

Tiger Beetles of Missouri

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What is a beetle?

- Insects are animals belonging to the class known as **Insecta**.
- All insects have 3 body parts:
 - Head
 - Thorax
 - Abdomen
- All insects have 6 legs attached to the thorax.
- Most insects have two pairs of wings attached to the thorax.
- **Beetles** have the front wings modified into **elytra** – hard covers for the flying wings that lie flat against the abdomen when at rest.
- Beetles have **mandibles** (jaws) for grasping/chewing and **maxillary palps** (segmented mouth parts) for grasping food.

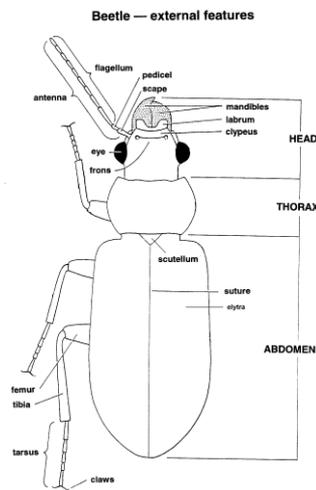
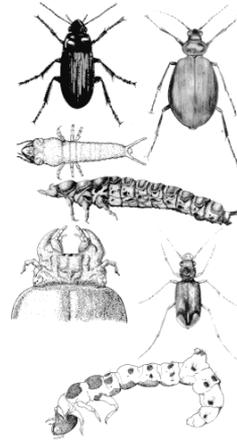


Image source: Landcare Research (http://www.landcareresearch.co.nz/education/insects_spiders/insects/what.asp)

What is a tiger beetle?

- Belong to a group called ground beetles (Carabidae):
 - Distributed worldwide
 - 20,000 known species
 - Predaceous both as adults and as larvae
 - Most live on the ground
- Tiger beetles recognizable by their distinctive shape:
 - Long legs
 - Cylindrical rather than flattened body
- Larvae live in vertical burrows in the soil
- Many species are strong fliers.
- 2,000 species worldwide
- 24 species live in Missouri



Ground beetles. A, Harpalus adult. B, Harpalus larva. C, Calosoma adult. D and E, Calosoma larva and head. Tiger beetle. F, Adult. G, Larva.

Image source: IPM North Carolina (http://ipm.ncsu.edu/AG268/html/ground_and_tiger_beetles.htm)

Where do tiger beetles live?



Roadsides



Sand/gravel bars



Open Woodlands



Glades

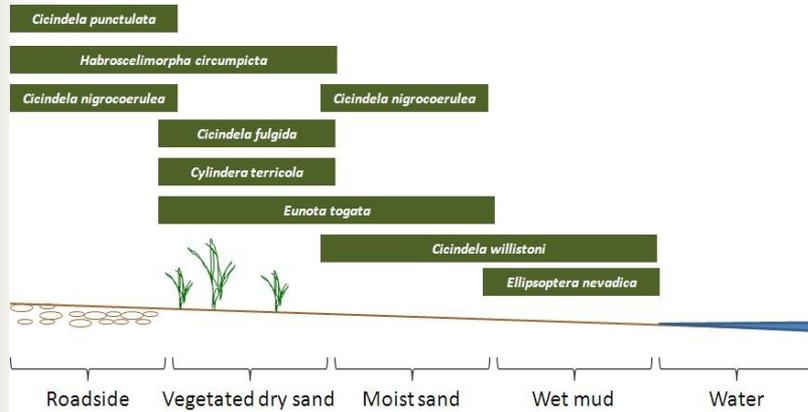


Sand Prairies



Loess Hills

Habitat partitioning by tiger beetles



Species that live along roadsides





Cicindela limbalis – Common Claybank Tiger Beetle
Common in Missouri along roadsides, open forests, and glades. Red head.



Cicindela splendida – Splendid Tiger Beetle
Same habitats as previous – more common in southern Missouri. Green head.



Cicindela purpurea – Cowpath Tiger Beetle
Diagonal marking at middle of elytra – not common in Missouri



Cicindelidia punctulata – Punctured Tiger Beetle
Our most common species of tiger beetle.



Easily recognized by the rows of brightly colored “punctures” on each elytron.

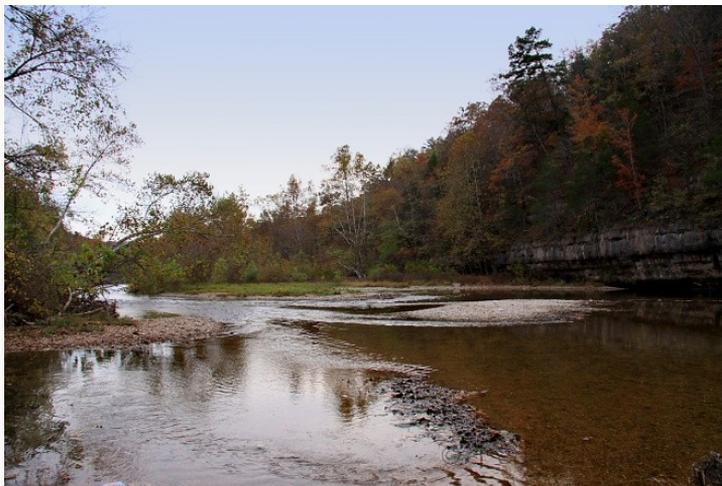


Cicindelidia rufiventris – Red-bellied tiger beetle
Only Missouri species with a “red belly” – more common in southern glades



Individuals show variability in spots and coloration – this one has more spotting than the previous and more bronzy rather than blue coloration.

Species that live along sand/gravel bars





Cicindela repanda – Bronzed Tiger Beetle
Common along riversides in Missouri – “C”-shaped shoulder marking



Cicindela hirticollis – Hairy-necked Tiger Beetle
Less common – “G”-shaped marking on neck and “hairy” thorax



Cicindela tranquebarica – Oblique-lined Tiger Beetle
Common, prefers drier sand areas away from water – also sand prairies.



Newly emerged male at the entrance to his burrow after summer hibernation.



Ellipsoptera cuprescens – Coppery Tiger Beetle
Not common – elytra “excavated” just before the tips.



Mating Coppery Tiger Beetles. Males grasp females by the thorax (“neck”) with their mandibles. Mate guarding prevents remating by female.



Ellipsoptera macra – Sandy Stream Tiger Beetle
Rare in Missouri – slightly less shiny than Coppery Tiger Beetle



We have only collected Sandy Stream Tiger Beetles by attracting them to ultraviolet lights along the Missouri River in northwest Missouri.



Cicindelidia trifasciata subsp. *ascendens* – Ascendent Tiger Beetle
Southeastern Coastal Plain – only one specimen known from Missouri.

Species that live in open woodlands





Cicindela sexguttata – Six-spotted Tiger Beetle
Most commonly encountered tiger beetle in Missouri



Cylindera unipunctata – One-spotted Tiger Beetle
Rarely encountered but locally abundant in eastern Ozark Highlands

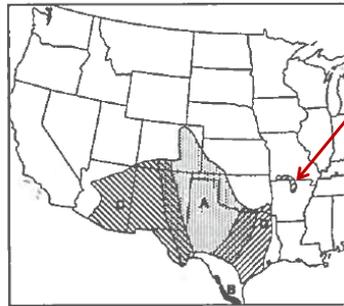


This species cannot fly and relies on camouflage and hiding amongst grass clumps and fallen leaves to avoid detection.

Species restricted to glades



Cicindelidia obsoleta – Prairie Tiger Beetle



Map 55 Large Grassland Tiger Beetle, *Cicindela (Cicindelidia) obsoleta*;
A, *C. o. obsoleta*; B, *C. o. neojuvencilis*;
C, *C. o. santacerae*; D, *C. o. vulturina*.

- Main population in southwestern Great Plains
- Large species – only *Tetracha virginica* is larger.
- Upland species – never found near water. Prefers grasslands and hillsides with exposed soil.
- Small disjunct population in White River Hills of SW Missouri and NC Arkansas – on dolomite/sandstone glades.
- Main population is a “summer species”; but MO/AR adults emerge in late summer and fall after seasonal rains.
- Powerful fliers

Image source: Pearson et al. (2006) *Tiger Beetles of the United States and Canada*.



Cicindelidia obsoleta subsp. *vulturina* – Prairie Tiger Beetle
Large, powerful flier, occurs only in glades in the White River Hills



Most individuals are dark olive-green, but some such as this one are brown



Other individuals show incomplete markings.

Species that live in sand prairies



Cicindela formosa subsp. *generosa* – Eastern Big Sand Tiger Beetle
Big, bold white markings and large size identify this species.

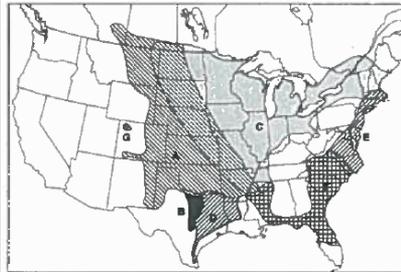


Coloration and markings may seem conspicuous but provide excellent camouflage against the pebbly-sand substrate.



Big sand tiger beetles remain one of my favorite tiger beetles in Missouri.

Cicindela scutellaris – Festive Tiger Beetle



Map 43 Festive Tiger Beetle, *Cicindela* (*Cicindela*) *scutellaris*; A, *C. s. scutellaris*; B, *C. s. flavoviridis*; C, *C. s. lecontei*; D, *C. s. rugata*; E, *C. s. rugifrons*; F, *C. s. unicolor*; G, *C. s. yampae*.

- Species occurs broadly east of the Rocky Mountains and exhibits the greatest amount of geographical variation of any tiger beetle species in North America
- Dry, upland sand habitats, including dunes, blowouts, road cuts, and sparsely vegetated pine and pine-oak forests
- “Spring-fall” species
- Disjunct populations in SE, NE, and NW corners of MO

Image source: Pearson et al. (2006) *Tiger Beetles of the United States and Canada*.



Cicindela scutellaris subsp. *lecontei* – Leconte’s Tiger Beetle
This individual from SE Missouri shows more green than those further north.



Another individual from SE Missouri, this one is completely green and contains no white markings on the elytra (matches subsp. *unicolor* to the south).

Species restricted to the southeastern lowlands





Tetracha carolina – Carolina Metallic Tiger Beetle
Largest tiger beetle in Missouri (nearly 1"). Similar species is *virginica*.

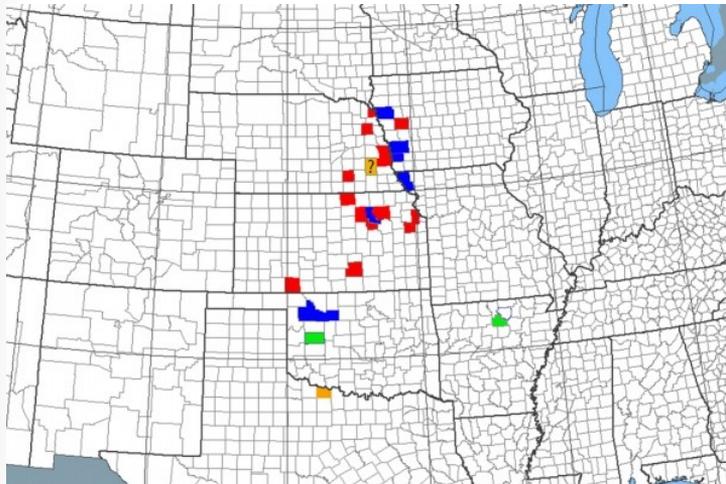


Toothy mandibles and rapid running capabilities make these and other tiger beetles formidable predators.



Cylindera cursitans – Ant-like Tiger Beetle
Smallest tiger beetle in Missouri (1/4-inch long) – flightless.

Tiger Beetle Conservation



Historical and current distribution of *Cylindera celeripes* – Swift Tiger Beetle

Cylindera celeripes – Swift Tiger Beetle



Habroscelimorpha circumpicta johnsonii Saline Spring Tiger Beetle

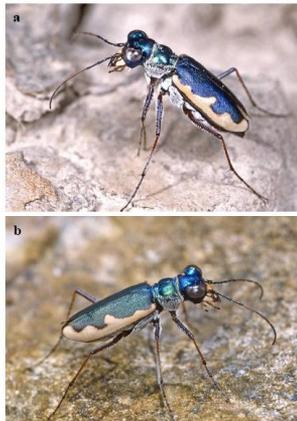


Figure 2. *Habroscelimorpha circumpicta johnsonii* adults showing the blue to blue-green coloration exhibited by Missouri disjunct individuals: a) Blue Lick Conservation Area (south), 22.vii.2001; b) same locality, 7.vii.2002. Photos by CRB.

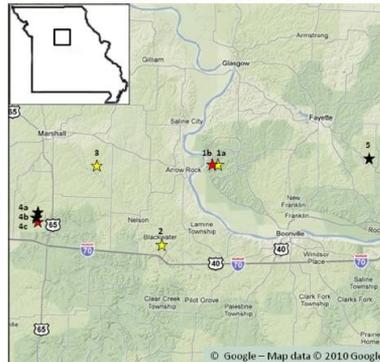


Figure 1. Saline seep survey sites (see Table 1 for key to numbers). Red stars indicate sites where *Habroscelimorpha circumpicta johnsonii* was observed during this survey, yellow stars indicate sites where the species has been recorded historically but was not seen during this survey, and black stars indicate sites from which the beetle has not been recorded at any time. Black box on inset map of Missouri denotes survey area in central Missouri.

Dromochorus pruinina Frosted Dromo Tiger Beetle



Figure 1. 2006 survey sites in west-central Missouri (see Table 1 for key to numbers). Red stars indicate sites where *Dromochorus pruinina* was observed. Black box on inset map of Missouri denotes main map area. Black box on main map denotes 2008 survey area (see Fig. 2).



Figures 3-4. 3) *Dromochorus pruinina* in west-central Missouri (Knob Noster State Park, 1.6 km W State Hwy 23 on County Rd DD, 30 June 2006). Photo by CRB. 4) Sparsely vegetated clay exposures; habitat for *Dromochorus pruinina* in west-central Missouri (Knob Noster State Park, 3.5 km W State Hwy 23 on County Rd DD, 8 July 2006). Photo by TCM.

Tiger Beetle Larvae



Enemies of Tiger Beetle Larvae



Anthrax analis (bee flies) lay eggs in or near tiger beetle larval burrows. Larvae hatch and attach to tiger beetle larva.

The fly larvae kill the host and overwinter. In spring an adult fly will emerge from the burrow.



Checklist of Missouri Tiger Beetles

- **Family CARABIDAE** (ground beetles)
- **Subfamily CICINDELINAE** (tiger beetles)
- **Tribe MEGACEPHALINI** (metallic tiger beetles)
 - *Tetracha carolina* – Carolina Metallic Tiger Beetle
 - *Tetracha virginica* – Virginia Metallic Tiger Beetle
- **Tribe CICINDELINI** (flashy tiger beetles)
 - *Cicindela duodecimguttata* – 12-spotted Tiger Beetle
 - *Cicindela formosa* subsp. *generosa* – Eastern Big Sand Tiger Beetle
 - *Cicindela hirticollis* subsp. *shelfordi* – Shelford's Tiger Beetle
 - *Cicindela limbalis* – Common Claybank Tiger Beetle
 - *Cicindela purpurea* – Cowpath Tiger Beetle
 - *Cicindela repanda* – Bronzed Tiger Beetle
 - *Cicindela scutellaris* subsp. *lecontei* – LeConte's Tiger Beetle
 - *Cicindela sexguttata* – Six-spotted Tiger Beetle
 - *Cicindela splendida* – Splendid Tiger Beetle
 - *Cicindela tranquebarica* – Oblique-lined Tiger Beetle

Species names in bold text shown in this presentation.

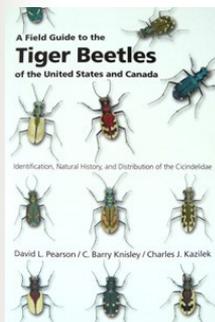
Checklist of Missouri Tiger Beetles (cont.)

■ Tribe CICINDELINI (cont.)

- *Cicindelidia obsoleta* subsp. *vulturina* – Prairie Tiger Beetle
- *Cicindelidia punctulata* – Punctured Tiger Beetle
- *Cicindelidia rufiventris* – Eastern Red-bellied Tiger Beetle
- *Cicindelidia trifasciata* subsp. *ascendens* – Ascendant Tiger Beetle
- *Cylindera celeripes* – Swift Tiger Beetle
- *Cylindera cursitans* – Ant-like Tiger Beetle
- *Cylindera unipunctata* – One-spotted Tiger Beetle
- *Dromochorus pruinina* – Frosted Dromo Tiger Beetle
- *Ellipsoptera cuprascens* – Coppery Tiger Beetle
- *Ellipsoptera lepida* – Ghost Tiger Beetle
- *Ellipsoptera macra* – Sandy Stream Tiger Beetle
- *Habroscelimorpha circumpicta* subsp. *johnsonii* – Johnson's Tiger Beetle

Species names in bold text shown in this presentation.

More Information

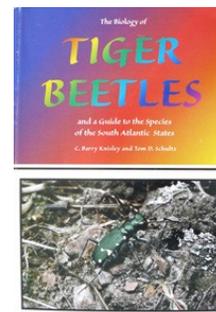


Pearson, D. L., C. B. Knisley & C. J. Kazilek. 2006. *A field guide to the tiger beetles of the United States and Canada*. Oxford Univ. Press, NY. 288 pp.



Beetles in the Bush

“Beetles in the Bush”
<http://beetlesinthebush.wordpress.com>
 (or, just Google it!)



Knisley, C. B. & T. D. Schultz. 1997. *The Biology of Tiger Beetles and a Guide to the Species of the South Atlantic States*. Virginia Museum of Natural History, Martinsville. 210 pp.