



# The Clifton Institute

**Insect Issue**  
**Fall 2024**

# Letter from the Director

In the last couple of years we've designed some exciting education programs focused on insects, we've started studying insects more seriously, and we've found some awesome arthropods here at the Clifton Institute. So we thought it was time for a newsletter all about insects. It's hard to think of a group that is more neglected and maligned and we think they deserve a little love.

For one thing, insects are important to the functioning of almost every terrestrial ecosystem. They provide crucial services, like pollination and waste management, and they provide food for lots of other animals. Insects are also incredibly diverse. One out of every four species of animals on the planet is a beetle! Not just an insect, but a beetle! There are 400,000 species of beetles alone. One of my favorite annual traditions is teaching our summer campers the "Twinkle Twinkle Little Beetle" song where we replace every fourth word of "Twinkle Twinkle Little Star" with "beetle" ("Twinkle twinkle little beetle, how I wonder beetle you are. Up beetle the sky so beetle. Like a diamond beetle the sky...") to hilarious effect, at least as far as the kids are concerned.

As important as they are, and despite their reputation for creeping people out, insects are also fascinating and charismatic creatures in their own right. Once you look up close at the colorful shiny wings of a beetle or see a miniature world of predator-prey interactions unfurl within the span of a bug net it's hard not to fall in love with insects.

This fall we are starting an exciting new program called Lawn Lab to foster future generations of bug enthusiasts (among other goals). The Fauquier County Public School system has agreed to set up a lawn mowing experiment on the campus of Grace Miller Elementary and Liberty High in Bealeton. During the school year, we'll take students to the experimental plots to survey insects there and they'll help us quantify the effects of reducing how often a lawn is mowed on insects. The students will get hands-on experience doing scientific research and help improve pollinator habitat at their schools.

If you've been bitten by the bug bug, you might be interested to know what you can do to support insects. Reducing the amount of land that you mow is a great strategy. Another strategy is to increase the abundance and diversity of native plants on your property. As you may know, most caterpillars can only eat one or two native plant species that they have coevolved with. We're also learning more and more about the extent to which bees, beetles, and other insects specialize on specific native plants. If you'd like to do more you can get in touch with our Landowner Outreach Associate to get advice about establishing native plants on your property, come to our plant sales in May and September to pick up some seedlings, or volunteer with our native seed collection projects. Together we can give insects some of the love they deserve and help reverse insect declines in Virginia!

Sincerely,

*Eleanor Harris*

Eleanor Harris, Co-Director

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**ABOVE:** Eleanor looks for bugs in the grassland with summer campers.

**COVER:** A summer camper admires a carpenter bee.

**BACK COVER:** A student surveys for ticks during our Young Scientists Research Experience.

# Insects Up Close

One person who got to spend a lot of time up close and personal with insects last school year was Sydney Houck, a University of Mary Washington student who completed a Smithsonian-Mason School of Conservation (SMSC) internship with us. Last summer our kestrel research technicians collected the detritus that was left in 40 American Kestrel nest boxes after the breeding season. Sydney sorted through the contents of 29 of the boxes to see what kinds of prey the kestrels were feeding their young. A lot of Sydney's work was done under a microscope and, as you can see below, even just pieces of insects serve as a reminder of the beauty we can miss when we're not looking closely.

As birds of prey, we often think of kestrels eating things like rodents and small birds, which they absolutely do. But Sydney found that insects made up approximately one third of the weight of the prey items that were found in the nest boxes! One interesting observation that Sydney made was that there were lots of wings of carrion beetles, like the one

shown here. The adult kestrels may have brought some into the boxes, but what we suspect happened is that the beetles were attracted by the smell of the kestrel prey remains and ended up being unwitting victims to the baby kestrels. It will require further analysis to identify many of the insects Sydney found, but we are confident about Green June Beetles, Carolina Grasshoppers, and Rainbow Scarabs. Sydney's analysis is providing data that are complementary to the work of other SMSC students who are watching footage from security cameras that we installed in kestrel boxes. Overall, we are collecting data from as many angles as possible to learn what kestrels need to reproduce successfully in our area.



**Above:** Insect parts collected from the bedding of kestrel nest boxes show an incredible variety of color, texture, and patterns.

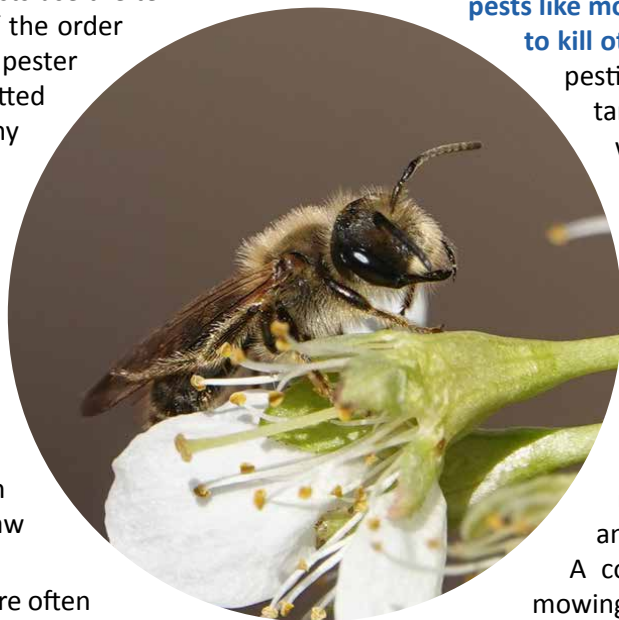
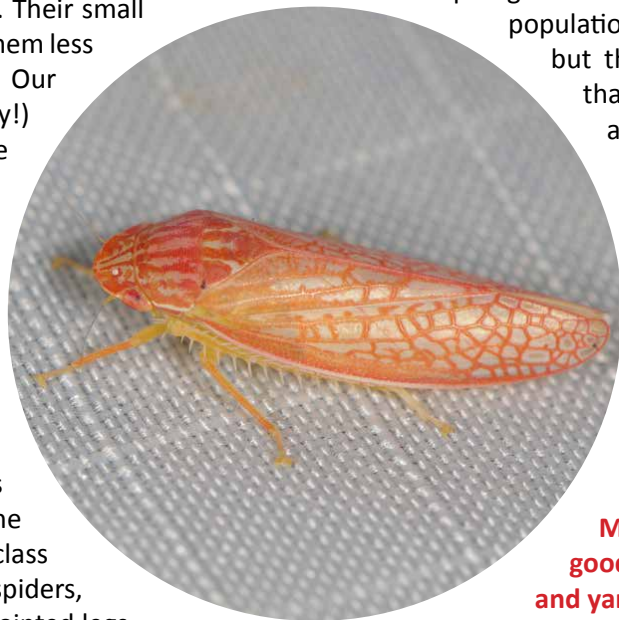
# Busting Common Bug Myths

If you dream of discovering a new species, get into insects. You are much more likely to find a wasp or fly new to science than you are to find a new bird or mammal or lizard. Scientists know much less about insects than they do about vertebrates and the same goes for the general public. While there are lots of birdwatchers and “herpers” (reptile and amphibian enthusiasts), many fewer people spend time with their faces in the grass looking at insects. Their small size and sneaky habitats also make them less conspicuous in our day to day life. Our lack of understanding (and empathy!) for insects can lead to unfortunate interactions and unwarranted fears. Here are a few common myths we’d like to dispel:

**Myth: “Bug” is just an informal word for “Insect.”**

**Fact: Entomologists use the term “true bug” for a specific group of insects.** While the term “bug” is used colloquially to refer to any of the species in the massively diverse class Insecta (and sometimes also to spiders, millipedes, and other animals with jointed legs and hard exoskeletons), entomologists use the term “true bug” to refer to a member of the order Hemiptera. There are true bugs that pester people, like stink bugs and Spotted Lanternflies, but there are also many many beautiful and charismatic members of the order. There are many ways to tell that an insect is a true bug, but here are some of the most common clues:

- True bugs have mouthparts that suck (as you may be familiar with from assassin bugs and aphids), as opposed to chewing or biting mouthparts. These mouthparts can often be seen from below as a straw folded up on the bugs’ bellies.
- The back half of true bugs’ wings are often clear, in which case where their wings intersect makes the shape of an X on their back.
- True bugs practice the art of incomplete metamorphosis. They hatch looking like miniature adults, but without wings. They will never look like a grub or caterpillar.



Next time someone points out a “bug”, you can ask, “Yes, but is it a *true* bug?”

**Myth: Honeybees are the most important pollinators.**

**Fact: Honeybees (*Apis mellifera*) are a domesticated species that is not native to North America.** Honeybees are often spotlighted in conversations about declining bee populations. Their population is decreasing, but that’s an agricultural problem rather than a conservation issue. Honeybees are valuable for pollinating food crops (although they are not the only insects we rely on for food), but the hundreds of native bee species are more important for pollinating the wildflowers in our local ecosystem. There are also lots of other animals that act as pollinators, including flies, beetles, ants, bats and hummingbirds!

**Myth: Mosquito and tick sprays are good ways to control pests in your home and yard.**

**Fact: Spray treatments may not effectively kill pests like mosquitos and ticks and they are likely to kill other insects too.** Despite claims from pesticide companies, it is difficult to target pests like mosquitos and ticks without harming insects you’re more likely to welcome, like butterflies and bees. On top of that, there’s a lot of uncertainty about the effectiveness of chemical spraying for mosquitos or ticks. Mosquitoes can fly over a mile and ticks are constantly moving around with the help of hosts like deer, mice, raccoons, and even birds, so new individuals will likely replace any losses from spray treatments. A combination of safety measures like mowing trails, doing daily tick checks and limiting standing water is probably more effective than constant spraying and definitely better for the other insects on your property.

**Top:** Leafhoppers like this *Gyponana badia* seen at Clifton last fall are in the order Hemiptera. They often come in psychedelic colors.

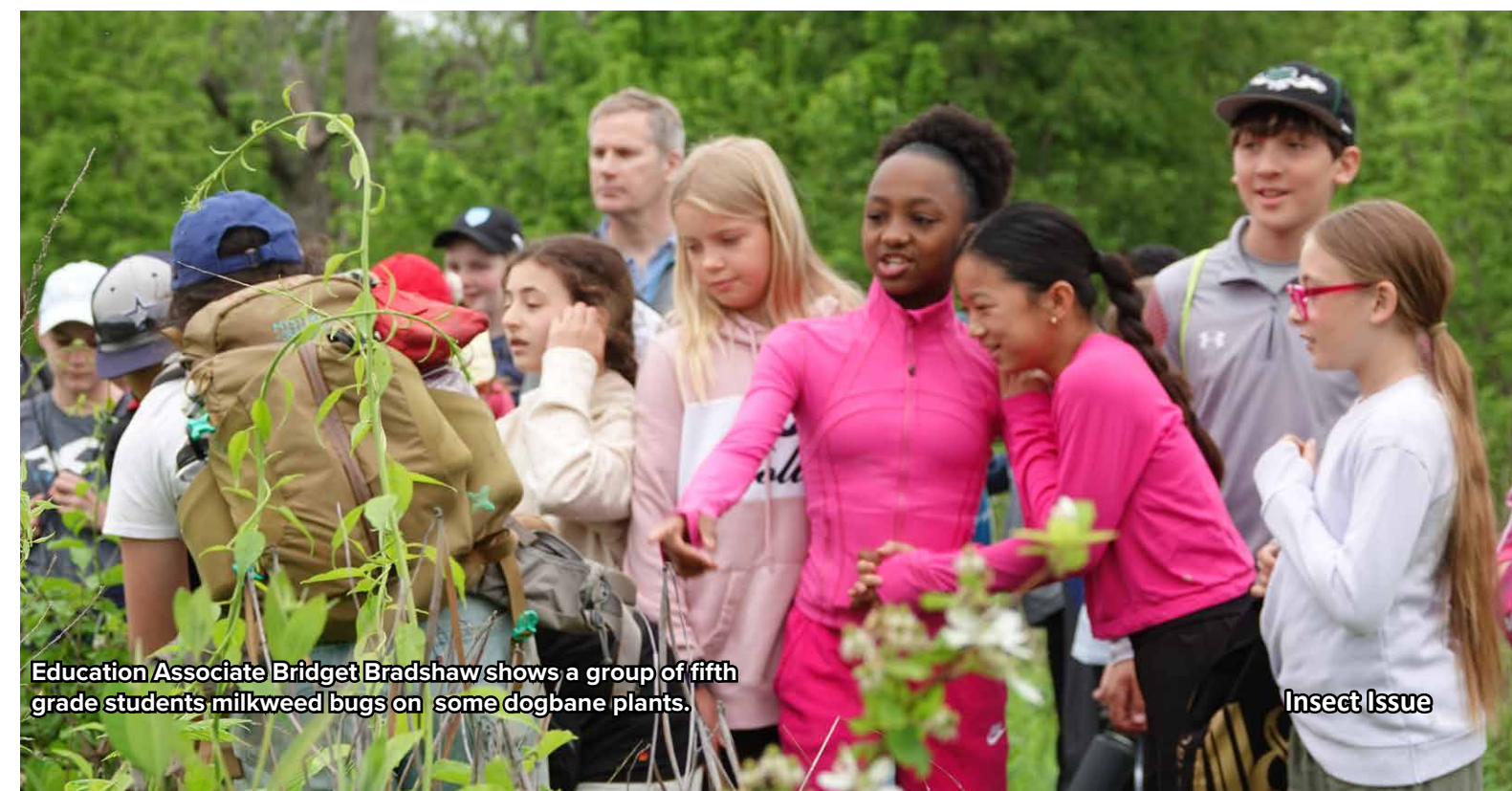
**Bottom:** This adorable mining bee (genus *Andrena*), seen at Clifton this spring, is an important native pollinator.

# Insect Investigation Field Trips

A lot of adults are scared of or weirded out by insects. But we’re not born that way. We teach a lot of children about insects every year (last school year 547 K-12 students attended 18 programs specifically about insects) and in our experience they love looking at bugs. Most of those students were here on an Insect Investigation field trip, where we take school groups out into our grasslands and shrublands to survey the insects that live there. We teach the students how to identify the six most common orders of insects (butterflies and moths, beetles, true bugs, grasshoppers and allies, bees and wasps, and flies) and then we set them loose with jars and nets and data sheets to keep tallies of what they find.

We usually give the students about an hour of bug catching time and at the end of that hour it’s hard to get them to stop. That’s not to say that their excitement about catching bugs isn’t sometimes mixed with a little bit of apprehension, as you can see in the photo below. We never make them get any closer than they’d like, but our educators’ enthusiasm and curiosity are usually at least a little bit contagious. After a field trip this spring a teacher wrote “My class was absolutely thrilled by the entire experience. My two who are ‘scared’ of bugs were completely at ease and were so proud of themselves for having such a great time!” While we don’t expect all of our students to grow up to be entomologists, we think they’ll at least be a little less likely to acquire the fear of bugs that so many of us have.

One of our rules for exploring the Clifton property is that everything that starts here stays here. That comes to the dismay of many students, who bring us grasshoppers and spiders and spittlebugs that they want to bring back home. The solution we offer is to take as many pictures as they want of whatever bugs they find and it is amazing how frequently we are asked to take a picture of a bug in a jar so that the photo can be shown to parents and grandparents and friends back at school. When they’re not being told that insects are gross or scary, children are so much more likely to find them cute and interesting. Our lives are that much richer when we are more open to finding wonder in the world around us.



Education Associate Bridget Bradshaw shows a group of fifth grade students milkweed bugs on some dogbane plants.

# Keeping Tabs on Dragonflies

People often share anecdotes with us about having very few Monarchs in their backyards or an unusual burst of dragonfly activity at their ponds and they ask us if we're observing similar things. It's valuable to make these kinds of observations, but it's easy for our brains to turn a single observation into a story about how insects are doing at large. The best way to track any kind of population is to do systematic surveys for many years in a row. **Unfortunately, unlike for birds, there are very few long term data sets about insects.**

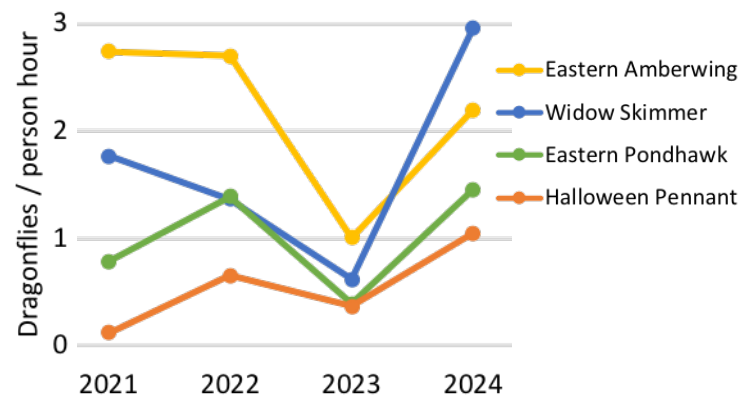
The North American Butterfly Association has been holding butterfly counts every year since 1993 (Clifton has been participating since 2009!) and that database is the foundation of what we know about how different species of butterflies are doing. There is not the same kind of national effort to collect the data on dragonflies, so in 2021 we started running one of only a few dragonfly counts in the country in a circle centered here at Clifton. This year we also added a count in Rappahannock county, which has a wealth of interesting dragonfly habitats.

Staff and volunteers identified 57 species of dragonflies and damselflies in the Clifton circle, including two new species for the count, Arrow Clubtail and Fawn Darner. We identified 49 species in the Rappahannock count, including a rare Dot-tailed

Whiteface. The photos to the right show some of the diversity of color, pattern, shape and size across the 69 species we have found so far.

Unlike birds, insect populations have booms and busts from year to year for reasons we don't fully understand, and insects are much more susceptible to changes in the weather. A cool rainy day makes it much less likely to see insects flying. A dry summer can make some pond-dwelling dragonflies practically vanish, even if they'll rebound just fine the following year, and that's exactly what we saw in the last two summers. These vicissitudes make it that much more important to have many years of data so that we can untangle year-to-year variations from long-term trends.

In addition to creating invaluable data sets, community science counts like these are a great way for participants to learn about dragonflies and to drum up some enthusiasm for them. A lot of people don't know that Virginia ranks third in the nation for dragonfly diversity, so just documenting 50+ species is a way to raise awareness about this understudied group and to get people thinking about how to conserve the aquatic habitats dragonflies rely on. Thank you to all the landowners and volunteers who made these counts possible! We're looking forward to seeing you next year!



One way to account for the number of people participating and the amount of time spent looking for dragonflies is to divide the number of dragonflies we find by the number of people and the number of hours spent, resulting in dragonflies per person hour. The graph above shows dragonflies per person hour for four of the most common pond-dwelling dragonflies in our area. 2023 was a low year for all four species, probably because of the intensely hot and dry summer we had. All four recovered well this year. You can also see how much they vary year to year. We will need more than four years of data to be able to say whether the populations of these and other species are increasing or decreasing and, if so, why.



From left to right below: Volunteer Emily Luebke surveys a stream. Education Associate Bridget Bradshaw's team looks for dragonflies in the pond at Clifton. From left to right above, some of the dragonflies we found this summer: Blue-ringed Dancer. Golden-winged Skimmer. Fawn Darner found flying at night (the first for the Clifton count). A darner emerging from its aquatic nymph stage, photo by Deneith Reif. Appalachian Jewelwing. Bar-winged Skimmer.



Every summer we look forward to welcoming a group of bright and curious middle and high school students at our Young Scientists Research Experience. Each student comes up with a research question, collects data, analyzes their data, and shares their findings during a presentation to friends and family, all in one week! This year, two students focused on arthropods (which include both insects and arachnids, among other groups). Check out the QR code for their full results, as well as those of the other five students.

Alistair surveyed spiders in different habitats using a sweep net. He found that orb-weavers were more abundant than wolf spiders, jumping spiders, or crab spiders and, in general, there were

roughly the same number of spiders in forested and open habitats. Lane was interested in understanding where ticks are most abundant. **He rigged up a weighted towel system (shown here) to drag through various habitats in order to survey ticks.** By the end of the week he had found more ticks on himself than on the towel, but the surveys still allowed him to conclude that there were actually more ticks on the trails compared to off the trails. There aren't many places young people can go to explore or embrace an enthusiasm for bugs and we're excited to see what these young entomologists go on to do.

