

rest of nature too). From the photos we saw, western Oklahoma is a hidden treasure few have visited. Ted showed photo after photo of plants and insects only found on the shortgrass prairies. The highlight of the trip for Ted was to find populations of the Swift Tiger Beetle, *Cylindera celeripes* – a potentially endangered species (see Ted's article about this species elsewhere in this newsletter).

**John Christensen** showed off a collection of insect toys he has acquired. Nearly all were the windup variety. We all had fun winding up the insects and letting them run. Interestingly, most of the toys had the general shape of a particular insect but were colored like no known species.

Our last presenter for the evening, **George Diehl** brought a nice selection of insects collected this summer in Missouri and was looking for identification help. It's always a pleasure to see what others have found during their summer travels. Everyone had a chance to admire the many colorful insects George had found.

The evening ended with more entomological conversation with chips, donuts and drinks provided by **Nancy Longhibler**.



## REVISITING THE SWIFT TIGER BEETLE<sup>1</sup>

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### *Ted C. MacRae*

When my hymenopterist friend, Mike Arduser, came back from his first trip to [Oklahoma's Four Canyon Preserve](#) last September, my first thought upon seeing his photos of the area was, "Ooh – that looks like a good place for tiger beetles!" Its rugged red clay and gypsum exposures reminded me of similar country I had seen in the not-too-distant Gypsum Hills of south-central Kansas, where I was fortunate enough to observe a nice population of the fantastically beautiful *Cicindela pulchra* (beautiful tiger beetle) back in 2005 (MacRae 2006). When I later realized that the area was only 30 miles southwest of a confirmed recent sighting of *Cylindera celeripes* (swift tiger beetle), I

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<sup>1</sup> Excerpted from a 3-part series of posts appearing 6/30–7/7, 2009 on the author's website (<http://beetlesinthebush.wordpress.com>).

thought, "Ooh, I wonder if *C. celeripes* might occur there also."

*Cylindera celeripes* is one of North America's rarest and least understood tiger beetles. This tiny, flightless, ant-like species has been recorded historically from eastern Nebraska south to north-central Texas, but its range appears to have become highly restricted over the past century. It hasn't been seen in Nebraska for [nearly 100 years](#), and most recent records have come from its last known stronghold in the Flint Hills of Kansas. Last year, however, small numbers of adults were seen in the Loess Hills of western Iowa, triggering an immediate trip to the site by myself and Chris Brown, who has been co-investigating the [tiger beetle fauna of Missouri](#) with me for several years now. The occurrence of this species in Iowa's Loess Hills had reignited our hopes – faint as they were – that the beetle might yet occur in extreme northwestern Missouri, where the Loess Hills reach their southern terminus. We wanted to see the beetle in the wild to better understand its habitat requirements before resuming our search for this species in northwestern Missouri. We succeeded in finding the beetle, and I wrote about that experience last August in a post entitled, "[The hunt for \*Cicindela celeripes\*](#)" (that post is now currently in press as an article in the journal *CICINDELA*).

Thus, when Mike asked me earlier this year if I might be interested in joining him on his return trip to Four Canyon Preserve in June, [I jumped at the chance](#). I figured I could look for *C. celeripes* at the preserve, and if I failed to find it there then I would go to nearby Alabaster Caverns to see if I could relocate the beetle where it had been photographed in 2003. My goals were modest – I simply wanted to find the beetle and voucher its current presence in northwestern Oklahoma (and if possible photograph it in the field with my [new camera!](#)), and on the first Friday of June I followed behind Mike and his lovely wife Jane during our ten-hour drive out to Four Canyon Preserve. [For three days](#), I roamed the mixed-grass prairie atop the narrow ridges and dry woodland on the steep, rugged canyon slopes of the preserve – always on the lookout for that telltale "flash" between the clumps of bluestem and grama, ever hopeful that one would prove not to be the ant or spider that it appeared to be (and, indeed, always was). Many



*Cylindera celeripes*, Alabaster Caverns State Park, Oklahoma.

tiger beetles would be seen – chiefly the annoyingly ubiquitous *Cicindela punctulata* (punctured tiger beetle), but *C. celeripes* would not be among them. Whether this is due to historical absence from the site or a more recent consequence of the wildfires that swept the area a year earlier is hard to say, but its absence at Four Canyon meant that I would need to make a quick, 1-day detour to Alabaster Caverns before rejoining Mike and Jane at Tallgrass Prairie Preserve in northeastern Oklahoma, where we planned to spend the second half of the week. There, I not only succeeded in finding the species but documented robust populations there and at several nearby locations, confirming the existence of a new, previously unknown population center for the species across a large swath of red clay/gypsum hill habitat in northwestern Oklahoma. This is good news for the species, which some have regarded as a potential candidate for federal listing on the endangered species list, and the presence of a strong population in Oklahoma gives reason for optimism about its long-term prospects.

My work with this species was not done, however. While *C. celeripes* has never been recorded in Missouri, my colleague Chris Brown and I have long suspected that it might occur here – most likely, we felt, in extreme northwestern Missouri where the [Loess Hills landform](#) reaches its southern terminus. We had looked for it in this area a few times before on the few remaining dry, hilltop prairie relicts that are so common further north in Iowa, and we had also looked for it in the larger tallgrass prairie remnants of west-central Missouri. None of these searches were successful, and with each unsuccessful effort it seemed less

likely that the species actually occurred within the state – especially considering the declines that the species has experienced throughout its range. However, our experience with this species last summer in the Loess Hills of southwestern Iowa convinced us that one more thorough effort this year to locate the species in Missouri was in order.

Our plan was straightforward – we would travel to northwestern Missouri each weekend beginning in late June and search the most promising hilltop prairie relicts that still remain in Missouri. There aren't many of these, so I contacted Tom Nagel of the Missouri Department of Conservation – who probably knows more about Missouri's hilltop prairie relicts than anyone else – for assistance in identifying these parcels. Tom graciously sent me descriptions and aerial photographs of the highest quality relicts still remaining in Missouri. None of these are large (12 contiguous acres or less), and all have been impacted to some degree by woody encroachment and are in various stages of restoration. We had already searched one of these tracts (Star School Hill Prairie) a few times, but two others were new to us. So, on a Friday evening before the first of three planned weekends for our study (and only two weeks after returning from Oklahoma), Chris and I made the long drive across Missouri and north along the Missouri River and began our search the next morning.

Our first stop was High Creek Hill Prairie in [Brickyard Hill Conservation Area](#) (Atchison Co.). We had been to Brickyard Hill a few times but had not previously found this particular hilltop prairie. We found the tract, a long, narrow series of ridge tops and southwest-facing slopes, thanks to Tom Nagel's map and began searching with all the enthusiasm and optimism that accompanies any new search. Our optimism waned with each hilltop ridge that we traversed not seeing the beetle, until we reached the easternmost ridge amidst a jumble of eastern red-cedar cadavers that halted any further progress or promise. As we stood atop that last hill, we debated our next move. Chris had noted apparently good habitat on the lower slopes below us, while I had spotted another very small hilltop tract across a wooded ravine and disjunct from the main prairie. We decided these areas should be explored before moving on to the next site, but as we searched those lower slopes our optimism continued to



*Cylindera celeripes* at Brickyard Hill Conservation Area, a new state record for Missouri.

wane. The habitat was perfect based on what we had seen in Iowa last year and what I had seen in Oklahoma earlier in the month – small clay exposures amongst clumps of undisturbed little bluestem and grama, but still no beetles. Chris, refusing to accept defeat, continued to search the slope, while I worked my way over to the smaller hilltop tract I had seen from above. After crossing through the wooded ravine, I found an old 2-track running along the base of the tract and began walking along it. The small slope above the 2-track was littered with large cadavers of the invasive eastern red-cedar (*Juniperus virginiana*), apparently left in place after chain sawing to provide fuel for a planned, future burn. As I walked, a white-tailed deer bolted from a nearby cadaver, giving me a bit of a start, and I veered towards the cadaver to have a look at where it had bedded down. By this time I almost wasn't even really thinking about *C. celeripes* anymore – we had been there for about an hour and a half and searched the most promising habitats without success – the small tract where I was now working was almost a last gasp before moving on. As I approached the deer's bedding site, a "flash" in the thick vegetation caught my eye, and I knew instantly what it was. Immediately I dropped to my knees and tried to "trap" the evasive little beetle (I've found that forming a "trap" between the crotches of my hands and gradually closing my hands together forces the beetle to run up and over one of my hands, at which time I can try to pin it down with my other). The beetle behaved exactly as expected, running over my left hand – but I missed it. I trapped it again, and once again it ran over my hand too fast to pin down. I tried to follow it as it zigzagged erratically through the

thick vegetation, but in the blink of an eye it was gone. I spent the next several minutes frantically pulling apart the vegetation in a 2-foot radius around the spot in what I knew was a vain attempt to relocate the beetle before ultimately accepting that I had missed it. No matter – I had seen it and had absolutely no doubt about what it was – *C. celeripes* does indeed occur in Missouri! Wow – big news! I knew if I had seen one, I had a good chance of seeing another, so I began searching the area again – now with much more deliberation. I walked back and forth along the old 2-track, up and down the cadaver-littered slope, and back to the original spot several times. As time passed, a gnawing fear began to grow inside me that this new state record might lack a voucher. Suddenly, very near the original spot, I saw another. This time I pounced with authority and made no mistakes, and after securing the live beetle in a vial I gloated and congratulated myself unabashedly inside while bursting to give the news to Chris. I searched the slope some more, but I couldn't take it anymore – I had to tell someone. I pulled out my cell phone and began texting a message to my daughter Mollie (who really doesn't care about beetles but loves to receive text messages). As I was texting, Chris appeared on the lower slope, obviously noting that my net had been left on the ground purposely to mark a spot. As I finished texting I told Chris to come here, I wanted to show him something, and then nonchalantly handed him the vial. I would give anything to have a video of the look on Chris' face as it changed from quizzical dumbfoundedness to shocked elation. Chris, too, had reached a low point in his optimism after thoroughly searching the previous slope without success, but now we were both as giddy as schoolboys – our long efforts had finally paid off with a new state record for one of North America's rarest tiger beetles. The way we were acting, you'd have thought we'd just discovered plutonium!

We searched the slope for another half hour or so, with Chris seeing one more individual very close to where I had seen the first one. Whether it was the same or a different individual is unknown, so we decided that we had seen at least two individuals at this site. The discovery of *C. celeripes* here caused us to once again search the lower slope that Chris had previously searched so thoroughly, but again



*Cylindera celeripes* habitat at Star School Hill Prairie. Beetles were seen along the narrow trail (foreground) and on the mild upper slopes (below bur oak, upper left).

the beetle was not seen. Our giddiness was beginning to give way to concern over the few individuals we had seen and how localized they seemed to be. We had been at the site now for about three hours, and I was famished. I hiked back to the truck, noting some habitat at the far western end of the main prairie where we had begun our search that looked like it deserved another search. As I ate, Chris worked his way over to that spot, and after a period of time I heard him yell down to me and give me the “thumbs up.” I hurriedly finished eating and worked my way up to where he stood, and together we located two more individuals – taking one as a voucher for the site and ganging up on the other to keep it pinned into an open area where each of us could take field photographs before we finally let it “escape.” Seeing the species on the larger parcel had relieved our concern a little bit, and we felt a little less worried about its status here now.

Later in the day we would see the species again at [Star School Hill Prairie Natural Area](#), the northernmost substantial loess hilltop prairie within Missouri, and one that we had searched at least twice previously for the species. Again, we saw only two individuals in almost three hours of searching, confirming the impression first gained at Brickyard Hill that the species is not present in very high densities. Like Brickyard Hill, the beetles at this site were found in areas of undisturbed hilltop prairie with moderately thick shortgrass vegetation and were seen only when they ran from one grass clump to another after being disturbed by our approach. We also looked

for it at a smaller disjunct parcel just to the north, but the lateness of the hour limited the time we had to explore this site. Star School Hill Prairie is some 6 miles north of Brickyard Hill, thus, finding *C. celeripes* at two sites not in close proximity increased our optimism that the species might actually occur in many of the loess hilltop prairie remnants still remaining in northwestern Missouri. This optimism was further increased the next day when we saw two more individuals at one of Missouri’s southernmost hilltop prairie relicts at [McCormack Loess Mounds Natural Area](#) in Holt Co. However, our optimism was tempered by the fact that, again, we saw only two individuals, both of which were seen in a small, unburned spur extending northward off the main prairie, while none were seen in the much larger main parcel that appeared to have been recently burned in its entirety.

The presence of this rare Great Plains species in Missouri’s critically imperiled hilltop prairies is cause for both excitement and concern. *Cylindera celeripes* represents a unique and charismatic addition to the state’s rich natural heritage. However, like soapweed yucca (*Yucca glauca* var. *glauca*), skeletonweed (*Lygodesmia juncea*), and the dozen or so other plant and animal [species of conservation concern](#) found within the hilltop prairies of Missouri’s Loess Hills, *C. celeripes* appears to be entirely dependent upon these habitats for its survival within the state. Ensuring its continued survival will require careful reconsideration of the management approaches used for these rapidly shrinking natural communities. Prescribed burning has been and will continue to be an important tool in restoring our hilltop prairies; however, nonjudicious use of fire could lead to local extirpation of *C. celeripes* within these habitats. Should that occur, recolonization from nearby parcels is unlikely due to the small, highly disjunct, and upland character of Missouri’s hilltop prairie remnants and the flightless nature of *C. celeripes*. As a result, rotational cool-season burns should be utilized as much as possible to avoid localized extirpations, especially on smaller parcels.

#### Reference:

**MacRae, T. C. 2006.** Beetle bits: The “beautiful tiger beetle”. *Nature Notes* 78(4):9–12.