

into the flower to accomplish the pollination. With these observations, Darwin predicted that there was an unknown insect (probably a large hawk moth, Sphingidae) that had evolved a tongue about a foot long specifically for reaching the nectar in the orchid and thereby pollinating the flower. And so began a forty year quest for the insect. In 1903, Rothschild and Jordan finally found the moth. Just as Darwin had predicted, it was a hawk moth and its tongue was exactly one foot long. In honor of Charles Darwin's prediction, Rothschild and Jordan named the moth *Xanthopan morgani praedicta*.

To learn more about Charles Darwin's life go to <http://darwin-online.org.uk/>. This web site contains all the known publications and letters written by Darwin. The volumes of books and publications written by Darwin that are found in this web site speak to true greatness for the father of modern evolution.



## Ozark Trail—Marble Creek Section<sup>1</sup>

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By *Ted C. MacRae*

*If you know wilderness in the way that you know love, you would be unwilling to let it go... This is the story of our past and it will be the story of our future. Terry Tempest Williams*

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**Marble Creek, Madison Co., MO.**

During the past several years that Rich and I have been hiking the Ozark Trail, most of our hikes have taken place in the fall and winter months. From a hiker's perspective, I really enjoy these off-season hikes—the foliage-free canopy affords unobstructed views of the terrain and vistas, the cool (even cold) temperatures are more comfortable under exertion (provided one has properly layered), and there are no mosquitoes to swat, ticks to pick, or gnats to incessantly annoy. I also enjoy them as a naturalist, for the world is quiet and still, allowing me to focus on things I may not notice amidst the cacophony of life during the warmer months. By the end of winter, however, the biologist in me yearns to once again see bugs and flowers and the great interplay of life. Unfortunately, this makes something as simple as hiking from point A to point B rather difficult—too many distractions! Nevertheless, each spring Rich and I try to hike a small leg of the Ozark Trail before the crush of summer activities fills our calendars. Last week, we chose the Marble Creek Section, an orphan stretch (for the time being) in the rugged St. Francois Mountains that eventually will connect to the famed Taum Sauk Section. It would be our first return visit to the St. Francois Mountains since we first embarked on our goal to hike the entirety of the Ozark Trail.



**Crane Lake, Iron Co., MO.**

The St. Francois Mountains are the geologic heart of the Ozark Highlands. Since their primordial birth 1.5 billion years ago, recurring cycles of erosion and deposition have worn them down and covered them up, only to see them reemerge once again as the younger rocks covering them were themselves stripped away. The Ozarks are an

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<sup>1</sup> Reprinted from an article posted May 28, 2008 on the author's website: <http://beetlesinthebush.wordpress.com>. All photos by the author.

ancient landscape with ancient hills, and none are older than those of the St. Francois Mountains. It's as if the Earth itself began in these mountains. We began our hike at [Crane Lake](#), a clear, blue 100-acre lake built in the 1970s by the Youth Conservation Corps. The trail surrounding the lake was built in 1975 and is, in its own right, a National Recreation Trail. It meanders along the lakeshore and through hillside igneous glades and descends into a deep ravine below the dam where Crane Pond Creek cascades through spectacular rhyolite shut-ins. East of the lake the trail connects to the Ozark Trail proper and continues to Marble Creek campground. All told, we would be hiking a 9-mile stretch.



*Tradescantia longipes* (dwarf spiderwort).

I knew we were in a special place almost from the beginning when I noticed a small flowering plant growing next to the trail under the mixed pine/oak canopy. I'm not a very good botanist, but I instantly recognized the plant as dwarf spiderwort (*Tradescantia longipes*), an Ozark endemic known from only a handful of counties in Missouri and

Arkansas. I knew this only because I had just the night before read about this wonderful plant on [Ozark Highlands of Missouri](#), a superb natural history blog focused on my beloved Ozarks. Reading about this lovely, diminutive member of the genus, I wondered if I might encounter it on my own hike the next day. As we searched off the trail and near the lakeshore we encountered dozens of the plants, each with one or two exquisite blue flowers. Our excitement at seeing a true Ozark endemic increased with each plant we encountered, giving us confidence that its future, at least in this area, appears secure. Of the numerous photographs I took, I share two that show its short, squat habit and filament-covered stamens. Eventually we decided we needed to move on—we had spent 20 minutes and only hiked 100 ft!



*Viola pedata* (birdfoot violet).

Looping around the south side of the lake, the trail traversed mesic to dry-mesic upland forest and afforded spectacular views of the lake and rugged north shore. The spring ephemerals had already come and gone, replaced by such classic woodland denizens as birdfoot violet (*Viola pedata*, pictured), fire pink (*Silene virginica*), cream wild indigo (*Baptisia leucophaea*), four-leaved milkweed (*Asclepias quadrifolia*), Pursh's phacelia (*Phacelia purshii*), and shooting star (*Dodecatheon meadia*). Insect life was abundant, however, the



*Acmaeodera ornata* (jewel beetle) on *Rubus* sp. flower.

only species seen in one of my chosen specialties, metallic wood boring beetles (family Buprestidae), were early spring species of *Acmaeodera*—pictured here is *A. ornata* on a dewberry (*Rubus* sp.) flower. This pretty little beetle occurs throughout eastern North America in early spring on a variety of flowers, where adults feed on pollen and mate. Eggs are laid on dead branches of certain hardwood trees, through which the larvae tunnel as they develop. Dry, dead wood contains little nutritional value, and the larvae cannot digest the cellulose. As a result, they eat considerable volumes of wood, extracting whatever nutrients they can for growth and ejecting the bulk as sawdust, which they pack tightly in their tunnels behind them. A year or more might be required before they have grown sufficiently to transform into the adult and emerge from the wood. A smaller relative, *Acmaeodera tubulus*, was also seen on flowers of native dwarf dandelion (*Krigia biflora*).

We stopped for lunch on a little point extending out towards the lake. The forest overstory was dominated by an open mixture of white oak (*Quercus alba*) and shortleaf pine (*Pinus echinata*). Thickets of highbush huckleberry (*Vaccinium stramineum*) and carpets of reindeer moss in the open areas belied the acidic nature of the igneous substrate. Stands of bastard toad flax (*Comandra richardsiana*) in full bloom were found at the tip's dry, rocky tip. These interesting plants feed parasitically on



*Comandra richardsiana* (bastard toad flax).



*Osmunda regalis* var. *spectabilis* (royal fern).

neighboring plants, attaching to the roots of their hosts by means of their long, thin rhizomes. Resuming our hike, we descended down into a

shaded, moist draw feeding the lake and saw a huge royal fern (*Osmunda regalis* var. *spectabilis*) bush. I had never seen this aptly named fern before, but it was immediately recognizable by its large size (~5 ft in height) and presence of distinctive, fertile leaflets on some of its upper branches—a very striking and handsome fern, indeed. Nearby was a smaller, but no less attractive species of fern that I take to be marginal shield fern (*Dryopteris marginalis*)—another species I have not seen before (or at least made the effort to notice).



*Dryopteris marginalis* (marginal shield fern).



Crane Pond Creek Shut-ins below Crane Lake.

Soon, we reached the dam and for the first time saw the spectacular rhyolite shut-ins. While perhaps not quite as impressive as the nearby and much more famous Johnson's Shut-Ins, Rich and I nonetheless watched entranced as the water roared



*Asplenium trichomanes* (maidenhair spleenwort).

over the smooth igneous rock exposure, forming elegant cascades, rushing through narrow chutes, and swirling into small pools. Steep canyon walls rose

sharply on each side of the shut-ins, as if standing guard. Clambering amidst the pines and cedars that cloaked them, we found this maidenhair spleenwort (*Asplenium trichomanes*) nestled within a crack on a vertical rock face under continuous deep shade. Reaching the top of the bluffs, we were greeted by one of my favorite of all Ozark habitats—the igneous glade. Glades are natural island communities surrounded by a sea of forest. Their shallow, dry, rocky soil conditions support plants and animals more adapted to prairie or desert habitats. Specific communities are influenced by the type of rock below—igneous and sandstone substrates support lichens, mosses, and other acid soil-loving plants, while limestone and dolomite substrates support a more calcareous flora.



Igneous glade above Crane Pond Creek.

The photo here shows the massive boulder outcroppings typical of igneous glades and their weather-resistant bedrock. We hoped to see a collared lizard (*Crotaphytus collaris*), perhaps Missouri's finest saurian reptile, but today was not the day. We did, however, see adults of the beautiful and aptly named splendid tiger beetle (*Cicindela splendida*) sunning themselves on the bare rock surfaces—flashing brilliant green and clay-red. The adults we saw had spent the winter deep inside tunnels dug into the rocky soil the previous fall and were now looking for mates. Male tiger beetles grab females by the neck, their jagged, toothy jaws fitting precisely in grooves on the female neck designed specifically for such. As I looked upon this prairie island within the forest, I thought about how the St. Francois Mountains were once themselves islands. I realized the

landscape we were exploring today was itself a fossil—with rhyolitic 'islands' amidst a 'sea' of cherty dolomite laid down a half billion years ago in the warm, tropical, Cambrian waters that surrounded the St. Francois Islands, by then already a billion years old themselves. Yes, the Earth itself seems to have begun here.

Leaving the glade and once again entering the acid pine forest, we came upon one of the most striking floral displays that either of us have ever witnessed—wild azalea (*Rhododendron prinophyllum*) in the midst of full bloom! I have known about several colonies of this plant for many years now but had only seen them at the very end of the bloom period, with just a few, pitiful, limply hanging flowers still attached. Today, the plants were absolutely dazzling. The blossoms were not only visually attractive, a deep pink color, but also unexpectedly fragrant. We stood amongst several specimen plants as tall as ourselves, taking picture after picture amidst the clove-like aroma wafting around us.



*Rhododendron prinophyllum* (wild azalea).

We checked our watches—we were now 3 hours into our hike and had traversed just 2 miles. Clearly, this was not a sustainable pace, so we put our heads down and focused on covering ground. Once leaving the vicinity of Crane Lake, the trail became rather difficult to follow—it obviously receives little use, and in one stretch some logging activities had obliterated the trail completely. Were it not for the sporadic pieces of orange flagging tape tied just within sight of the previous, we would not have known where to go. At one point, we got completely off-track and had to backtrack a full half mile before we found the proper trail. The day put our contour map reading skills to their greatest test yet. It was difficult and strenuous terrain, with steep up and down grades and few long ridgetop stretches until (thankfully) the final 2 miles, which terminated in a long descent (more thankfully) to Marble Creek Campground. Despite the difficulties in following the trail and our not bringing enough water, I would have to rank this section a close second to the Taum Sauk stretch for its ruggedness, spectacular vistas, and unique plant communities. Yes, the St. Francois Mountains are truly the heart of the Ozarks.



## Catch the Buzz on Bees and Other Pollinators<sup>1</sup>

### **BEE PART OF POLLINATOR WEEK**

**June 21–27, 2010.**

Pollinators make one out of every three bites of food you eat. Buzz by the Monsanto Insectarium during National Pollinator Week to celebrate the many reasons we should be thankful for pollinators!

### **THE POLLINATOR DINNER**

**Tuesday, June 22, 2010 6–9 p.m.**

Join us for a special dinner where you can sample the many foods pollinators help provide. Before dinner, sip mead and enjoy a honey tasting as you peruse tables and displays about bees and other

<sup>1</sup> Submitted by Jim Jordan, Curator of Education, St. Louis Zoo.

pollinators. After dinner, enjoy a presentation on pollinators and what you can do to help them bee.

For more information and to make reservations, call (314) 646-4857.

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## **POLLINATORS FACING PROBLEMS— OR—THE POLLINATOR EQUATION**

*By Ed Spevek<sup>2</sup>*



About 80% of all flowering plants need the help of animals to move pollen from flower to flower for the production of fruits and seeds. Most pollinators, about 200,000 species, are beneficial insects such as bees, flies, beetles, wasps, ants, butterflies and moths. About 1,000 species of pollinators are vertebrates like birds, bats, lizards and small mammals.

What is Halloween without pumpkins? Thanksgiving without cranberries? And life without chocolate? Of the estimated 1,330 crop plants grown worldwide for food, beverages, fibers, condiments, spices, and medicines approximately 75% are pollinated by animals. Insect pollination is critical for the production of many important crops in the United States including alfalfa, almonds, apples, blackberries, blueberries, canola, cherries, cranberries, pears, plums, squash, sunflowers, tomatoes and watermelons. In the U.S, European honey bee and native bee pollination accounts for almost \$20 billion worth of crop production. Native bees also help maintain plant communities that provide food and shelter for other animals. About 25% of birds and many mammals, from grizzly bears to

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<sup>2</sup> Curator of Invertebrates, St. Louis Zoo.