



April Entomology Group Meeting: *Insect Ecosystem Engineers*

Jane Walker

The Entomology Group met for their last meeting at the Butterfly House before the summer break (we will have one more meeting as a field trip on Saturday, May 19). Our guest speaker for the evening was Dr. Bob Marquis, Professor of Biology at the University of Missouri-St. Louis. The title of his talk was *Caterpillars and Other Insects as "Ecosystem Engineers": Build It and They Will Come*.

Dr. Marquis defined "ecosystem engineering" as when an insect or other animal modifies the environment such that it changes the habitat resources which can positively or negatively impact other species in that habitat. Dr. Marquis' studies look primarily at shelter building caterpillars as ecosystem engineers.

Shelter-building caterpillars can make up a large number of the species of all caterpillars in a given geographic location. In Canada and Britain, shelter building caterpillars make up 20% and 25%, respectively, of all the caterpillar species in those two countries. In the Brazil forest, they can make up as many as 65% of the species, and in the dry forests of Costa Rica they make up 60% of the caterpillar species.

Shelter-building provides the caterpillars with three benefits: 1) protection from enemies, 2) increased food quality, and 3) protection from the abiotic environment. Shelters provide a place for the caterpillar to hide from birds, spiders, and parasitoid wasps.

Dr. Marquis and former student John Lill (WGNSS scholarship recipient) have studied leaf tying caterpillars on white oak trees and the effects of the leaf ties on leaf environment. Leaf-tiers make "sandwiches" of two touching leaves. This environment protects them from the dry air. Some leaf-tiers are messy housekeepers with lots of frass in their homes, while others are very clean. In their experiments, they created artificial leaf ties using hair clips. Using sapling oak trees that they could easily access, they left some trees alone (control), removed all of the leaf-tiers from a

second group, and removed all of the leaf-tiers from and added 10% artificial ties to a third group. They found that the greater the number of leaf ties, artificial or natural, the greater the number of arthropods on the plant, including predators, parasitoids, and other leaf-tiers, and the greater the diversity of arthropods. In another experiment they found that frass in new and old ties attract other leaf-tiers to lay eggs.

Currently, Dr. Marquis and his students are looking at stem boring beetles in the Cerrado of Brazil. The stem boring beetles they are studying are in the families Buprestidae and Cerambycidae. The larvae of these beetles create chambers up and down a stem and drill an exit hole, leaving behind a hollow chamber. Arboreal ants subsequently inhabit these hollow chambers. So far, they have found that the final size of the beetle, determines the size of the ant occupying the hollow chambers left behind, i.e., the larger the beetle, the larger the ant occupier. Dr. Marquis and his group are continuing to look at the relationships of stem borers and secondary occupiers and their effects on the plants.



Friday Flower: *Phacelia purshii*

*Ted C. MacRae*¹

It's been rather a long time since I've featured a botanical subject here, so it seems a good time to resurrect my "[Friday Flower](#)" meme with this delightful little wildflower seen on my birthday field trip a few weeks ago. *Phacelia purshii* (family Hydrophyllaceae), also known as Miami mist, is one of only four species in this rather large genus (159 species in North America according to the [USDA Plants Database](#)) found in Missouri. Though the flowers are small, their deeply fringed petals are quite striking. The late Dan Tenaglia²

¹ Originally posted May 11, 2012 at *Beetles in the Bush*: <http://beetlesinthebush.wordpress.com>.

² Dan Tenaglia was not only an expert botanist but an enthusiastic cyclist. He died in February 2007 after being struck by a car while riding his bicycle. Dan's wife has kept MissouriPlants.com up and running since then in honor of his passion for plants. You can help support its maintenance by making a donation to the "Dan Tenaglia Foundation": 1416 Victoria Avenue, Opelika, Alabama 36801.



Phacelia purshii (Miami mist) | Sam A. Baker State Park, Wayne Co., Missouri. Photo by Ted C. MacRae.

noted at his Missouriplants.com website that the species is limited in Missouri to the extreme eastern portions of the state—the plant shown here was one of several I saw in rich, bottomland forest along Big Creek at Sam A. Baker State Park in Missouri’s southeastern Ozark Highlands.

This particular woods is one of the richest I’ve seen in the state, and in the past two years I’ve featured a number of interesting plants (*Phlox bifida* and *Tradescantia longipes*), invertebrates (*Drosophila* sp., *Magacicada* sp., *Calosoma scrutator*, *Pleurolooma flavipes*, *Graphisurus triangulifer*, *G. fasciatus*, *Arrhenodes minutus*, *Neoclytus scutellaris*, *Corydalus cornutus* and *Panorpus belena*) and even snakes (*Crotalus horridus* and *Agkistrodon contortrix phaeogaster*) from there. This year marks the third consecutive birthday that I’ve visited these woods, and since I’ve found something I’ve never seen before each time (hint: just wait till you see what I still have coming from there!), I have a feeling the trend will continue next year as well.



Tiger Beetles in Southeast Missouri

Ted C. MacRae³

Volume 43(3) of the journal *CICINDELA* was published a few weeks ago, and I can truly lay more claim to the issue than anybody else (except perhaps Managing Editor Ron Huber). In addition to having one of my photos (a face-on shot of

³ Originally posted February 17, 2012 at *Beetles in the Bush*: <http://beetlesinthebush.wordpress.com>.

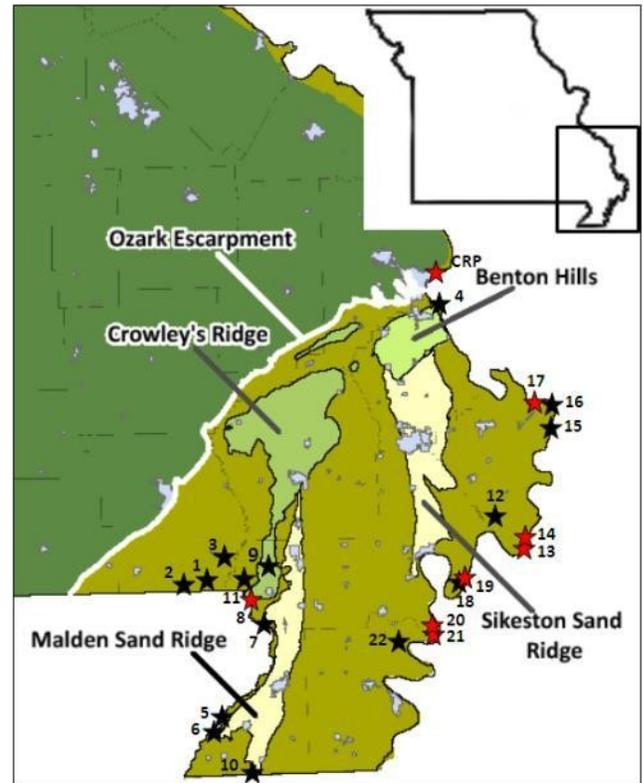


Figure 1. Sites surveyed in southeastern Missouri for *Cylindera cursitans* during 2007–2010. Site numbers are referenced in Table 1 (CRP = Cape Rock Park), with red stars indicating sites where *C. cursitans* was observed. Black box on inset map of Missouri denotes main map area (bordering states include AR to the south and TN, KY, and IL to the east).

Tetracha carolina) featured on the cover, I was coauthor on the first of two papers included in the issue and lead author on the second. (And to complete my stamp of ownership, I did the final assembly of the issue as the journal’s Layout Editor.) The two included papers each report the results of surveys conducted in the Mississippi Alluvial Plain of southeastern Missouri (also called the “boothel” in reference to its shape—see Fig. 1) for tiger beetles whose occurrence in that part of the state was previously not well known. In the first, Fothergill et al. (2011) used a novel survey technique that involved searching beneath irrigation polypipe in agricultural fields to find *Tetracha carolina* (Carolina Metallic Tiger Beetle); while the second paper (MacRae et al. 2011) reports the results of a multi-year survey to characterize the distribution, habitat associations and conservation status of *Cylindera cursitans* (Antlike Tiger Beetle). Together with our three papers on *Habroscelimorpha circumpicta johnsonii* (Saline Spring Spring Tiger Beetle), *Dromochorus pruina* (Loamy Ground Tiger Beetle) and *Cylindera celeripes*