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

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PRESIDENT'S CORNER



by Charlene Donahue

I spoke to SWOAM (Small Woodlands Owners Association of Maine) at the Agricultural Trade Show in early January. The Director of the Maine Forest Service was there and afterward he remarked to my boss, "I don't know why all your people (read entomologists and forest pathologist) aren't alcoholics, their work is so depressing." He said that because often what we are asked to speak on is forest pests. I don't generally see my job as depressing. First, the native insects come and go. The forest is resilient enough to survive a few years of defoliation. Individual trees may suffer damage or die but the forest is fine. These outbreaks can be fascinating.

Take Bruce spanworm (*Operophtera bruceata*) for example. It looks like we are poised for an outbreak of this geometrid next year. This past summer I had reports of light defoliation across the central part of the state. The leaves of understory maple, beech and poplar looked like 'Swiss cheese' after the larvae had finished feeding. Then this fall there were large numbers of beige moths flitting through the woods in November. A field check in Charleston came up with spanworm males and two females. The females have only wing stubs so they do not fly and are about as big as a fat mosquito. The only reason I found the females was that when I went to collect a male moth off a tree the female was there too.

Bruce spanworm defoliate hardwood trees in early spring. The larvae hatch at budbreak and begin to feed on the leaves as soon as there is any green. They are done feeding and have dropped to the ground by early June, so often all people see is the damage. Although you can find a few moths every year, the last outbreak was in the late 1990s.

Looking back through the Forest Commissioner Reports to the turn of the century, there have been outbreaks about every 10 years since the 1960s and not much mention of it before then. An outbreak lasts for 2-3 years, and trees can be heavily defoliated with an accompanying reduction in maple sap production and some dieback. Overall, the impact is minimal.

It is assumed that parasites keep the spanworm under control. There is not much in the literature as to precisely what parasites or if there is a disease component to the control as well. Also, south of Maine, Bruce spanworm is a regular part of the forest fauna but rarely goes into an outbreak phase. Why is that?

Why do we care? If we understand the mechanisms of natural pest control then perhaps we can do a better job finding solutions to invasive pest problems. If we understand the inter-relatedness of an ecosystem maybe we can be better stewards of the land. If we learn more about how the world works, maybe we will take better care of it. And sometimes it is just interesting to know something new.

With Bruce spanworm, there is an immediate need to understand how the population stays in balance in the forest ecosystem. A very closely related invasive species, winter moth (*Operophtera brumata*), appears to be working its way into Maine and we may see the first outbreak in the midcoast this coming summer. Winter moth has been in Massachusetts since the early 1990s, and is defoliating thousands of acres of forest every year. I am not going to go into its history here, but winter moth is so closely related to Bruce spanworm that they mate and produce viable offspring. But the natural pressures that keep the Bruce spanworm under control do not seem to have the same effect on winter moth. Why is this? Again, what is it that suppresses the Bruce spanworm populations?

I find this work fascinating and challenging. It means digging into old reports and journal articles, talking to colleagues and devising ways to study the problem. I do not see it as discouraging. What I find discouraging is people's lack of knowledge about the natural world and their aversion to insects. I think MES is a great vehicle to expand our understanding of insects and pass on our passion for them.

And I have started prefacing talks about invasive and pest insects with a brief introduction to all the GOOD things insects do in the forest.

This summer I will be collaborating with researchers from Massachusetts in studying Bruce spanworm and winter moth. We will need locations to collect Bruce spanworm larvae and possibly people willing to rear them. Did you see a moth flight in November? I would be interested in knowing where. Are you interested in looking for spanworm larvae this spring? Please let me know. And for winter moth; if you live near the coast or in southern Maine – did you see moths around your dooryard lights in December? Please give me call or email me: 287-3244 or charlene.donahue@maine.gov. Thank you for your help!

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***Apocephalus borealis* Brues (Diptera: Phoridae): A Maine Parasitoid Fly Now Documented on Honeybees in California**
by Bob Nelson

A recent paper (Core *et al.*, 2012) has documented yet another potential contributor to beehive abandonment consistent with Colony Collapse Disorder (CCD): a parasitoid fly.

The fly, *Apocephalus borealis*, was first described by Brues (1924) based on a specimen from Salisbury Cove on Mount Desert Island that was collected by C. W. Johnson in 1913. Subsequently, specimens collected from 1902-1959 (housed in the MCZ and USNM) documented its presence also in Belfast, Mt. Katahdin, Orono, Old Town, and Bethel; the species is thus likely to be found throughout the state (pers. commun. from Brian V. Brown, Entomology Section, Natural History Museum of Los Angeles County). There are, however, no specimens in the MFS collection in Augusta (pers. commun. from C. Donahue). The species is known transcontinentally in the United States (Core *et al.*, 2012) and probably across at least southern Canada as well.



Fig. 1. *Apocephalus borealis* Brues female habitus photo by Jessica Van Den Berg

Though most members of this genus are parasitoids on ants, this species is in a subgenus (*Mesophora*) which has previously been documented as a parasitoid on paper wasps and bumblebees (Core *et al.*, 2012). The paper by Core *et al.* was the first to document it as a parasitoid on honeybees, though a related genus, *Melaloncha*, has eight species known as honeybee parasitoids in the American tropics (pers. commun. from Paul Kozak, Provincial Apiarist of Ontario, to Maine State Apiarist Tony Jadczyk).

Prof. John Hafernik of San Francisco State University observed the unusual circumstance of apparently disoriented honeybees at lights in the evening, even during rain events when no other insects were at the lights. He collected live specimens which subsequently died, only to yield emergent fly larvae which then pupated. His team subsequently set

out to evaluate the regional extent of the infestation, and to document the genetics of the Phorids involved.

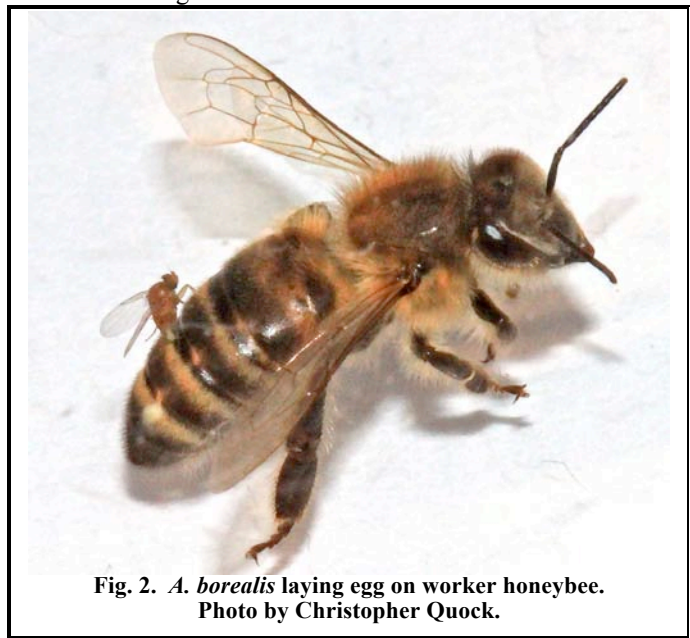


Fig. 2. *A. borealis* laying egg on worker honeybee. Photo by Christopher Quock.

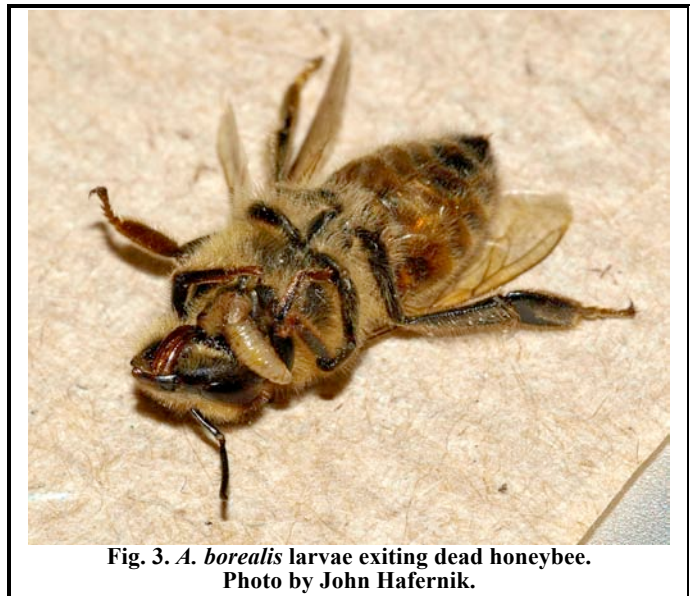


Fig. 3. *A. borealis* larvae exiting dead honeybee. Photo by John Hafernik.

Subsequent sampling of 31 hives in the greater San Francisco Bay Area showed that 77% of them (24) were parasitized by *A. borealis*. Though the authors considered that the species may have been infecting honeybees at undetected but low densities in the past, they believed it more likely that this represents a potentially ominous host shift for the species.

Frank Drummond and one of his graduate students at the University of Maine have not encountered a single infected bumblebee in an ongoing study of parasitism in Maine bumblebees, despite dissection of numerous specimens (pers. commun.). The host for *A. borealis* in Maine thus remains a mystery.

Given that *A. borealis* is undoubtedly widespread in Maine, this is probably something for which we should watch. Honeybees at outside lights at night are unusual enough to warrant attention. Specimens so encountered should definitely be live-captured and held for observation. Persons wishing to monitor hives for potential infestation

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Phorid fly Parasitizing Honeybees (cont.)

could set up light traps nearby to collect night-active specimens for evaluation. There will undoubtedly be a nationwide watch for *A. borealis* as temperatures warm in the spring.

Acknowledgments:

Dr. John Hafernik very graciously answered multiple questions for this piece and generously provided the photos, which were previously published in the Core *et al.* (2012) article. Dr. Brian Brown provided information on the known Maine localities for *A. borealis*, and Dr. Tony Jadczyk shared of his knowledge of the group as well.

References:

- Brues, Charles T., 1924: Notes on Some New England Phoridae (Diptera). *Psyche*, v. 31, issue 1, pp. 41-44.
- Core, Andrew, Charles Runckel, Jonathan Ivers, Christopher Quock, Travis Siapno, Seraphina DeNault, Brian Brown, Joseph DeRisi, Christopher D. Smith, and John Hafernik, 2012: A New Threat to Honey Bees, the Parasitic Phorid Fly *Apocephalus borealis*. *PLoS ONE*, v. 7, issue 1, p. 1-9.
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Finding *Isodontia*: Is identification by Ethology Valid?

by Monica Russo and Kevin Byron

In mid-July, 2011, a friend in Wells called about a wasp that was using a small rolled-up awning to nest in. When the awning was opened, out fell long strands of dried grass, and at least three small moribund or paralyzed green grasshoppers. My friend (Jane) saved the hopper carcasses for evidence, rolled the awning back up, and later saw that a wasp was returning with strands of dried grass (which were longer than the wasp itself).



**Fig. 1. One of the grass-stuffed holes in the cedar block.
Photo by Kevin Byron.**

I figured that the wasp must certainly be an *Isodontia* wasp, called the "Grass-Carrier" in some books, and nicely described in Howard Evans' *Wasp Farm* (Evans, 1963). Although it is a Sphecid wasp like the fossorial Great Golden Digger and Great Black Wasp of Pennsylvania, it does not nest in the ground. Instead, it uses hollow woody stems or borings in wood, either man-made or tunneled by other insects. I confidently told my friend it must be an *Isodontia*, without having a specimen in hand. (!)

Isodontia is not included in the Hymenoptera list of the

Forest Insect Survey of Maine (Dearborn and others, 1983). However, Mike Mazurkiewicz told me he'd encountered this interesting hunting-wasp several years ago in Falmouth, nesting in the crevices of an Adirondack chair.

In early September, my friend Jane called again and said that it looked like the grass-carrying wasps were nesting in a cedar wood-block. This is a commercially produced vespiary/apiary block drilled with holes to attract hole-nesting pollinators such as *Osmia* bees. The nesting block is available in some garden catalogs.

On September 11, Kevin went to observe the block late in the morning and found that at least five holes were stuffed with dried grass, and some ends were sticking out. He took photos of the nesting block showing the coiled grass ends. He observed an *Isodontia* going into a hole and coming back out, and caught her. We put her into the refrigerator to chill her so photos could be taken. I assumed it must be very close to the end of nesting season, so we did feel the small colony was jeopardized by taking a specimen. But on September 18, Jane called again to say that the wasps were entering the rolled-up awning once more.

I sent the grasshopper specimens to Don Mairs for identification, and he reported that they were *Conocephalus*, one of the several different genera which *Isodontia* females hunt (Krombein, 1979).

Has anyone else in Maine seen the Grass-Carrier? I felt so sure about my initial over-the-phone identification, with no specimen in hand, but that is not good science. I had identified the insect by ethology: behavior, predator-prey dynamics, nesting material and habitat adaptation.

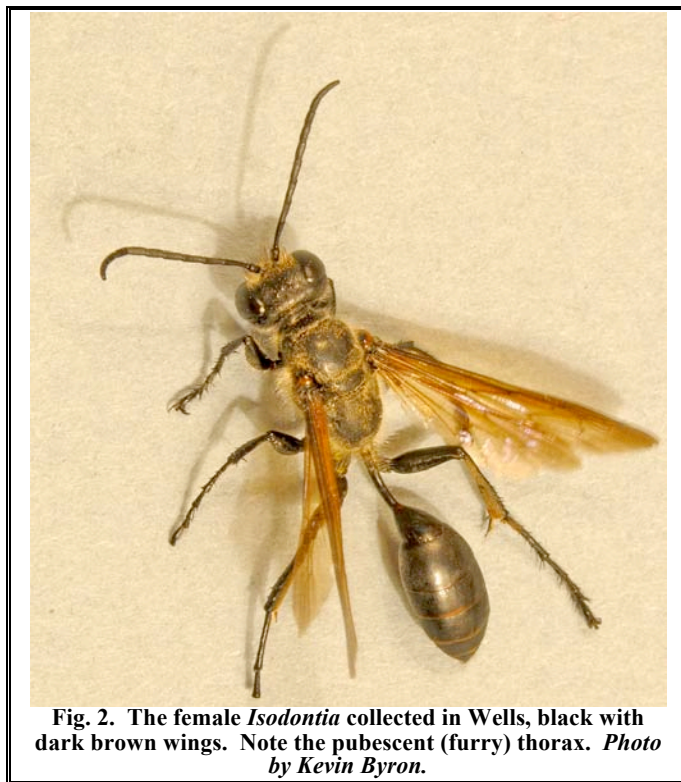


Fig. 2. The female *Isodontia* collected in Wells, black with dark brown wings. Note the pubescent (furry) thorax. Photo by Kevin Byron.

Fortunately, the specimen which Kevin collected and photographed did show gross morphological appearance similar to a photo in *Sphecid Wasps of the World* (Bohart and Menke, 1976), along with an illustration of facial details. And the wing venation matched that shown in *The Sphecoidea of Southern Quebec* (Finnemore, 1982). Whew!

Many thanks to Jane, Mike and Don for their help.

(Continued on next page)

Finding *Isodontia* (cont.)

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- Bohart, R. M., and A. S. Menke, 1976: *Sphecid wasps of the world: A generic revision*. (Berkeley, California: University of California Press); 695 pp.
- Dearborn, R., R. Bradbury and G. Russell, 1983: *The Forest Insect Survey of Maine: Order Hymenoptera*. (Augusta, Maine: Maine Forest Service, Dept. of Conservation); Technical report, Entomology Division, no. 20; 101 pp.
- Evans, H. E., 1963: *Wasp Farm*. (Ithaca, New York: Comstock Publishing Associates); 178 pp.
- Finnemore, A. T., 1982: *The Sphecoidea of Southern Quebec (Hymenoptera)*. (Ithaca, New York: Cornell University Press); 348 pp.
- Krombein, K. V., ed., 1979: *Catalog of Hymenoptera of America North of Mexico*. (Washington, D.C.: Smithsonian Institution Press); 2209 pp. in 3 volumes.

Ed. note: Brandon Woo has also posted a nice photo of this species (*Isodontia mexicana*) from Kennebunkport on BugGuide, at <http://bugguide.net/node/view/557012>.

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Winter Workshop Sees Record Turnout by Bob Nelson

The 2012 M. E. S. Winter Workshop on Aquatic Entomology was held on Saturday, January 14th, at the Maine Forest Service facility on Bolton Hill, in eastern Augusta. This was the first time that a workshop had been held at this location, made necessary because prior localities at the Forest Entomology Lab and the Department of Agriculture were too small to accommodate the large number of people who wanted to participate. Even with this change, a "wait list" became necessary, although in the end we got everyone in who could make it. Over 30 people were actively engaged in this workshop event.



Fig. 1. The Winter Workshop this year was a record-setter for participation. Don Chandler (standing, right rear) once again made a seemingly monumental identification challenge seem a very realistic goal for those participating.

The focus of the workshop was on aquatic insects, to complement the Acadia Entomological BioBlitz this next July. Since the diversity of insects that spend all or part of their life cycles in aquatic environments is vast, those groups that had been the focus of previous Blitzes and workshops (e.g., Diptera, Coleoptera, Hemiptera, etc.) were skipped, in order to focus more specifically in two major groups that had not previously been covered in either a Blitz or Workshop – the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies). Odonata were covered by Harold White years ago, prior to the first Blitz, though data may be incomplete for the Schoodic Peninsula.

Don Chandler, of the University of New Hampshire, really outdid himself this time. He discussed the specialized collecting techniques needed to find larvae in the aquatic environments, as well as for some of the more crafty adults.

As usual, he also had handouts on the key groups, along with illustrated keys on how to differentiate between the families that one would encounter in New Hampshire or Maine.

One of the key elements of Don's teaching style in these workshops that is much appreciated, is that he focuses identification on those key criteria that can usually be readily recognized and identified by educated amateurs. While major taxonomic keys on various groups may ask you to determine whether there are two or three setae on a procoxal plate, to separate out a neotropical genus known only from Florida and the Caribbean, Don's focus tends to be on larger, more obvious, and much more useful structural elements. His paring down of the options as well to include **only** those families to be found in this region also simplifies life greatly. In addition, his PowerPoint slides have arrows on each of the photos of representative specimens, indicating the key features for which to look (see Fig. 2, above). A third handout for all participants was a complete printed set of his PowerPoint slides.

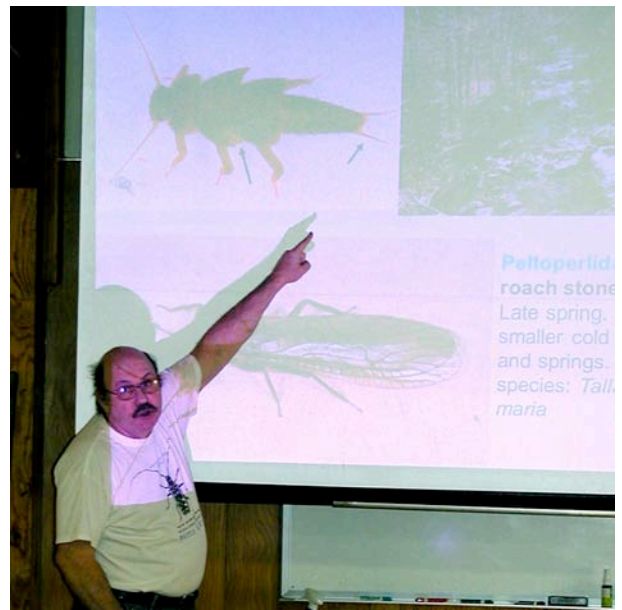


Fig. 2. Don Chandler points out key features to identify the larvae of the Peltoperlidae, or roach-like stoneflies.

Don noted that for the three major groups he was covering in the Workshop (the mayflies, stoneflies and caddisflies), collecting might be very limited at the mid-July Blitz. Now and into spring would be the best time to be collecting larvae. "You've got to tolerate being cold to get a good diverse collection of these guys," he declared. Since mayflies don't feed as adults, they rarely live more than 48 hours after the transformation from subimago to imago (the fully adult form), so collection of adults must be at the time of emergence, unless you rear them. The actual emergence times for various taxa is knowledge that Don said is probably much better known in the fly-fishing community than it is in the scientific literature, though for a relatively small number of species used in determining water quality.

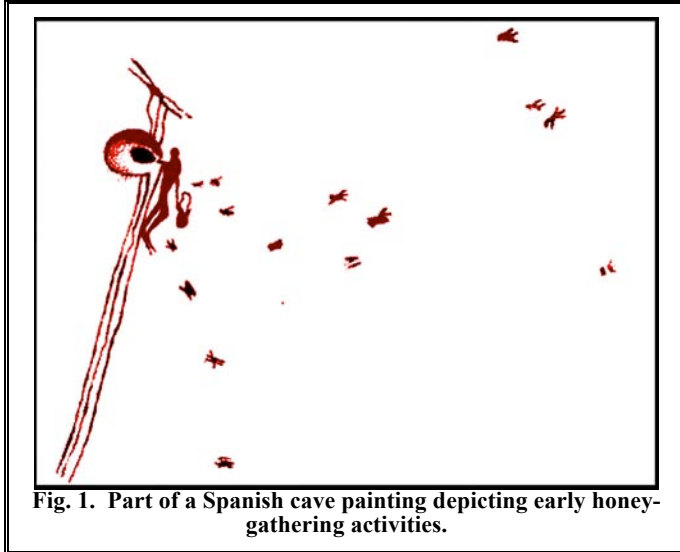
The workshop included significant laboratory time at the microscopes, with scores of specimens in alcohol for study by all participants. And if the temperature hadn't been hovering in the single digits with a good stiff breeze to drive the wind chill below zero, some participants likely would have left the workshop and gone directly out to do some collecting!

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HONEY! by Fred Gralenski

I got the inspiration for this essay at breakfast. I mix up some oatmeal, bran, slices of wild apple (these will run out in a few weeks), a couple of tablespoons of ground up flax seed and sunflower seeds, and top it off with a tablespoonful of honey. Add some water, stir, then zap this for 6 minutes at a power level of 6, add a little milk and UMM! UMM! Fit for a king.

People have been using honey as a sweetener for thousands of years. The oldest reference seems to be a 10,000 year old cave drawing in Spain depicting a couple of women collecting honey (see Fig. 1). (Of course, with two unclad maidens with baskets on a rickety ladder approaching a bee hive, this may also be the first noted record of a pinup).



Mago of ancient Carthage wrote much about agriculture and bees and honey. In biblical times John the Baptist ate locusts and wild honey, and a land of milk and honey was a good place to live. Honey was commonly used in all parts of the old world. In the Western Hemisphere before Columbus there was some honey harvested from stingless bees by South American natives, but honey bees as we know them were not here until the early European colonists.

Looking at the USDA production data from 2010, the US produced over 175 million pounds of honey. Surprisingly, the state that produced the most honey was North Dakota, with over 46 million pounds. Maine was not a heavy producer of honey, with a total production of about 246,000 lbs. The data is a little fuzzy as to whether or not this includes the hives brought in for blueberry pollination, but interestingly our production of honey was more than that of Virginia. Since Virginia encompasses Washington D.C., I guess the production of sweet talk is more important down there.

The country that produces the most honey is China, with over 200 million lbs. produced last year. There was some controversy early in the year about China sneaking 60 million pounds of ultra-filtered honey through India and into the U.S.

If you want to get some real honey from our own lupines and goldenrods, etc., complete with a little pollen and all of that other good stuff, buy your honey locally. I get mine from Stephen Taylor of Pembroke. He claims this year was pretty good, and his hive production was very satisfactory, at about 60 lbs. per colony.

Bee keeping can be an iffy hobby, and some say that coastal properties are especially vulnerable. Bees are very susceptible to just about any pesticide, even if it doesn't kill them outright, as bees, like any of us that are under the weather, just won't produce. One beekeeper in Lubec had a poor year, lost one hive, and the other hives had such marginal honey production that they opted to leave the honey for the bees for winter food.



We have all watched the busy worker bees harvesting the nectar and pollen, but we are not privy to see what goes on in the hive, and we have to rely on beekeepers and scientists. When the worker bee goes into the hive with a gut of nectar, she regurgitates the partially worked nectar into a 'house' bee. (This is called 'trophallaxis', not mouth-to-mouth puking). The house bee somehow 'works' the nectar by digestion and drying (?) until it has the proper consistency of honey (i.e. very little moisture and a pH of about 4.0) so it can be sealed in the comb for later use. Honey in this state will last indefinitely, as no fermenting organisms can live in it. However, the endospores of the bacterium *Clostridium botulinum* can survive, and with enough moisture, the bacterium will flourish and be viable, and may cause Infantile Botulism. Don't feed raw honey to an infant, even during the holidays! Us old geezers, however, can enjoy it with impunity on our breakfasts.

Honeybees are opportunists, and aren't above stealing a little sweetener from aphids, if the ants don't get it first. Apparently, in some isolated Western areas, much of the nectar is gotten this way. Beekeepers have to be aware that this is not a good diet for bees, as the pollen is missing, and make sure the necessary dietary supplements are available.

Bees do need a regulated social structure, as no matter where they get the nectar, it takes an operating hive with many levels of different workers to produce honey, and this is only the foodstuff part of the organization. The political system is explained in *Honeybee Democracy* by Thomas Seeley*. Here in Maine, the honeybees will shortly, if not already, start to get the hive functioning, and the queen producing eggs and the workers tending, so a good supply of laborers are ready for the first warm days of summer. Good luck, guys (well, gals)! I don't want to run out of honey!

* *Reference:*

Seeley, Thomas D., 2010: *Honeybee Democracy*. Princeton, N.J.: Princeton University Press; 280 pp.

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The Elusive Arrowhead Spiketail Dragonfly (*Cordulegaster obliqua*) Poses Intriguing Challenges by Mark Ward

If you're like me, you can experience an incredible sense of joy when you make the new acquaintance of one of our invertebrate friends. That experience can be even further enhanced when the critter in question has been one that has eluded you for some time. Such has been the case for me with the arrowhead spiketail dragonfly (*Cordulegaster obliqua*).

From 2001-2004, I participated as a volunteer in the Maine Dragonfly and Damselfly Survey (MDDS), without coming across this species. That isn't surprising. I didn't focus any particular attention on finding it during those years. And a host of surveys by many other volunteers throughout the state during that same time yielded only two records of this species. The lack of recorded MDDS occurrences for the arrowhead spiketail contributed to its designation in Maine as a "species of special concern"—that is a species that might be endangered or threatened in the state, but for which insufficient data are available.

Spiketails are large, black dragonflies with strikingly bold yellow markings. They are quite spectacular! Spiketails are so named because the long ovipositor of the female extends beyond the tip of the abdomen. Females lay their eggs by hovering over shallow water and driving the long ovipositor vertically into the bottom substrate in a manner reminiscent of a sewing machine. Spiketail larvae are found in streams or seeps where there is flowing water.

The arrowhead spiketail is one of three species of spiketails (Family: Cordulegastridae) in Maine. All three Maine species belong to the genus *Cordulegaster*. The other two members of the genus in Maine, the delta-spotted (*C. diastatops*) and twin-spotted (*C. maculata*) spiketails, are not uncommon in the state and have been documented from most counties. I have come across these species on plenty of occasions and you may have as well. Both species have paired yellow dorso-lateral markings on their abdominal segments. Arrowhead spiketails, by contrast, have only a single row of yellow dorsal spots on their abdominal segments and the spots on abdominal segments 4-8 have a unique and distinctive arrowhead shape. The distinctive pattern of abdominal spots makes them relatively easily to distinguish in the field, but only if you come across them!

The arrowhead spiketail really came onto my radar screen in 2005. I was fortunate to have the opportunity to do some targeted odonate work for the Maine Department of Inland Fisheries and Wildlife (MDIFW) in the Eastern Lowlands Ecoregion (in 2005 & 2006) and in the Western and Central Mountains Ecoregions (in 2007 & 2008). The arrowhead spiketail was one of a number of species targeted during those efforts. While the work yielded some very good discoveries of riverine and peatland species, the arrowhead spiketail continued to elude me.

One of the challenges that this species presented was identifying potentially suitable habitat on a macro scale. The arrowhead spiketail favors small forested spring fed streams and seeps, which are difficult to pick out on topographic maps or aerial photos. When sampling over these large regions, it was much easier to pick out potential habitat for peatland and riverine species. So my searches for the arrowhead spiketail were mostly opportunistic. When heading to a riverine or peatland site in late June or July, if I saw potential habitat for this species, I would check it out. I did this for four years in far flung locations in Maine without any success. The lack of success, however, only reinforced my desire to find this species.

In July 2009, I was visiting mixed woods in southern Maine, searching for spicebush swallowtail caterpillars, when I noticed a black dragonfly with yellow spots zip by me. The location was over a very small intermittent stream in the woods. I didn't get a great look at it, but in the brief glance it appeared to have just a single row of spots. As you can imagine, my attention shifted immediately from caterpillars to this tantalizing odonate observation. I adjusted my location slightly to maximize the breadth of the stream within my view. Surprisingly, after only a minute or two, I saw it flying again, but this time in the opposite direction. I got a better look, and it had undoubtedly only one row of dorsal spots! I was sure that this was the elusive arrowhead spiketail. Now my heart was racing, but of course I would have to get it in hand to be 100% sure. Fortunately, I had my net with me (let that be a lesson to you all!). So I found a location beside the stream which allowed both good visibility and an opportunity to swing the net freely. Then, I waited. At last, the opportunity arrived. I saw the spiketail approaching from upstream. But before it reached me, it paused and perched itself at an angle on a twig near the stream almost as if it were tempting me. Did it somehow know how desperate I was to get it in hand? Carefully I approached, and gently nudged my net beneath it, before the moment of action. Then, "Swoosh" I had it in my net! Pulling it out, I finally had the chance to take in its spectacular green eyes up close! Face to face at last with the arrowhead spiketail! After eight years, the long search was over. But the story doesn't end there.

The following year (2010) in Orono on an outing with Bronco Quick, we caught two arrowhead spiketails in flight along an abandoned railroad track corridor! It wasn't clear where their aquatic habitat was located, but the two individuals strongly suggested that suitable habitat must be found nearby. Later that summer, while prepping my house in Bristol for painting, I spotted a dark dragonfly perched on the house about 10 ft off the ground. You can imagine my shock when it turned out to be an arrowhead spiketail! What were the chances of finding this long sought after species at rest on my own house! I thought of the small intermittent stream behind the house and determined that it deserved some exploration, but for a variety of reasons (including house painting) that search waited until this past summer.

I was prompted finally begin that search, after fortuitously coming across yet another arrowhead spiketail in June 2011 patrolling on a small stream in Biddeford. You know how it is when you get introduced to someone for the first time, and then suddenly you start to see that person everywhere you go? That's sort of the way that it has begun to feel with me and the arrowhead spiketail. When I finally got to the small stream behind my house on July 2nd, it took only five minutes to observe my first male arrowhead spiketail patrolling. On repeated visits to this stream last July, I observed several males on each visit. For years, I had searched in vain for the arrowhead spiketail only to discover that there is a resident population in the stream in my own backyard! The irony in that has not been lost on me. It reminds me of how easy it can be to look past the tree to the forest. On the other hand, I now have an incredible opportunity very close to home to become better acquainted with this "elusive" species. And as I have done so, my curiosity has only grown.

On my visits last July, I observed that males patrol in a determined, but halting manner. They seemed to rapidly advance about 5 meters at a time, pause, hover, then advance again in a very regular way. After moving upstream in this halting pattern, they reach the end of their territory, turn around and retrace their path in the downstream

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Arrowhead Spiketail Dragonfly (cont.)

direction. The substrate at patrolled sections varied widely from sand to silt to exposed bedrock. Their patrolling flight was generally very close to the water's surface, and I found it difficult to net them because even a slight wobble in the net's trajectory yielded a big splash and an empty net. When disturbed in this way, I observed males fly high up into the canopy. Although I wasn't able to quantify it, the number of individuals in flight seemed to diminish as it got later into July. The last day that I observed adults was on Aug 1st. I didn't observe any females, except for one that I found dead on the road near where the stream runs underneath it. The amount of water in the intermittent stream sometimes varied dramatically from one visit to the next. After a recent rain, the stream carried a significant volume of water, but after several consecutive hot, dry days in late July surface flow appeared to cease in some sections.

I've tried to do a little bit of digging into what is known about the ecology of this species, but have found very little in the way of dedicated studies. Although this species range throughout eastern North America is rather large (from Quebec to Wisconsin in the north and from Florida to Texas in the south), it is generally described as being very localized within that range. Many states list its status as being vulnerable (S3), imperiled (S2) or critically imperiled (S1). I'd like to verify that the localized habitat label is indeed accurate here in Maine. Based on my observations over the last few years, I suspect that it is more widely distributed in Maine, but still not abundant. If that is the case, then I'd like to get a better sense of what factors limit its distribution. Is it likely to be found at streams that host other dragonfly or spiketail species? I observed *C. diastatops* in flight at the stream in Biddeford in June, but did not observe any other dragonflies at the stream behind my house last July. I'd also like to get a better understanding of the behavior and habits of adult females (and have the opportunity to observe their unusual style of oviposition!). The larval lifespan of this species is also not well understood. In general, spiketails are thought to spend from 2-5 years as larvae, but I couldn't find anything more definitive than that for the arrowhead spiketail.

So, as you can see I've become a little bit obsessed with this species. But you can help! If you have a small wooded stream nearby take some time on a sunny day in June or July to look for this critter. I'd love to know what you find (maward@midcoast.com). If you are able to net one or take a photo, then please submit your data to the MDDS and/or report it to MDIFW on a Rare Animal Form since this species is still considered a species of special concern. Oh, and don't forget to keep your net close at hand at all times, you never know when opportunity will strike!

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Eagle Hill Schedules Summer Workshops

The Humboldt Field Research Institute at Steuben has completed its rich and varied schedule of summer workshops for 2012, which can be accessed directly from the newly revamped M.E.S. web page. The first scheduled workshop starts on May 27th, and the last (on migratory birds) runs from 9-15 September.

Only one entomology workshop is currently on the agenda, dealing with aquatic insects. This is scheduled from July 29th through August 4th, two weeks after the Aquatic Insect BioBlitz at Acadia National Park.

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MARCH Field Day: Maple Sugaring in Whitefield: Saturday, March 17th

Maple syrup buckets often contain a fascinating assemblage of insects, plus there are insects on tree boles, in the woodpile and tucked in other nooks and crannies this time of year. There is a seep open all winter down near the river and wetlands across the road.

Come visit a backyard sugar operation, enjoy the company and collect a bug or two. Dress for the weather and be sure to wear boots, bring snowshoes if conditions permit, as well as your lunch and drinks. If the sap cooker is running there are usually people hanging out, and it's a laid-back time (until a batch of syrup is ready to come off!). **Contact Charlene Donahue** if you're planning to attend, at 549-7241 or via e-mail: charlene.donahue@maine.gov. The fun begins at **10:00 a.m.**

Directions: Take Rte. 17 east out of Augusta. Go 12 miles, turn right onto Rte. 218 (Mills Rd.). The house is 0.8 mi. down the road, on the right. It's a cream-colored cape, with a garage with rounded doors.

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Entomologists Needed Here!
by Kathy Murray

If you've ever been a part of Bug Maine-ia, the State Museum's annual insect-themed event, you know how exciting it is to share your knowledge and love of insects with children. But you don't have to limit yourself to one day a year. There are many opportunities to reach and inspire the next generation. And they need you! It is well-recognized that the majority of Americans are lagging in scientific literacy. Yet everyone, from CEOs and policy makers to homeowners and scout leaders, needs a basic understanding of science. What better way to help protect the planet and conserve insects than to teach young people?!



Children enjoy learning about insects and safer ways to keep them in check at the 2011 New England Environmental Education Conference, from Serena Sanborn, an educator at the LC Bates Museum in Hinckley, Maine. The LC Bates Museum is an active partner in the Maine Department of Agriculture's K-12 IPM Education Project.

The Maine Department of Agriculture was awarded a 3-year grant aimed at improving science literacy among the next generation of citizens through integrated pest management (IPM) education. By partnering with classroom teachers, environmental educators, entomologists, (Continued on next page)

Entomologists Needed (cont.)

and specialists in the 12 northeastern states we have introduced IPM lessons to nearly 2000 teachers and more than 20,000 students. We've visited 175 classrooms in 109 schools in Maine, Connecticut and Pennsylvania. We've developed new lessons for teaching about insects in a school greenhouse setting and created a website for teachers to easily access lessons, activities and other resources.

What have we learned? Teachers and students need and want entomologists! They love and welcome volunteers! Kids love insects and teachers appreciate the help. And insects are a great tool for teaching scientific concepts that blend well with academic standards. It is easy to be a hero! Download a lesson or activity from our website (www.maine.gov/agriculture/pesticides/school-ipm-curriculum/index.htm) and bring it to your local school. Or just bring a sweep net and take the kids out to the school yard to look for insects! Or bring an insect collection or some live insects. Read to them from an insect-themed children's book. Join them at a school garden day – many schools have started gardens and want help in identifying insects found there.

Just call the school's office and volunteer to share your excitement and knowledge of insects. Or volunteer with your kids' or grandkid's classroom. Or contact me for a list of schools, teachers and events needing your help. If volunteering in the classroom is not for you, Facebook members can still participate by sharing insect news and events on our Facebook page for teachers and kids at <https://www.facebook.com/pages/No-More-Pests-IPM-for-Teachers-and-Kids/267894009921321> (or, via a shortcut at <http://tinyurl.com/7wlsazo>).

Share an hour (or less) of your time and be richly rewarded.

Kathy Murray, IPM Entomologist
Maine Department of Agriculture, Food, and Rural Resources

207-287-7616; Kathy.murray@maine.gov
www.maine.gov/agriculture/pesticides/school-ipm-curriculum/index.htm
www.gotpests.org
www.maine.gov/IPM
<http://www.thinkfirstspraylast.org/schoolipm>

COMING M.E.S. EVENTS in 2012:

- | | |
|--------------|---|
| 17 March | Maple Syruping Day, Whitefield; contact person: Charlene Donahue [207-287-3244] |
| 19 May | M.E.S. field day, Pownal; contact person: Domenica Vacca [207-967-6159] |
| 16 June | M.E.S. field day, Belgrade; contact person: Bob Nelson [207-426-9629] |
| 13-16 July | Acadia Entomological BioBlitz [Aquatic taxa]; Schoodic Education and Research Center, Acadia National Park; contact person: David Manski [207-288-8720] |
| 11 August | M.E.S. field day, Otisfield; contact person: Charlene Donahue [207-287-3244] |
| 8 September | Annual Meeting, Clinton (Kennebec Co.); contact person: Bob Nelson [207-426-9629] |
| 12 September | Bug Maine-ia, Maine State Museum, Augusta; contact person: Joanna Turow [207-287-6608] |

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



Maine Entomological Society
c/o R. E. Nelson
Department of Geology
Colby College
5804 Mayflower Hill
Waterville, Maine 04901-8858 U.S.A.

Please visit our website at <http://www.colby.edu/MES/>

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