University, it was found that the presence or absence of fish in ponds could affect the degree of success of the terrestrial plant community in the vicinity of the pond. For instance in ponds without fish, the number of larval dragonflies increase, the number of adult dragonflies increases. These adult dragonflies then feed on plant pollinators near the pond and limit the degree of pollination and seed set. In this study Dr. Knight found that plants did better around ponds with fish which controlled the amount of predatory adult dragonflies. Dragonflies are a key link between an aquatic ecosystem and a terrestrial ecosystem.

Kevin looked at this study and wondered if the energy flow could go in the opposite direction. That is, could the number of flowers around a pond or wetland attract more adult dragonflies, which would lay eggs, producing more larvae, which would then feed on zooplankton and change the bottom of the food chain? In the study he participated in, they tested this question by using the invasive purple loosestrife, *Lythrum salicaria*. Part of the success of this plant is that it produces a lot of flowers over a long bloom period. Using cattle tanks as model ponds, Kevin's group surrounded each experimental pond with wading pools containing potted purple loosestrife. The experimental ponds had already been inoculated with zooplankton, snails, and aquatic plants to simulate a natural pond ecosystem. Students then manipulated the percentage of flowers of the potted loosestrife for each experimental pond.

Observing each experimental group, they counted more pollinators around experimental ponds with loosestrife with more flowers. In turn they observed more dragonflies around these same ponds and saw more dragonflies laying eggs in ponds surrounded with more floriferous loosestrife. At the end of the summer they then assayed the zooplankton. Predictions expected the increased number of dragonfly larvae in ponds surrounded with the most loosestrife flowers would predate the zooplankton and this group of organisms would decrease. However, this did not happen, as zooplankton diversity increased rather than decreased. This may have been due to dragonfly larvae selectively removing more competitive zooplankton species, but this needs to be tested experimentally. The study does demonstrate, however, how complex and interconnected relationships can affect ecosystems on a greater scale.

Life at 8X: Hibiscus Flea Beetle

Ted C. MacRae[1]

***Chaetocnema quadricollis* on *Hibiscus lasiocarpus*, Route 66 State Park, St. Louis Co., Missouri (photo @ 2X).**

In mid-August I visited Route 66 State Park along the Meramec River in east-central Missouri to check stands of rosemallow (*Hibiscus lasiocarpus*) that I had previously noticed growing in the park for the presence of the stunning jewel beetle, *Agrilus concinnus*. Once considered amongst the rarest members of the genus in North America, this species has in recent years been collected at several localities—always in association with *Hibiscus* spp. (MacRae 2004). I was disappointed to find the rosemallow stands sparse and stunted—a result of this year's drought—and there were no *A. concinnus* to be found. Whether this was a result of the drought or the location or the lateness of the season, I do not know. However, as often happens when I don't find what I'm looking for, I start seeing things that I'm not looking for. In this case, what I noticed were these incredibly tiny leaf beetles feeding on the foliage of the rosemallow plants.

I've collected a fair number of leaf beetles over the years, thus I recognized these immediately as

[1] Originally posted November 3, 2012 at *Beetles in the Bush* (http://beetlesinthebush.wordpress.com). All photos by the author.

Adults feed gregariously on the upper leaf surfaces, leaving characteristic feeding damage (photo @ 3X).

An adult pauses long enough for a photo while feeding on sap at the broken end of a leaf petiole (photo @ 8X).

belonging to the subfamily Alticinae (flea beetles) due to the way they jumped when I disturbed them. However, I have also done a fair bit of collecting of insects on rosemallow and never seen (or at least noticed) this species of flea beetle. The beetles were feeding gregariously on mostly the upper surface of the leaves, and their feeding resulted in a rather distinctive damage that caused the more severely affected leaves to shrivel and turn brown. Based on gestalt, I was guessing *Crepidodera* or *Chaetocnema*, two genera that contain some of the state's smallest species of flea beetles.

Based on host plant and this photo on BugGuide, I thought these might represent *Chaetocnema quadricollis*. However, that species isn't among the nine species of the genus recorded from Missouri by Riley & Enns (1979, 1982). Nevertheless, Ed Riley himself, and Shawn Clark as well, each confirmed this as the likely identity of the beetles based primarily on its associated host plant, and in fact Riley did record the species from Missouri at numerous localities under the name *C. decipiens*

Although coupled, these beetles are not actively mating (is this mate guarding?) (photo @ 8X).

(later synonymyzed under *C. quadricollis* by White (1996) in his revision of the genus in North America). Schwarz (1878) described the species from Florida (noting that it has "exactly the same aspect of a small *Crepidodera*"), and apparently its association with and occasional pest status on rosemallow has long been established (Weiss & Dickerson 1919 recommended Bordeaux or arsenate of lead for its control).

These are probably the smallest beetles that I have photographed so far. In the photo of the mating pair above, the male measures just over 1 mm in length, while the female measures about 1.6 mm in length (the sensor of my camera measures 21 mm wide, so an 8X photo yields a field of view measuring 2.625 mm wide). All of the above photos were taken hand-held in the field with a Canon MP-E 65mm macro lens (1/250 sec, ISO-160, f/14, full flash). The last two photos were taken with the lens mounted on 68 mm of extension tube and fully extended to achieve 8X magnification. While the photos contain good depth-of-field (DOF), they are soft due to the extreme amount of diffraction that occurs at such a small aperture and high magnification. If I were to do it over, I would reduce the aperture to f/10 or even lower and sacrifice DOF for sharpness.

REFERENCES:

MacRae, T. C. 2004. Beetle bits: Hunting the elusive "hibiscus jewel beetle". *Nature Notes, Journal of the Webster Groves Nature Study Society* 76(5):4–5.

Riley, E. G. & W. R. Enns. 1979. An annotated checklist of Missouri leaf beetles (Coleoptera: Chrysomelidae). *Transactions, Missouri Academy of Science* 13:53–83.

Riley, E. G. & W. R. Enns. 1982. Supplement to an annotated checklist of Missouri leaf beetles (Coleoptera: Chrysomelidae): new state records and host plant associations. *Entomological News* 93(1):32–36.

Schwarz, E. A. 1878. The Coleoptera of Florida. *Proceedings of the American Philosophical Society* 17(101):353–469.

Weiss, H. B. & E. L. Dickerson. 1919. Insects of the swamp rose-mallow, *Hibiscus moscheutos* L. in New Jersey. *Journal of the New York Entomological Society* 27(1):39–68.

White R.E. 1996. A revision of the genus *Chaetocnema* of America north of Mexico (Coleoptera: Chrysomelidae). *Contributions of the American Entomological Institute* 29(1): 1–158.

Book Review: *Bird Sense: What It's Like to Be a Bird*

P. Mick Richardson

Bird Sense: What It's Like to Be a Bird. By Tim Birkhead. About 200 pages plus notes and glossary. Published by Bloomsbury, $25 ($15.50 from Amazon).

One of my Christmas presents last year was a new book on the senses of birds—seeing, hearing, touch, taste, and so on. It turned out to be a very readable book and I would like to recommend it to all birders. It is written by a professional scientist but he has taken scientific discoveries and made them available to regular people, like you and me. It is a book that you can dip into, without reading a whole chapter. Each page has some fascinating piece of information and explanation. Here are some random bits from the book.

A chickadee can see insects on the bark of a twig but the food items are so small that we would need a microscope to see them. In an eyeball, the fovea is a part of the retina where the image is sharpest. Most birds have a single fovea (like humans) but a falcon has two foveas and this gives them extraordinary vision. What about 3-D vision, you may ask? An American Robin cannot see the tip of its bill but it manages to feed its young and build a nest. Ducks and woodcock can see behind themselves. You can see the back of an owl's brain through its ears. Wow!

When a chickadee sees a hawk it can utter a call heard by other chickadees but not by the hawk. But when it sees a roosting owl it utters a raucous call to summon other birds to mob the (non-hunting) owl. The description of how a Great Gray Owl can detect a vole under the snow is fascinating. American Robins actually hear a worm's bristles scratching as it moves

You may never look at a Mallard the same way again after you read how its bill can strain food from mud. Or a woodpecker after your learn how it removes prey from inside a tree. I thought a 'brood patch' was where the feathers wore away during incubation but it makes a difference between whether a Northern Flicker lays 5-8 eggs or 71 eggs!

Did you know that some birds have poisonous feathers? I didn't.

The chapter on smell is equally fascinating. Ravens are known to follow coffins in a hearse. Put some bacon fat on the ocean and albatrosses are likely to appear within the hour. The author also explains why Turkey Vultures are attracted to leaks in natural gas pipelines.

There is so much more but I don't want to steal any more of the author's thunder.

There's an app for that! FieldSurvey

Anne McCormack

Wouldn't it be great if you could enjoy birding without the burden of recording and submitting data? Imagine surveying the birds in your Breeding Bird Survey territory, then submitting the data on your iPhone or iPad before you head home. Just such an app has been developed by WGNSS member David Rabenau of Stray Dog Software. It's available on the App Store for iPhone, iPad, and iPod Touch for $1.99.

FieldSurvey allows you to enter each species and the number of individuals seen quickly and easily. Global positioning records the location where you enter the birds. When you've completed your survey, it's easy to email the list or export it to bird listing sites, including eBird, and Eremea as a CSV