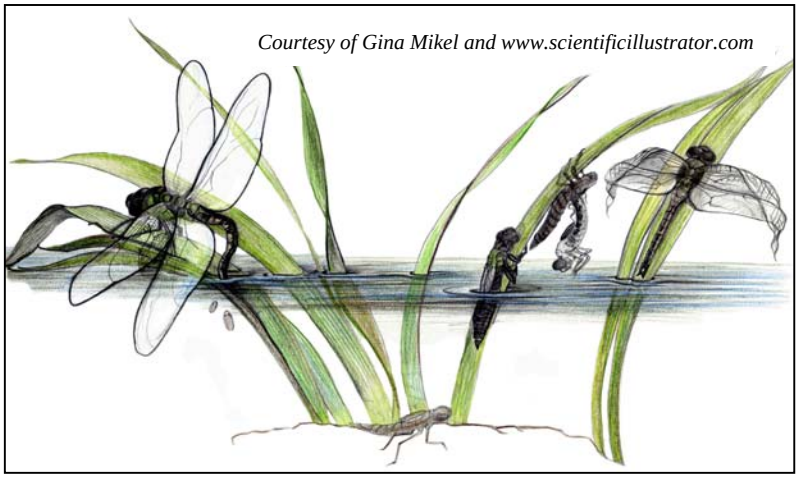
The gloworm

23 April 2007 Volume XV No. 3

Artwork for Camp shirt contains a lesson in aquatics!



Courtesy of Gina Mikel and www.scientificillustrator.com

We are fortunate this year to have artwork from Gina Mikel, a scientific illustrator, for our camp T-shirt. Her website, www.scientificillustrator.com contains images of aquatic arthropods and other biota including plants and animals. Gina Mikel received a Bachelors of Fine Art from the Art Institute of Chicago in 1988, studying under scientific illustrator Zbigniew Jastrzebski and others. Her many projects include illustrating insects and other invertebrates for the Minnesota Department of Natural Resources, animals for the California Science Center Foundation, fish, frogs, and birds for Wisconsin Sea Grant, bird illustrations for Organic Gardening Magazine, and primate illustrations for the Field Museum of Natural History. She is currently working on a panorama of a coral reef for the Smithsonian! Her artwork is done by hand, in traditional media, primarily in watercolor or colored pencils. Gina gladly provided permission to use her artwork. Shirts are provided to each camper as part of their registration so get your registration in ASAP. See camp information on the last page of this newsletter.

Honeybees in trouble again…

This spring I spent some time looking at flowers of red and white clover. This is not a strange passtime but a search for bees. These pollinators were largely absent from my surveys this spring. How are they doing in your area? An April article on the extension webpage (www.MSUCares.com) focused on colony collapse disorder in honeybees. Dr. Collison, our Entomology Camp bee specialist, was interviewed. He explained that this problem seems to be cyclic but this cycle appears to be worse than previous ones. Mississippi has one of the largest nation providers of 'hives for hire'. This business provides bees to guarantee pollination of certain crops. Bee pollinated crops account for $250 million annually in Mississippi and $14.7 billion annually worldwide. Stress on bees from parasites, diseases, and insecticides contribute to colony collapse disorder. The more we know about the biology of these pollinators, the more we can do to help them. The hive tour at camp is one way to learn more. It also gives you a chance to ask Dr. Collison what you can do to protect bees in your county or city!

Mosquitos and West Nile Virus in MS

I hate to focus on the negative aspects of insects but sometimes it is necessary to protect ourselves. Already this year there has been five cases of West Nile documented in Mississippi. Two of these cases, in Lawrence and Walthall counties, were in humans. All others were from birds. These cases confirm that mosquitos in these counties may possess the virus and are more likely to vector the disease. Remember to protect yourself from mosquitos while outside. Reducing your exposure of skin and use of repellents are the two most effective ways to reduce mosquito feeding.

How Insects Become Pests: Host shifting

This is part three in the series on how insects become pests. We have covered accidental introductions, and monoculture and bad culture. This month features one example of how insects possess the capacity to adapt to new hosts and how this can lead to a new insect biotype. It is thought that biotypes (a big word for a race within a species that has a slightly different habit but is otherwise identical) require a geographic separation to form. For example, two groups of the same species one on each side of a mountain that keep them separate from one another. The insect pest we will study here is the apple maggot. Like the Colorado potato beetle, the apple maggot is a native species that feeds on fruit of wild hawthorn

(*Crataegus* spp.) trees. Within the last 200 years of apple cultivation in the U.S., this species has been a significant pest of cultivated apples (*Malus* spp.). Was this another case of a native species attacking a related host (both in the Rose plant family) once it was cultivated or was something else happening?
Research has shown several interesting twists to this story. First, apple maggot flies mate on the fruit of their host creating a close association between successful reproduction and a particular host. As a result, it is not surprising that several biotypes of apple maggot may become specific to a particular host (apple, sour cherry, and hawthorn). Depending on the host, these otherwise identical flies emerge in synchrony with their host limiting the amount of interbreeding on different hosts. That's not it. There is also a natural enemy component. Parasitoids are more successful attacking apple maggot when it is inside a smaller hawthorn fruit than when it is inside an apple. So, more flies can survive on apples than the native host. These flies become synchronized with that host limiting outbreeding and potentially forming a race specific to that host. That's just cool! In this case, apple maggots are doing more than just exploiting a related resource as was Colorado potato beetle. Apple maggots appear to be re-centering their focus and thus life cycle around the new host. I should mention this is one of just a few examples where this has been extensively studied. This system is now being explored from a genetics perspective where gene flow among these groups of apple maggots is being researched.

Silk - the Original Bullet (Arrow) Proof Vest
Silk has a long history and may have been harvested in China before 6000 BC. Silk was initially used by Emperors but soon became a major commodity in international trade. Possible the best known trade route was the Silk Road stretching from China to the Mediterranean. The Emperors kept the knowledge of sericulture a secret but by 200 BC the secret was out. They were so successful in keeping their secret that European scientists initially thought silk was a plant product. By 2700 BC, the Chinese were cultivating the white mulberry, (Morus alba) for silkworm production. Genghis Khan's warriors wore tunics made of silk because of its great strength. When the warriors were struck with an arrow, the tunic was carried into the wound with the arrow instead of tearing making removal of the arrow easy ("Genghis Khan", Mike Edwards, National Geographic, December 1996).

Silk is stronger than steel is flexible even when cold, bends and stretches without distortion, and is lightweight. It has many possible uses from bullet proof vest and safety lines to surgical dressings. There could be hundreds of uses for silk from surgical dressings to bullet-proofing to clothing to safety equipment. Silk is non-toxic and biodegradable.

The best silk is obtained from cocoons made by the larvae of the silkworm *Bombyx mori* reared in captivity (sericulture). All caterpillars that spin fibrous cocoons are commonly referred to as silk worms. There are several common American silkworms that produce usable silk including: the cecropia moth (*Samia cecropia*), the largest North American moth and Glover's silkworm (*Samia gloveri*), the promethea moth (*Callosamia promethea*), and the polyphemus moth (*Telea polyphemus*), the io moth (*Automeris io*) and the luna moth (*Actias luna*). Much research remains to be done on moth silk and then there is spider silk...

Each cocoon produces only a small amount of silk, however it is fun and interesting to harvest a little. You will notice cocoons are pretty stiff because of sericin that is found on the surface of silk. The best results are obtained by killing the pupae by dropping the cocoon in boiling water or piercing it with a needle. Otherwise it will chew through the continuous strand in many places as it emerges. If you are harvesting the invasive exotic gypsy moth cocoons you should definitely kill it! Begin by boiling the cocoons in water with a little soda ash or Arm and Hammer detergent for about 45 minutes. You will notice the water taking on the color of the cocoon. When the fibers begin to separate you are ready to begin teasing it apart using toothpicks. Keep the cocoon wet and begin winding the silk on a plastic spool. Be patient, the Cecropia moth cocoon contains about a mile of silk! If your cocoon already has a hole in it you can gently twist the ends together. Let us know how your silk harvest turns out or better yet bring your silk to camp for a show and tell!
John Guyton

Entomology Camp Plans
It is looking like we will have really exciting camps this summer. The first camp is for everyone; youth and adults including teachers, 4-H agents, etc. The second is for adults and older youth. We will offer CEU's for teachers at both and are working on securing college credit (graduate and/or undergraduate) for the second camp. Both will be at Plymouth Bluff, just west of Columbus, to take advantage of Dr. Marty Harvill's new sampling boat to increase our collection and study of aquatic insects. We are increasing our study of forest insects. After Katrina, insects have been a larger problem in Mississippi. Although we are not in south Mississippi this summer, we do have funding to improve our forest entomology component. Expect forest insect hikes similar to the plant-insect interaction hikes that were so popular last year. We will continue the plant-insect hikes that Drs. Joy Anderson, Lelia Kelly and David Held made so popular.

We are working on some new activities for this summer. You already know we are increasing our aquatics and forest bugs components. Dr. Held has indicated his continuing interest in having live insects to observe, so you can expect more cages. We are going to try to train wasps to seek scent targets. We will learn to tie flies, for fishing, that resemble the insects and macroinvertebrates fish are dining on. Dr. Tim Menzel (University of Mississippi) hopes to do acoustic night hikes to record the sounds of insects. We are working to improve our GIS/GPS component and receiving assistance from Dr. Bronson Strickland that should improve our map making.
Since Plymouth Bluff is so close to MSU, Dr. Mike will likely paint trees to bait moths before camp. For the adult camp we will be doing all of the above plus dissecting insects, experimenting with insecticides, collecting with a wider variety of traps, studying caterpillars' circulatory systems and insects defensive chemicals.
Of course we are interested in your ideas. Reading Eisner's For Love of Insects this past year gave us a lot of ideas - what have you been reading or wondering about insects? Drop us an email with your ideas and we will see if we can work it into an activity for Bug Camp.

Attention Bug Camp GISers

The 2007 ESRI Education User Conference in San Diego will be June 16 –19. This conference coincides with the ESRI International User Conference. If you want to attend, we have a complimentary registration for a team of one adult and one 4-Her. You would be responsible for room, meals and transportation. From what we have heard, this is an exciting event. New products, books, teaching materials, computer labs to try things out in, the opportunity to meet with experts, troubleshoot issues with experts and meet with educators and ESRI experts. If you are interested let us know.

Max Miller wins again!

Last month, we congratulated Max Miller, a regular at Entomology Camp since 2001, for winning the regional Science Olympiad competition in Entomology. Well now we can make that a 2nd place winner in the state (Louisiana) in Entomology. Pictured here is Max, his proud sister Mary Kathryn and brother Michael–all experience Entomology Campers. Max's mother, Dr. Renee Clary, is also a Bug Camp staffer and her area of expertise is geology! (Congratulations Max!)

If you are a past camper or are coming to camp this year, please send your stories with school, regional, state, or even national Science Fairs. We will put them in the Gloworm!

Teachers, Get in on the Ground Level Creating Project Bug

The MSU departments of Entomology and Wildlife and Fisheries and the Mississippi Entomological Association have teamed up to develop a K-12 curriculum supplement that will contain lesson plans for incorporating insects and arachnids in all subjects. This curriculum supplement will be patterned on the very successful and ever-popular Project Learning Tree model. Development will accelerate during the July 15 - 19 Entomology Camp to be held at Plymouth Bluff Environmental Center in Columbus, MS. Entomologists, horticulturalists and educators will be available to answer questions as you convert these activities into lesson plans for your grade levels and subject specialization.

After camp you will be encouraged and supported in developing additional activities and field testing them with your students. You will have a list of contacts you have worked with to assist in developing lessons. The Mississippi Entomological Association will welcome you to become a member and present your best insect activities at their fall conference where you will meet many more entomologists who are looking forward to assisting you.

For more information contact Dr. John Guyton, Dr. David Held or Dr. Mike Williams

ATTENTION: YOUNG PEOPLE –TEACHERS – PARENTS
ALL WHO ARE INTERESTED IN ENTOMOLOGY!!!!

THE MISSISSIPPI STATE ENTOMOLOGY DEPARTMENT
PRESENTS ENTOMOLOGY CAMP:

Camp #1: June 17–21 – Plymouth Bluff Environmental Camp, Columbus

This camp is for **adults and youth** (over age 10) **who want to learn about insects** from experts. The camp will be taught by professors from the Entomology Department at Mississippi State, and will be educational and fun!!!!

- Learn how to collect, identify, and preserve insects!
- Learn about unique critters you've never seen, yet they live all around you!
- Make an insect collection with help from the experts!

4-H rules and guidelines apply.

Camp #2: July 15–19 –Plymouth Bluff Environmental Camp, Columbus

This camp is for **adults** (teachers, college students, youth leaders) that are looking for a unique learning experience. The camp will be also be taught by professors from the Entomology

Department at Mississippi State, but will be available for college credit at Mississippi State University or CEU credits for teachers! This camp will include:

- Lecture and field collecting components that cover ecology, behavior, and taxonomy of insects
- Field identification and use of keys for family level identification of pinned specimens
- Field collecting methods

Mississippi State University
4-H Entomology Camp Registration Form

I will be attending CAMP Session #_____. Indicate 1 or 2, please!

Indicate t-shirt size: Small _____ Medium _____ Large _____ XL _____ Other _____
All shirt sizes are measured in adult sizes, the vendor does not handle children's sizes

Name: _____

Address: _____

City: _____

State:_____ Zip:_____ County:_____

Age:_____ Gender:_____

Telephone _____ email _____

I am interested in: ☐ CEUs or ☐ credit hours.

For adults attending Camp #2, please check the appropriate box above if you need CEU credits or wish to take the course for credit.

Please submit a **separate copy of this form for each camper** - be sure to indicate the session the camper will be attending.

Certification of health is required - so camp physicals are in order
Mail individual applications along with **$60.00 deposit** to reserve your place to:

Entomology Camp
MSU Entomology Department
Box 9775
Mississippi State, MS 39762

Charges include room/board, t-shirt and miscellaneous supplies. Pins and insect boxes can be made available for an additional cost. Deposit is not refundable after May 1, 2007 for camp #1 and June 15, 2007 for camp #2, deposit is applied to camp costs.

Enroll now for either camp!! Out of state campers are welcome!!!!!
Enrollment is limited and will be on a first come basis.

Entomology\4-H Calendar

May

Deadline for register for the June Entomology Camp

June

June 3-7 Wildlife and Fisheries Camp #1
June 12-Project Achievement Days, SE District
June 13-Project Achievement Days, SW District
June 14-Project Achievement Days, NW District
June 15-Project Achievement Days, NE District
June 15-Deadline to register for the July Entomology Camp #2
June 17-21 First Entomology Camp

July

July 8-12 Wildlife and Fisheries Camp #2

July 15-19 Second Entomology Camp