all *Bombus* species.

**March 20, 2010** Allegheny mound ants out, and crawling around on the mound (72°)

**March 23, 2012** Three fresh wasp tumuli seen (probably made by *Crabro*) (70°)

**March 31, 2016** Allegheny mound ants out (73°)

**April 2, 2006** Allegheny mound ants out (58°)

**April 12, 2012** A dozen fresh tumuli seen (again, probably *Crabro* wasps) (52°)

**April 13, 2012** Several wasp tumuli are open (60°)

**April 15, 2013** Allegheny mound ants out (52°)

**April 15, 2017** Allegheny mound ants out (67°)

**April 24, 2001** First *Bombus* seen (78°)

**April 27, 1994** Two Pompilid wasps seen, hunting on dry, bare ground. Pompilids are noticeable because as they hunt for spiders, they look like they are running around frantically, asking "Where did I leave my keys?!" The small Pompilid on our M.E.S. logo, *Dipogon sayi*, often hunts on tree bark, stumps, logs, etc., and not always on the ground.

\* \* \* \* \*

**Raising Black Soldier Flies:  
For Fun and (?) Profit**

(a 2018 University of Maine M.S. thesis summary)  
by Joshua Villazana

Sustainable waste management is one of the most important issues facing highly industrialized modern-day societies. Americans generated approximately 258 million tons of post-consumer municipal solid waste in 2014.

Current efforts to improve environmental impact of waste management practices involve reduction, reuse, recycling and composting. However, landfilling and incineration are still the most common method for final disposal of solid wastes. In addition, approximately 1.04 million tons of marine waste is generated each year in the United States.

Worldwide, aquaculture produces 45% of all seafood consumed, and the production is expected to rise to 75% in the next 20 years. Wild-caught fish used for fish meal will not be able to sustain aquaculture industries, and its continuous harvest could lead to detrimental ecological consequences.

The black soldier fly (BSF) *Hermetia illucens* (Linnaeus) (Diptera: Stratiomyidae) is a beneficial fly species that can be used for remediating biological waste. An overarching goal of my M.S. thesis project at the University of Maine was to obtain additional insights into their biology, to improve their rearing and handling in future mass-production facilities serving Maine aquaculture.



Adult black soldier fly, *Hermetia illucens*.

- Photo by Johnny N. Dell, Bugwood.org

Their larvae (BSFL) are rich in nutrients, grow rapidly, convert a variety of decaying organic wastes to vermicompost while suppressing human pathogens and pests, and contain a

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### Raising black soldier flies (cont.)

number of potentially valuable biologically active compounds. BSFL can also be processed into value-added animal feeds, including those used in aquaculture.



Black soldier fly larvae. - Photo by Joshua Villazana

We started with testing BSFL growth in the laboratory on seven seafood wastes from Maine fish processing facilities. Substrates potentially suitable for BSFL rearing included finfish trimmings, wet sea cucumber, dry quahog, and sea urchin. Crab meal produced large larvae in a short time, but larval mortality was high. There were dramatic differences in seemingly similar materials, such as wet and dry sea cucumber or wet and dry quahog, highlighting the importance of thorough testing of specific substrates instead of extrapolating from published data.

We investigated antixenotic (pest aversion) and antibiotic effects of finfish substrate inhabited by BSFL, which are important for hygiene in mass-rearing facilities. Green blow flies, *Lucilia sericata* (Meigen) (Diptera: Calliphoridae), were reluctant to colonize substrates previously inhabited by BSFL even after the latter were sifted out. When released into BSFL-containing substrates, the majority of *L. sericata* larvae emigrated.

There was also significantly lower enzymatic activity in substrates inhabited by BSFL than in the control, due to a decline in bacterial abundance. Fungal abundances were not significantly different from the control when BSFL were present but increased after their removal. BSFL also altered the taxonomic composition of microbial communities in finfish substrate, as estimated by a diversity assay.

Migration of BSF prepupae is commonly exploited for self-harvesting biomass in commercial rearing facilities. We tested if harvesting larvae prior to the prepupal stage can produce larger larvae than those harvested as prepupae. Our results indicated that larvae were at their greatest weight immediately before transition into prepupae. Therefore, the late larval instar before reaching prepupae can be considered as the optimal harvest period for larval biomass.



No, Joshua isn't about to eat a slice of black soldier fly larvae pizza! But he found that THEY really enjoyed his leftovers!

- Photo courtesy of Joshua Villazana

Black soldier flies are normally found in subtropical and warm temperate regions. Potentially, cold temperatures can also be used to manipulate the rate of BSFL development, which may be needed for obtaining certain life stages in mass-production facilities. We determined that BSFL were highly susceptible to freezing. Chilling at above-freezing temperature also had a significant negative effect. However, it was much smaller, especially for fifth-instar larvae. Low temperatures may be used to manipulate development of the late instars, but at a cost of higher mortality.

My time at UMaine was a splendid voyage that I'd repeat if I could. I made lifelong connections with remarkable people along the way, hiked thousands of miles above sea level, and stuffed my belly full of bugs and blueberries. With the help of my Advisor Andrei Alyokhin and committee member Edward Bernard, we were able to publish some of our findings:

Villazana, J. and A. Alyokhin, 2019: Development of black soldier fly larvae (Diptera: Stratiomyidae) on seafood wastes. *Journal of Insects as Food and Feed*, v. 5, no. 4, pp. 313-319.

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### **Raising black soldier flies (cont.)**

- Villazana, J. and A. Alyokhin, 2019: Tolerance of Immature Black Soldier Flies to Cold Temperatures Above and Below Freezing Point. *Journal of Economic Entomology*, Volume 112, Issue 6, pp. 2632–2637.
- Bernard, E., J. Villazana, A. Alyokhin, and J. Rose, 2020: Colonization of Finfish Substrate Inhabited by Black Soldier Fly Larvae (Diptera: Stratiomyidae) by Blowflies (Diptera: Stratiomyidae), Bacteria, and Fungi. *Journal of Insects as Food and Feed*. (in press)

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*M.E.S. member Joshua Villazana, having completed his M.S. at the University of Maine, is now working in entomological research in Illinois.*

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## **Notes on the status of Wintering Monarchs (*Danaus plexippus*) in Mexico (2019-2020). New Threat: Killings!**

**By Robert E. Gobeil and Rose Marie F. Gobeil**

On July 17, 2019, we saw our first sign that it might be a good season for Monarchs. We observed Monarchs laying eggs on a dozen or so milkweed plants growing along the edge of our driveway in Saco, ME. We then checked the plants in more detail and found three small Monarch caterpillars (roughly a quarter of an inch long). By mid-August we received many reports of Monarch caterpillars being seen in various parts of Maine on our mainebutterflies.com Facebook page.

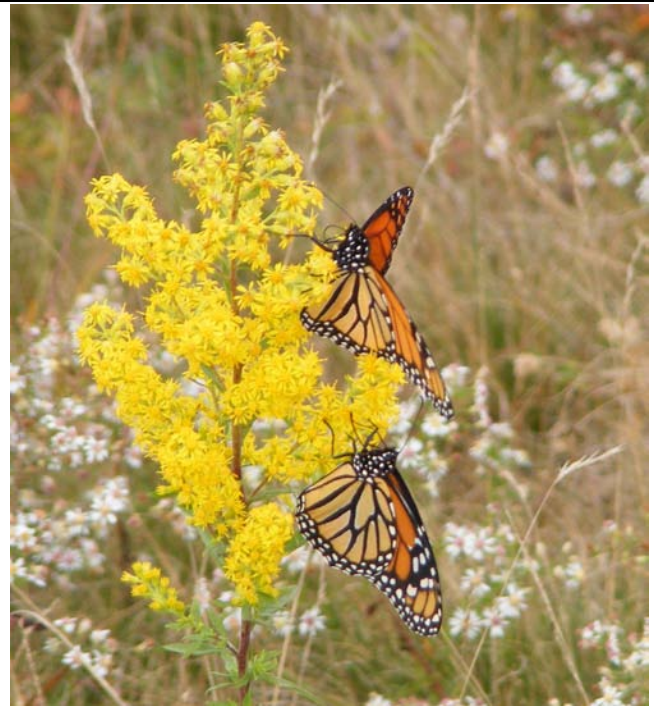
On August 21, 2019, Heather Halsey, who lives in Washington, ME (near Augusta), reported seeing thousands of Monarch chrysalises covering the sides of her farmhouse (Sarnacki 2019). She had never seen so many Monarch chrysalises at the farm since purchasing the property in 2015. Later in the season, on Sept. 25, 2019, we went to the Sylvan Trail in Saco, ME and observed over 25 Monarchs (Fig. 1). We have been regularly visiting this trail for over 10 years and this is the highest count we have ever recorded on a single day at this site.

As reported by Journey North (2019), other regions of the US and Canada witnessed impressive numbers of Monarchs during the 2019 fall migration. On Sept. 3, 2019, over a thousand Monarchs were recorded in Toronto, Ontario, while an estimated 15,000 Monarchs per hour were observed flying along the shores of Lake Erie in Clearville Park, Ontario on Sept. 8, 2019. On the same date at Point Pelee National Park in Ontario, a major gathering area for migrating Monarchs, an observer estimated clusters of over 3,500 Monarchs.

In the US, however, at Cape May, NJ, the Monarch migration counts were unexpectedly low (Garland 2019). Cape May also had low counts during the 2018 fall migration even though the number of Monarchs wintering in Mexico ended up being 144% higher than the previous year (Gobeil & Gobeil 2019).

In mid-February and early March, 2020, a new threat to the wintering population of Monarchs was reported in Mexico (O'Grady 2020, Sieff 2020). Two individuals associated with the conservation of Monarch sanctuaries in Mexico were found dead. Homero Gomez González, a local politician,

disappeared on Jan. 15, 2020, and his body with head injuries was found two weeks later. González was a former commissioner of the town of Rosario and managed the local butterfly reserve.



**Fig. 1. Monarchs nectaring on Goldenrod in Saco, Maine, on September 25, 2019. Photo by Rose Marie F. Gobeil.**

To make matters worse, a second man associated with Monarchs was also killed. The badly beaten body of Raul Hernandez Romero was discovered shortly thereafter. He was a part-time tour guide in one of the larger Monarch preserves. Local Mexican investigators are trying to determine if the two killings are related.

Illegal logging in the areas of the Monarch sanctuaries has long been a problem and both of these men were active in promoting eco-tourism instead of logging. It is believed that illegal logging in Mexico is often controlled by organized crime, leading to clashes with local environmentalists. Brower et al. (2016) reported that even though logging had been declining for a number of years, some sections of the Monarch Preserve were illegally logged as recently as the spring and summer of 2015. They estimated that around 10 hectares in the preserve had been cleared of trees. Besides major log-clearing operations, they also found small-scale logging operations involving the removal of individual trees continuing to impact the Preserve. These small-scale logging operations are now of growing concern especially since the killing of the two conservationists trying to protect the colony.

In mid-March (2020), the Mexican government and the World Wildlife Fund organization announced that the 2019-2020 wintering Monarch population in Mexico declined by 53.22% compared to last winter (WWF 2020). The area of forest occupied by Monarch butterflies was approximately 7 acres (2.83 hectares), down from roughly 15 acres (6.05 hectares) during the 2018-2019 Season (Fig. 2). A total of 11

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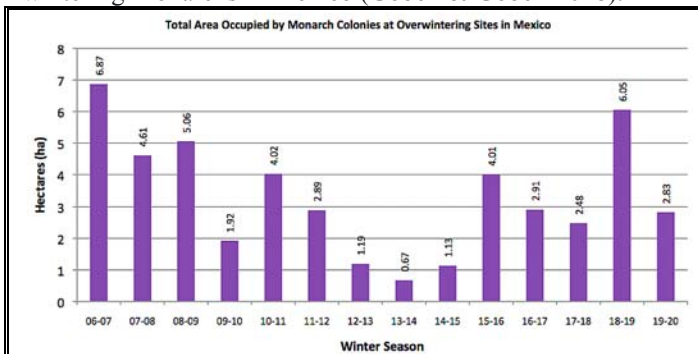


## Overwintering Monarchs (cont.)

colonies were found on the wintering grounds. This is very discouraging considering that last summer (2019) Maine had one of the best seasons for Monarchs in years, as reported on our mainebutterflies.com Facebook page.

It appears that climate change continues to be the major threat to the Monarch. According to Chip Taylor (2020), the Director of the Monarch Watch Organization, high numbers of Monarchs in the Northeast during the fall migration do not necessarily lead to high counts of overwintering Monarchs unless the weather conditions are perfect along the flyway to Mexico. He believes that the lateness of the migration due to warmer temperatures last fall and drought conditions in Texas partially accounts for the decline in the overwintering population.

The journey from Maine to Mexico is longer than from other regions of the US and is even more difficult when the migrating Monarchs encounter drought conditions in southern states. There was a severe drought in Texas last fall and by the time Monarchs from Maine reached that area, nectar sources were very limited. This may help to explain why many of the Monarchs originating in Maine and other Northeastern states never made it to the wintering grounds in Mexico. This is very similar to what happened during the 2017 fall migration which resulted in low numbers of wintering Monarchs in Mexico (Gobeil & Gobeil 2018).



**Fig. 2. Chart showing area occupied by Monarch colonies at wintering sites in Mexico (2006-7 to 2019-20 wintering seasons). Data based on various sources including the Monarch Butterfly Biosphere Reserve and the World Wildlife Fund Mexico.**

As we discussed in previous articles in the MES newsletters (Gobeil & Gobeil 2018, 2019), the threats for the survival of wintering Monarch populations in Mexico are numerous. Besides global warming and associated climate changes, you have the loss of habitat in Western states, illegal logging in Mexico on or near the wintering grounds, and now we add the killing of local butterfly conservationists!

In early March, 2020, the Monarchs started to leave their wintering grounds and are now heading north. Let's hope this is a better season for the Monarch and that we have normal weather conditions without droughts which would be favorable for the species.

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## Maine Forest Tick Survey Seeks Volunteers

Maine has fifteen recorded species of ticks, though the predominant number of tick-borne illnesses are attributed to the black-legged tick (*Ixodes scapularis*), commonly called the deer tick. The black-legged tick can harbor pathogens responsible for a number of diseases including Lyme disease, anaplasmosis, and babesiosis. This tick was first detected in Maine in the 1980s and has since expanded its range across the state. While populations are most dense in southern and coastal Maine, they are expanding inland and northward and have been found as far as northern Aroostook County.

Tick habitats are associated with forests and forest edges. With a state that is 90% forested, Mainers have a high risk of encountering ticks while working, doing yard maintenance, or engaging in recreational activities. Forest workers and recreationists are particularly vulnerable to tick-borne diseases due to the frequency of time spent in tick habitat, especially in southern and coastal Maine.

A team at the University of Maine is looking for people to collect ticks on their wooded properties in Androscoggin, Cumberland, Hancock, Knox, Kennebec, Lincoln, Sagadahoc, Waldo, and York Counties. If you have between 10 and 1000

(continued on next page)



**Tick Survey (cont.)**

acres of wooded land and want to be know more about ticks and the pathogens they carry on your property, sign up to be part of their tick surveillance program!

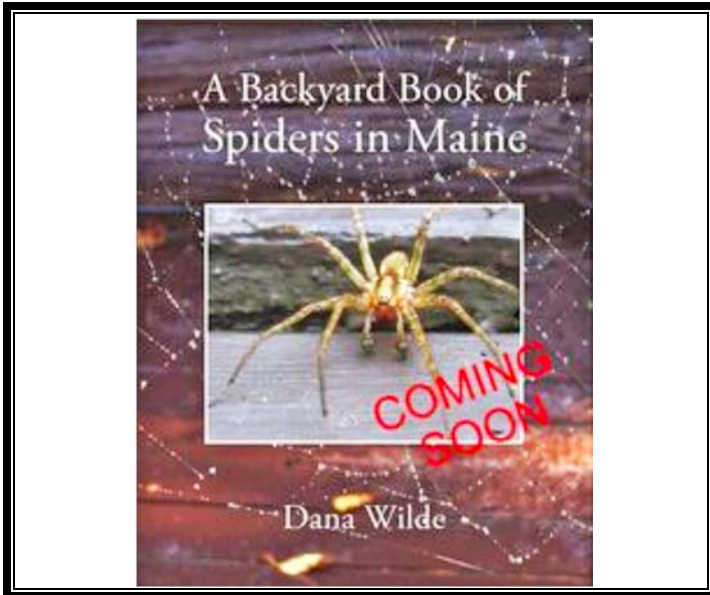
They will provide training and the supplies you need to collect ticks on your property. You will collect ticks using a drag cloth and tweezers three times during the month of July, and fill out a questionnaire about your property. This will help them to understand the tick-borne disease risks across southern and coastal Maine, and better help you understand the tick hazards on your personal property. (Please note they are only able to select a limited number of participants and signing up will not guarantee your participation.)

See <https://umaine.edu/forestticksurvey/> for more information. If you have questions, please contact the citizen science coordinator, Elissa Ballman, by phone at 207-581-2503 or via e-mail at [elissa.ballman@maine.edu](mailto:elissa.ballman@maine.edu).

\* \* \* \* \*

**Dana Wilde's Maine Spider Guide "In Press!"**

M.E.S. members will want to be on the lookout for the first-ever guide to Maine spiders, down to the family level, complete with photos of representative members of each family. Dana Wilde, long-time M.E.S. member and regular columnist for the Kennebec-Journal and Central Maine Morning Sentinel, has poured heart and soul into synthesizing his broad knowledge of Maine spiders into a volume that will be a "must have" on everyone's gift list, if they can wait that long!



"I love this book. Any group that has had 300 million years of evolution in back of it has got to be impressive, and spiders have amazing adaptations in heaps. The problem is, we generally don't get to see spiders, and we can't much care about them to appreciate them through their diversity and sophistication when they're abstractions. The personal anecdotes in *A Backyard Book of Spiders in Maine* make them real, and they show how Wilde is passionate about them, making it fun to follow as he opens a new world, not just to those spiders of Maine but through them to the rest almost anywhere, and to anyone. There is so much fascinating to see in nature, as this book shows."

- Bernd Heinrich, author of *A Naturalist at Large*, *Summer World*, *Winter World*, and others

**On a related note**, The Maine Forest Service plans to publish *The Spiders of Maine* by Daniel Jennings and Charlene Donahue some time in 2020. This will be a checklist of the spider species found in Maine to date, and will be a good complement to Dana's new book.

\* \* \* \* \*

**M.E.S. Summer Field Days:  
COVID-19 Update Edition**

Avid M.E.S. field people may be wondering what's up with the summer field plan schedule, given the statewide shutdown of just about everything due to the COVID-19 plague that's taken over our lives.

The **May 30th** field day in Fayette at the Kennebec Land Trust's (KLT) newest property, the Surry Hill Community Forest, has been **cancelled**. However, M.E.S. members wishing to get out and about and explore the site, including its stellar views of the White Mountains, can find easy driving directions on the KLT web page: <https://www.tkl.org/surry-hill>. Dana Michaud has checked this out (see p. 10). Just remember "social distancing" applies here, too!

The planned **June 12-14** field weekend in Grande Isle (in Aroostook County) has been **cancelled** as well, but it's hoped that conditions will improve such that we may be able to re-schedule later in the summer. Any such notice will be posted on the M.E.S. web site as soon as arrangements have been made.

The planned **July** field day on Appledore Island has also been **cancelled**. **HOWEVER**, the scheduled **August 1st** field day with the Bangor Land Trust at their Walden Parke Preserve is still tentatively a "go." A final decision on whether to cancel or go ahead with this event will be made later in the summer, and posted on the M.E.S. web site as soon as something definitive has been determined.

There are, however, some ideas of really cool other insect activities in which we can take part this summer:

The Massachusetts Audubon Society is sponsoring a national Firefly Watch. All you need to do is spend at least **10 minutes once a week** during firefly season observing fireflies in one location (your backyard or in a nearby field). All firefly sightings - or lack thereof - are valuable! For more information, check out their web page at <https://www.massaudubon.org/get-involved/citizen-science/firefly-watch>

The Lost Ladybug Project (<http://www.lostladybug.org>) is seeking to documents any "ladybugs" (technically, ladybird beetles, family Coccinellidae) from anywhere in the country. They're asking people to upload photos of any specimens they may encounter, which will then be added to their database. Nearly 40,000 photos have been uploaded thus far.

Maine has a poster with all the ladybug species known in Maine - some of which are considered potentially "lost" since no one has seen any of them alive in a considerable length of time. Posters can be picked up at the Maine State Museum front desk when the museum opens, hopefully in June.

*(continued on next page)*

*Things to do (cont.)*

**National Moth Week** is **July 18-26, 2020**. National Moth Week celebrates the beauty, life cycles, and habitats of moths. “Moth-ers” of all ages and abilities are encouraged to learn about, observe, and document moths in their backyards, parks, and neighborhoods. National Moth Week is being held, worldwide, during the last full week of July. NMW offers everyone, everywhere a unique opportunity to become a Citizen Scientist and contribute scientific data about moths. Through partnerships with major online biological data depositories, NMW participants can help map moth distribution and provide needed information on other life history aspects around the globe. More information can be found at their web site: <http://nationalmothweek.org>.

Also a new book “You’re Invited to a Moth Ball” gives a description on how to throw your own Moth Ball: <https://www.charlesbridge.com/products/youre-invited-to-a-moth-ball>. Leave the light on this week, stay up late and see what flies around when you sleep!

Carnegie Mellon University has also put together the great online key to **aquatic macroinvertebrates**. It is easy to use and could be used as part of a fun project in your own nearby stream or pond. Scoop up some water from near the bottom of the water body, dump it in a pan, and see what starts to move as the water settles. The key can be found at <https://www.macroinvertebrates.org>.

AND, whenever you're out and about just buggin', always remember to wear your MES shirt, hat or both!

\* \* \* \* \*

Rusty Patched Bumble Bee (*Bombus affinis*), which has not been seen in Maine since 2009.



The rusty-patched bumblebee (*Bombus affinis*).

- Photo from U.S. Fish and Wildlife Service

Information about this rare species, including an identification guide, can be found on both the MBBA (<https://drive.google.com/file/d/0B985dSJVRA1mcUE4b1ISbERNVjg/view>) and the U.S. Fish & Wildlife Service websites (<https://www.fws.gov/midwest/Endangered/insects/rpbb/>). Tips on how to photograph bumble bees for successful species identification can also be found on the MBBA website in the MBBA Manual (Appendix 5) under the “Member Resources” tab.

Many of the *Priority Townships* and special habitats needing bumble bee data are in remote locations or can be difficult to access. MBBA reminds everyone to always let someone know where you are going, leave an itinerary, and never attempt to do anything beyond your capabilities. While COVID-19 is still a concern, please be careful to limit your exposure to others by being well prepared with a full tank of gas, plenty of food and water, and a safe place to stay if needed.

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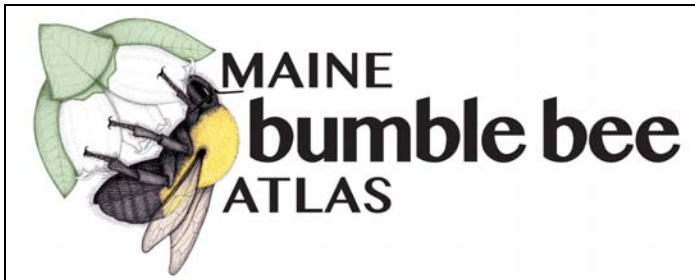
*Saturday May 30th:*

**Surry Hill Community Forest**  
by Dana Michaud

Although the Kennebec Land Trust and Maine Entomological Society are no longer sponsoring an official May 30th field day on Surry Hill, due to the COVID-19 outbreak and state restrictions, a small number of M.E.S. members could probably still get together to collect on this property as private citizens. This is *not* an officially sanctioned M.E.S. event.

This 600-foot-high hilltop and the surrounding 331 acres are owned by the Kennebec Land Trust (KLT) and located in the town of Fayette, with a beautiful view of Mt. Washington some 63 miles to the west from the summit. Although parts of the summit have been heavily logged, the property includes 18 acres of old-growth hemlock-hardwood forest and 153 acres of newer growth forest, plus 31 acres of saplings, 26 acres of cedar swamp, and 58 acres of mixed

*(continued on next page)*



***The Maine Bumble Bee Atlas Needs Your Help!***

In its final season, the Maine Bumble Bee Atlas (MBBA) is looking for help from amateur and professional entomologists and naturalists to fill survey gaps in documenting Maine’s bumble bee fauna.

Anyone interested in contributing can submit **photographs** of bumble bees from Priority Townships to iNaturalist (<https://www.inaturalist.org/>), where verified records will be mined and added to the project’s database. A map of **Priority Townships** is posted on the MBBA website (<https://mainebumblebeeatlas.umf.maine.edu/2020-mbba-priorities/>). Multiple, **close-up** images from different angles (i.e., from above, side, and front) should be submitted for each bumble bee photographed whenever possible.

In addition, photographs of bumble bees found in the following under-surveyed habitats are also needed: high elevation areas (>1000 feet), coastal islands, and uncommon wetlands such as peatlands, bogs, and fens. The project is also looking for help in documenting the federally Endangered

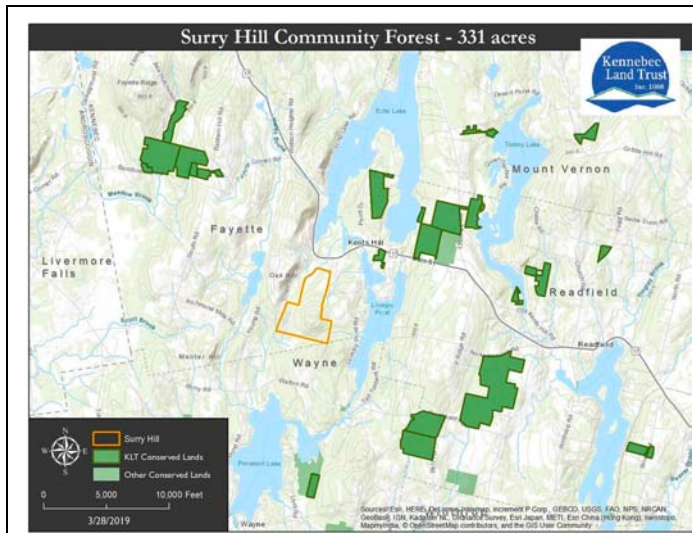


### Surry Hill (cont.)

oak-maple forest. The summit and open areas cover 38 acres, and the lowland has some seven acres of open wetlands.

To get to the site from I-95, take the Augusta exit to go west on Route 202 (also State Routes 11, 17 and 100) towards Manchester and Winthrop. In Manchester, turn onto Route 17 north and stay on this for about 12 miles; you'll pass the Kents Hill School at about mile 10, and you'll encounter the Fayette marker at about mile 11. Take a left turn on Tom Surret Road, which is across the highway from the Fayette Central School. This is paved for a short distance, but the parking area is on the right where it becomes a dirt road (0.3 miles from Route 17).

**Let me know by phone (872-7683)** if you're planning to come, so we can plan properly. If I don't answer, it'll go to an answering machine after five rings. Bring your usual insect repellants as ticks (both dog and deer) and biting flies are always in abundance. Bring PPE if you wish; we'll be "social distancing" outdoors. We'll plan to get together at 10:00 a.m.; "rain day" will be on the 31st.



### Syrphids at the Museum by Charlene Donahue

Back in September of 2019, Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife (IF&W), inquired about Flower Flies (family Syrphidae) in the Maine State insect collections. He is working on a project with NatureServe to develop a list of species in Maine.

Why syrphids? First, many adult flower flies are pollinators, providing an estimated one-third of pollination services across the world. Although this is an important reason to focus on the syrphids, just as important are all the other service the larvae perform. Many larvae in the subfamilies Syrphinae and Pipizinae are predators of soft-bodied insects – think aphids and scales. There are other species that are invaluable parts of recycling system in natural settings and in sewage systems. These flies are amazing mimics of wasps and bees as well. Some are so good that it is hard to tell them from their models.

Checking the collections, we found that the Maine Forest Service (MFS) had 25 species listed, the University of New

Hampshire (UNH) 46, and there were 41 in the Maine State Museum (MSM) material - once it was catalogued. Of these 113 species, 14 were found in two collections, so a total of 98 species of Maine syrphid flies were in museum collections.



*Toxomerus marginatus* (Say) is a common Maine Syrphid fly. Like numerous other species in multiple genera, it mimics the appearance of a stinging Hymenopteran.

- photo by Jon Yuschock, Bugwood.org

But there were four drawers of unidentified material labeled as syrphids at the Maine State Museum and the Maine Forest Service, and probably more in the unidentified Diptera drawers. Dana Michaud and I offered to ferret out more specimens from the Maine material and work on identifying them with the new Field Guide to the Flower Flies of Northeastern North America. Tom Schmeelk lent the MFS specimens and helped Dana and me go through the unidentified MFS Diptera to pick out more syrphids.

Dana and I set to work sorting through hundreds of unidentified flies. It can be a daunting task when you are unfamiliar with a group. But we each took a deep breath and started with the bigger, showier specimens and worked down to the smaller and more difficult ones.

Dana is the taxonomist and even though beetles are his favorites, he has the eye and mind for doing other groups as well. Me – not so much. I did preliminary sorting and sexing of groups and worked on learning at least the basics of syrphid identification. Along with working on the taxonomy, I also kept records of species as they were confirmed, added, or changed, looked up records, figured out name changes and kept specimens sorted.

Then the pandemic hit as we were finishing up identifications. The IF&W wanted the data that went along with all those 1,800 flies. I hate data entry, but it's something that can be done at home.

So, I packed up seven drawers of dead flies and headed home. Some 45 hours later - spread over three weeks - it is

(continued on next page)

*Syrphids (cont.)*

mostly done. It was slow at times due to checking what county a town is in, checking spelling, looking up authors for species and looking up Agriculture Experiment Station records that do not have information on the labels. (Thank you to Pete Darling who has digitized four Agricultural Experimental Station log books, and who roped Nina Beckwith into doing another one.)

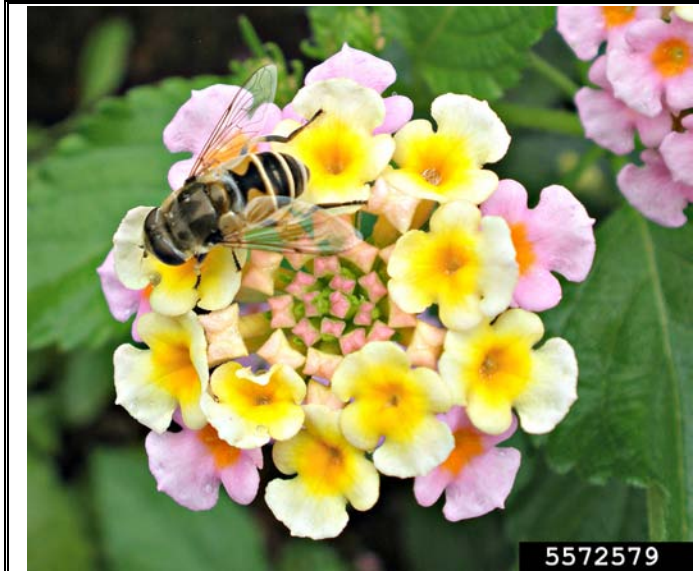
The MFS has seven species not found in the other two collections and three of these are rare, uncommon or restricted in habitat. *Polydontomyia curvipes* (Wiedemann) is found only in saltwater marshes and specimens were collected as by-catch from a greenheaded fly study at Reid State Park - another example of why it is always good to keep by-catch when possible. *Sphagina lobata* Loew is uncommon but found in hardwood forests. Little is known about the rare *Ferdinandea croesus* (Osten Sacken).

There are also specimens from the 1800s that have now been identified for the first time. How cool is *that*?

Reference:

Skevington, J. H., M. M. Locke, A. D. Young, K. Moran, W. J. Crins, S. A. Marshall. 2019. *Field Guide to the Flower Flies of Northeastern North America*. Princeton Field Guides; 134 pp.

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*Eristalis arbustorum* (Linnaeus), the European Drone Fly, is another common Maine Syrphid fly.

- photo by Ansel Oommen, Bugwood.org

At this point, Dana has identified 192 species including ones found in his collection (those still need to be catalogued). The UNH collection has an additional 10 species, for a total of 202 species now known to be found in Maine (subject to verification). The specimens now need to be verified by an expert, and we had planned a road trip to New Brunswick to get that done this month. Now that will have to wait.

Some interesting pieces of information come out of this though. Specimens come from 15 of Maine's 16 counties; Waldo is the only county with no records in the collections - but maybe we can remedy that this summer.

The collection is heavily skewed toward Orono and Old Town in Penobscot county, near the University of Maine, and two townships in Hancock county. Rich Hanson, a graduate student in the early 1980s, collected in T42 MD and Oqiton Township for a pollinator study evaluating the effect of spruce budworm spray on non-target species. In two months, Rich collected 95 species! Adding in the specimens of Jeff Brushwein, collected in Orono, and E. Milicsky, primarily from Passadumkeag, these three graduate students contributed over half the specimens.

Although the MFS collection is smaller than that at the MSM, the specimens come from a broader portion of the state with records from 119 townships not sampled by MSM collectors (13 towns were collected in by both groups). The MSM collection comes from 60 townships.



*Opogona papayae* Turner 1923, as it would appear at rest (above) and pinned and spread (below). Length at rest ~8 mm; wingspan 12-15 mm. - Australian Government Photos



**G'Day, Mothy Mate!**

Tony Roberts, in Steuben, and a friend in Brunswick, have written to report an apparent invasion of the Australian moth *Opogona papayae* Turner in their kitchens. These pretty little "pantry moths", now assigned to an outlying branch of  
*(continued on next page)*



*Aussie Moth (cont.)*

the Tineidae - commonly known simply as "Clothes Moths" - were observed darting about erratically in the air in the latter part of the day through most of March and all of April. The collectors have no notion as to the host with which these unlikely invaders may have arrived.

Tony has collected some four dozen specimens, at least one of which will be forwarded on to the USDA for identification confirmation. Reports of any similar sightings will be much appreciated and can be e-mailed directly to Karen Coluzzi (Karen.L.Coluzzi@maine.gov) or to Tony at maroberts@maineline.net.

\* \* \* \* \*

**Ticks Await You -- Be Prepared!**  
by Bob Nelson

Spring is finally here, and for many of us this is a welcome chance to get out and about, and see the first-appearing pollinators, the "founder queen" bumblebees, mourning cloak and spring azure butterflies, and others in all our favorite groups. I suppose there are even those among the M.E.S. membership who look forward to the first black flies of the season!

Lurking out there, however, and waiting for us to come by to give them a free ride and meal, are the ticks - and of particular concern, the black-legged tick, *Ixodes scapularis*, carrier of Lyme Disease, anaplasmosis, and other nasty things. In the past I've walked out to our compost pile and back to the house - perhaps 50 feet across the lawn each way ..... and found six of these little guys scrambling up my clothes in the spring.

However, there IS a solution, and it's name is permethrin. Last year on our Manchester field day at the Hutchinson Pond Reserve of the Kennebec Land Trust, Charlene Donahue was wearing permethrin-treated gaiters. At lunch, she cooperatively raised one foot and dropped it onto the tailgate of Pete Darling's truck. Dana Michaud reached down and picked up an unsuspecting dog tick from a blade of grass at his feet, and dropped it onto the exposed gaiter.

I have *never* seen a tick move so fast in my life, as it ran off the top of her leg and flung itself into the air, to drop to the ground again, writhing in agony. Such a testimonial to the effectiveness of the permethrin!

You can buy permethrin-treated field clothing at numerous on-line sources, and there is even a local Maine manufacturer of treated clothing and animal wraps (DogNotGone and NoFly products in Skowhegan). Sprays of 0.5% or 1.0% concentration are also available from multiple sources - a simple Internet search will bring up many options.

I've been treating all my "outside" trousers with a 1% spray from the knees down, spraying them down in the garage and letting them dry thoroughly before putting them on. I've also sprayed my field boots. And I haven't found a single tick on me since I started doing this. One of the best parts is that once dried on your clothing, it will not easily wash out. I have treated my clothes maybe twice a year, and that's it.

DO read the instructions on any products carefully, and follow them. One important warning is not to allow any cats to contact liquid or damp permethrin-treated materials -

*The Maine Entomologist*

they're extremely sensitive to this material. Once it's totally dry, it's fine for even cats. Humans, on the other hand, metabolize it quickly when it is absorbed by the skin; it's even in some prescription shampoos.

However, don't believe label claims that permethrin can survive going through the laundry on your clothes some 50 times. The only thing I've found that will go through 50 wash cycles and still be on my clothes is a red wine stain on one of my M.E.S. sweatshirts!

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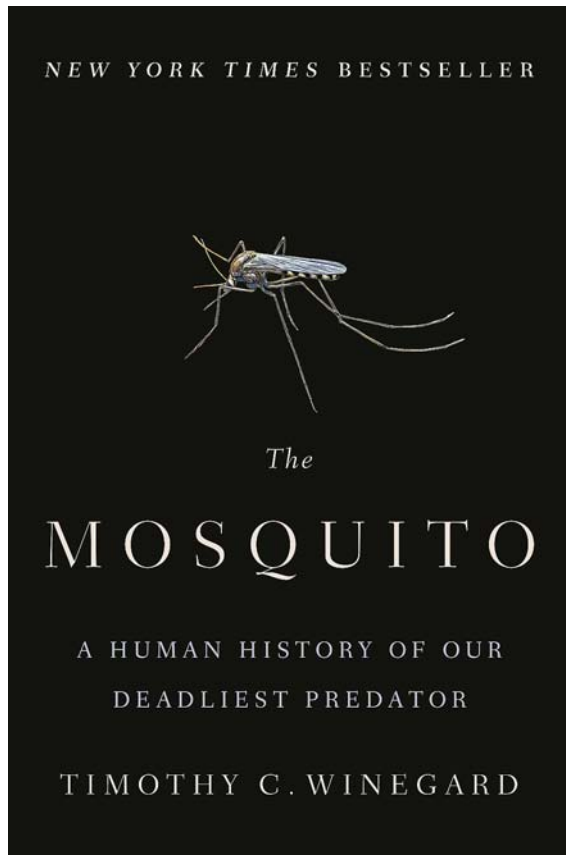


**BEE NICE!**

Many M.E.S. members will know that Charlene Donahue has been a bee-keeper for some time, and now she and her son Brian are expanding the apiary. She shared these early spring photos of some of their honeybees exploring the crocus and snowdrop flowers of the earliest-blooming spring bulbs. You can see the pollen sacks on the legs of some of these busy workers were already getting quite packed!



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**Book Review: by Dana Michaud**

*The Mosquito: A Human History of Our Deadliest Predator*, by Timothy Winegard. Dutton Press (Penguin Random House), 2019; 485 pp. (Hardbound; list price \$28.00)

This is a well-researched non-fictional narrative that, in 19 chapters, explores the role that the "lowly" mosquito has played in human history. The mosquito as a vector of many deadly diseases has killed many millions of people.

The first chapter, "Toxic Twins," introduces the reader to two of the deadliest killers of humankind - "Generals" *Aedes* and *Anopheles*, and the diseases they spread. The second chapter, "Survival of the Fittest," covers the rise of sickle-cell disease in humans as an evolutionary response to malaria, and which took place on the African continent.

Chapters 3-6 explore the history of the mosquito as an exploiter and yet exploited insect. History is replete with conquerors who themselves fell victim to the mosquito. From Alexander the Great to every battle thereafter, Winegard reveals the mosquito of having affected the outcomes. In Chapter 7, the Columbian Exchange, the introduction of the Toxic Twins and their diseases to the New World is exposed. The history of the environmental disaster is still being written, but the toll to endemic tribes alone may be as many as 100 million people, or more.

Chapters 7-15 expose the role played by mosquitoes from colonial times through the American Civil War. Generals

*Aedes* and *Anopheles* spread their deadly diseases with impunity.

The final Chapters 16-19 cover from the Civil War to recent times, and outline how the established hordes of bloodthirsty mosquitoes - with the help of humans - have added a few more deadly diseases to their arsenal: EEE (Eastern Equine Encephalitis), West Nile Virus, and Zika, to mention a few. The recent gene-editing technique - CRISPR - when put into practice, is capable of exterminating a mosquito species in a very short time frame. Mankind can now, through genetic editing, create a malarial mosquito (*Anopheles*) that no longer carries the plasmodium for the disease. It was a success in the lab, at least. The next step would be to release designer mosquitoes that in a few generations would spell extinction for these very mosquitoes that carry some of humankind's deadliest diseases.

Winegard's "conclusion," however, is of using caution when we now have gene editing - CRISPR - as a powerful new weapon in our arsenal to combat the mosquito. Of the estimated world mosquito population of 110 trillion, the mosquitoes that carry deadly diseases are just a few hundred out of some 3500 species. Humankind needs to tread carefully when contemplating a species' extermination.

After reading this aptly-titled book, I for one will continue to swat the buzzing bloodthirsty Dipterans around me. I'm sure a world without mosquitoes and their amazing variety would be quieter, but less interesting. I'm equally sure, however, that they pose a major threat to the health and welfare of many humans.

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COMING M.E.S. EVENTS in 2020	
May 30	Field Day - Fayette (NW Kennebec County) has been <b>cancelled</b> - BUT see p. 10.
June	Field Day - Grande Isle (Aroostook County) in the St. John River Valley has been <b>cancelled</b>
July 11	Field Day on Appledore Island has been <b>cancelled</b>
August 1	Field Day with Bangor Land Trust, Walden Parke Preserve (Penobscot County) <b>tentative - watch the M.E.S. web page for updates</b>
September 12	Field Day, China (Kennebec County; collecting live specimens for Bug Maine-ia at the Maine State Museum)
September 15	Bug Maine-ia, Maine State Museum, Augusta (Kennebec County)
September 26	Annual Meeting, Clinton (Kennebec County)
October	Field Day (still open as to where and when)
April, 2021	Symposium - <b>Working Title:</b> Bridges: The spectrum of entomologically related interests in Maine and the region. <b>Coordinator: Kathy Claerr.</b>

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(See <http://www.colby.edu/MES/> for more detailed information; new information on any event will be posted as soon as received.)

*The Maine Entomologist* is the quarterly newsletter of the Maine Entomological Society. Dues are \$15 per year. Checks should be made payable to the M.E.S. and sent to Mr. Dana Michaud, M.E.S. Treasurer, at 3 Halde Street, Waterville, ME 04901-6317. Our records show your dues are paid through the year printed on your mailing label; please contact Dana if you believe this is in error. *Individual articles reflect the opinions of the authors and mention of any specific commercial products or businesses should not be construed as formal endorsement by the M.E.S. of any such product or business.*