



The Camp That Almost Wasn't

Late registrations resurrected the June Entomology Camp at Crows Neck and although we lost half of the staff during the short period that it was cancelled it turned out to be an incredible camp. We enjoyed having Crows Neck Naturalists Deb and Donna on board and found the facilities much to our liking and conducive to collecting insects.

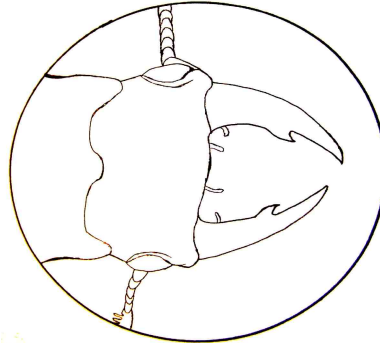
During the June Entomology Camp 1024 insects were reported collected representing 22 orders, and luna moths were plentiful. Our Kings Arrow Ranch record was 1847 insects in 22 orders. So at Crows Neck we matched our record number of orders with only 55% as many insects.

Blattaria	33	Hemiptera	34	Neuroptera	30	Psocoptera	11
Coleoptera	281	Homoptera	30	Odonata	36	Siphonaptera	4
Collembola	1	Hymenoptera	72	Orthoptera	27	Thysanoptera	6
Dermaptera	6	Isoptera	38	Phasmida	2	Thysanura	1
Diptera	56	Lepidoptera	311	Plecoptera	1	Trichoptera	19
Ephemeroptera	24	Mantodea	4				

Competition between the groups to see who could collect the most orders was continuing Thursday morning and we would not have been surprised if someone had called after we had made it home to report another order collected on the windshield or radiator! In fact the competition was so lively someone asked the cook's husband to bring their family dog to camp so they could collect a Siphonaptera - fleas! It was fun watching them wrestle the dog down on the dining room floor to get a few fleas!

Al and Joan Herrington, from New Albany did the bee hive tour that Dr. Collison usually does and they did an outstanding job, at both camps! It was great to have Tim and Anna Groman back and they already have the pictures on the Internet at bugcamp.org.

A new Bug Camper staffer Ms. Terri Jacobson joined us this year and she lead an activity called Private Eye in which campers used loupes to more closely examine insects and sketch them. Move over Joe McGowen, we have some budding new scientific illustrators coming to join you!



We will feature more campers and their sketches in future newsletters.

Small is Beautiful by Dr. John Guyton

In the United States wetlands may be our most diverse environment and I have often been asked, “just where is all of the diversity anyway?” Too often the visitors are disappointed to learn that most of this biodiversity is in the small stuff. As many as 80%, of the organisms composing earth’s biodiversity weigh less than a few grams each! These organisms include algae, ants, bacteria, beetles, fungi, mites, nematodes, protozo, spiders, springtails, worms and small insects. And, most of the biodiversity is in the soil! The total number of species on earth is still unknown. There could be as many as 80 to 100 million, however the currently accepted estimate is closer to 14 million. About 95% of all known animal species are insects. When you consider there are only a couple million catalogued and the smallness of most of them you can begin to understand the difficulty of getting a better estimate.

The shirt pocket insect collection pictured contains 21 orders and would suffice for most highschool insect collection requirements, and would be guaranteed to raise your teachers eyes! Be sure to tell your teacher you are concentrating on the most abundant insects, albeit difficult to collect and identify! I hope to feature Karen Benson’s “Red Neck” version of a miniature collection in a future edition!



To find more the obscure, however more numerous, insects there are a variety of places to look and techniques to use. Sweeping a net through tall grass or through the plants along a stream or near a pond is often very profitable. A favorite techniques at bug camp is black lighting and in addition to a lot of large moths and beetles there are many small insects, some of which are beautiful and incredible for the stories they tell. Many readers of the *Gloworm* will remember Dr. Richard Brown typically finds insects new to science when he camps with us and they are the small insects! If *you* want to name an insect, think small.

The insect-plant interaction hikes during bug camps have yielded many insects often overlooked. Leaf damage is a sure indicator of insects lurking or feeding in the vicinity. Placing a black cloth under a bush and taping the bush with a stick dislodges a variety of insects. Galls on leaves and stems are another indication of an insect plant interaction. Many insects including ants, beetles and termites call dead branches, stumps and logs home. Holes and pitch tubes on the bark of pine trees is another indicator of insect habitation. Scan the bark for bark lice. You may find sap suckers on the ends of drooping branches and a frothy mass could be concealing spittle bugs. Open acorns, other nuts, seed capsules and fruit with blemishes searching for insects or their larvae.

Flowers should be checked for aphids, thrips, ladybug larvae and ants that are attracted by honeydew. Scale insects on plants can be preserved in alcohol. While we are on scale insects, be sure to mash a few to find the ones used for a brilliant red dye and dye a spot on your t-shirt or jeans.

When insects found in carrion, or dead animals, start showing up in collections during camp it does not take long for other collectors to get over it, and head out to collect some for themselves. Be sure to examine the insects in the soil beneath dead animals. It is also interesting to note when various insects show up on carrion. Yes, you will have to get over the smell and best practice is to wear latex gloves and wash your hands after collecting. We might as well mention collecting insects in dung while we are on the subject of washing your hands!

Ground dwelling insects are small, plentiful and very important. A square foot of leaf litter just a few inches thick in a forest can contain over 10,000 arthropods and yes, a dissecting microscope and other equipment will be needed to study these. Use forceps to collect the larger insects and a Berlese funnel or Winkler bag to collect the smaller ones. Both use similar techniques, heat and drying, to drive insects toward collection jars at their bottoms. Insects also find shelter on the underside of rocks. Cicada nymphs, mealybugs, mint root borers, weevils and wireworms can be found feeding on roots.

Pitfall traps are made by sinking plastic cups in the ground so that their lip is flush with the surface and insects can fall into it as they walk along the ground. A little soapy water in the cup will quickly kill the insect. Glycerol or propylene glycol can be used if the traps will be checked infrequently. Often a board is placed an inch or two on rocks above the trap to allow insects to crawl under and prevent rain from filling the trap.

Aquatic insects can be collected by disturbing the rocks upstream of a net held against the bottom. There are a wide variety of aquatic insects and their presence in a stream can also tell you something about the stream's health. Caddisfly larvae construct incredible cases from the rocks or twigs found in the stream.

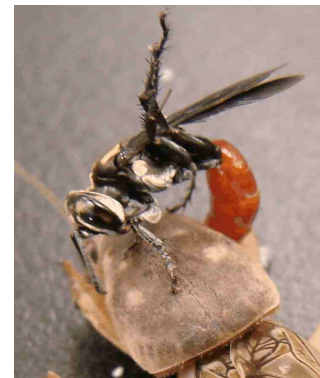
Your dog should not be passed up and will likely appreciate you removing a few fleas for your collection.

A Research Report by Cheri Abraham

Larra bicolor

Hunting was the way to find food for the primitive Man. When he became the civilized beast, hunting became a way of outdoor enjoyment, but animals and those creatures much lower than us on the evolutionary ladder- Insects still hunt to live and perpetuate. Mostly, insects hunt for food, but there could be other reasons, one of which is to get proteins for egg production so that their life cycle could go uninterrupted.

Those of you who were present at the Bug camp '07 had a chance to see *Larra bicolor*, the wasp that I work with and the mole cricket of which it is a parasitoid. *Larra* is one such insect which hunts for both the above mentioned reasons. For food, it lays an egg on a mole cricket which it first chases then stings and paralyzes. The young one develops by feeding on the body fluid of the mole cricket. By the way mole crickets are responsible for causing damage in our lawns by burrowing and eating the roots, therefore killing the turf. Having said that mole crickets cause us damage, the wasp seems to be our friend...yea... such insects are beneficial and are called parasitoids, because they live on another insect. Coming to the second reason for hunting, which was the requirement of proteins, *Larra bicolor* feeds on the mole cricket when they are still paralyzed to imbibe some haemolymph from which they acquire the proteins necessary for egg production.



Larra bicolor (female)
stinging a mole cricket

What is it about this wasp and mole cricket am I interested in? I did say that mole crickets were causing us damage and were pests, and *Larra bicolor* were helping us to get rid of these pests. A major portion of the wasp's diet consists of nectar and just like many of us; these wasps are picky about what they want to eat. In order to use these parasitoids to our advantage and reduce the population of the pest mole crickets, it is important to provide the wasps with a diet of their

liking, which till recently was *Spermacoce verticillata* a weed in Florida where this wasp was first introduced in the United States.

Part of my research focused on finding how long this wasp was present in our climatic conditions. Being active in the Northern Gulf Coast of Mississippi, the climate is favorable for most of the time during the year except when it is too cold. Surveying for the wasp for the past two years and now into the third year, we have seen that they are active from May to early December. As the wasp requires about 2-2 ½ months to complete a single life cycle, there is almost time for three such cycles to occur. This is significant because, these three generations of wasps (multivoltine) act on the mole crickets which have only a single generation a year (univoltine). Another portion of my research stressed on finding some flowers other than the weed *Spermacoce* which would interest the wasp. Results so far indicate that *Pentas lanceolata*, a common landscape plant found in many of our yards would be a good flower to satisfy the wasp's nectar requirement.



Larra bicolor (male)
feeding on *Spermacoce*

What I'll be looking into this summer is whether we could increase parasitism by planting some pentas near a mole cricket infested area. We are excited and looking forward to what conclusions our experiments would lead to.

So yea.... Hunting still happens for various reasons... For adults a leisure activity that would pump some adrenaline, for insects their requirement to life, and for graduate students like me..... want for a degree and the whole pleasure we derive by finding answers to nature's intricate puzzles.....hunting must go on and on and on.....

Opportunity for Young Entomologist

or, Are Libraries Filling Young Children's Minds and Stomachs... with Mealworms?

After the complaints about the omission of mealworms at the first camp this summer we knew what we had to do. Unfortunately, we have discovered a national shortage! We have never heard of such! We have had several notable excuses, "oops, I forgot," and "oh, I thought you were going to order them," but never a shortage! We have been overheating our brains trying to figure this one out and I think we have it - it is the libraries summer reading theme, *Catch the Reading Bug* - that is the problem! No longer are they just filling young minds with literature now they are filling their stomachs - with mealworms! If the shortage is over by fall that could explain it, if not what about going into business. If you go into business be sure to get on our vendor list!

We have been trying to figure just what "bug" the "reading bug" is or at least what order it is in. It is almost as annoying as some of those in Diptera, but since it specifies bug we thought, ah Hemiptera. Now, with the mealworm shortage, could it be Coleoptera? Then we thought maybe it is in a newly discovered bug so we Googled it and got 820,000 hits so it cannot be a new bug. We are pretty sure its habitat is local libraries all over the country, however some may be found in schools and fewer, it is believed, in homes across the country. Apparently its greatest competitor is computer and video games and text messaging is making its DNA more difficult to decode. It appears to be diurnal. We are not ready to label it a parasite of young minds, but that has come up... I have it on good authority that is not yet allowed in Biology or 4-H collections, however we know a few people who have offered to pin it with a 16d pin (nail).

Could this be a non-indigenous species? USDA is on record claiming to have not released it for experimental purposes and Homeland Security says it did not come into the country on their watch. No examples have been reported in entomological literature and no entomological museum has a voucher. Dr. Mike was very surprised and reports that reading bugs are very common and he has interacted with many is libraries, and that he even has a few he keeps at home - though not caged!

A litigious conscious colleague suggested the federal prohibition on immersing reading bugs in alcohol or exposing them to ethyl acetate or other activities that would result in their unnatural death may be why there are no specimens in entomological museums. There being no prohibitions on hugging them or reading to them the editors suggest you enjoy them while they are young. - Dr. John