# Cylindera cursitans: Distribution and Seasonal Occurrence in Southeast Missouri

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### INTRODUCTION

Cylindera (s. str.) cursitans (LeConte), is a flightless species that has been associated with wet meadows and other open lowland habitats with moist substrates near waterways and roadside ditches in the Ohio and lower Mississippi River basins, and with an apparently disjunct population also occurring in the upper Missouri River basin (Brust et al. 2005, Pearson et al. 2006). Until now it has been known from Missouri by a single specimen collected "nr. Portageville" (New Madrid Co.) on 7 July 1991 by an unknown collector (deposited in the Enns Entomology Research Museum, University of Missouri, Columbia). Ronald L. Huber (in litt.) suggested that populations from the Ohio and lower Mississippi River basins are actually associated with bluff tops overlooking rivers; however, ho such habitat exists in southeast Missouri, which forms the northern terminus of the Mississippi River Alluvial Basin.

In 2007 several C. cursitans adults were observed and documented at Stewart Towhead in New Madrid County near Portageville. The beetles were not found in the open areas, but rather along a shaded sandypam 2-track leading through the adjacent bottomland forest. Additional adults were observed in similar habitats at two additional sites by all three authors, and in 2008 an extensive survey was initiated using pitfall traps and direct observation in selected bottomland forests in the Mississippi River Alluvial Basin to more fully characterize the geographical distribution of C. cursitans in southeast Missouri. Additional visual surveys were conducted in 2009 and 2010 at several sites further north along the Mississippi and St. Francis Rivers in the northern reaches of the Mississippi River Alluvial Basin. We report details and results of those surveys here.

### **METHODS & MATERIALS**

2007, after the initial discovery of C. cursitans at Stewart Towhead, pitfall traps (MacRae and Brown 2010) and direct observation were used to survey for the species at that location and at nearby Girvin Memorial Conservation Area (New Madrid Co.) and Dorena Access (Mississippi Co.) (Fig. 1). All three of these sites support wet bottomland forest immediately adjacent to the Mississippi River. A total of 13 traps were placed at Stewart Towhead (8 traps) and Girvin Memorial Conservation Area (5 traps) and checked every 6-8 days during the survey period. Direct observations only were made at Dorena Access and at the other locations whenever traps were placed or checked to monitor for the presence of active adults In 2008, nine sites in selected bottomland forest habitats along the Mississippi River (Mississippi, New Madrid, and Pemiscot Counties) and along or near the St. Francis River (Dunklin Co.) were surveyed by direct observation and pitfall traps (Fig. 1). Sites were selected based on their similarity to the three sites where C. cursitans had been observed in 2007. Several additional potentially suitable habitats were noted along the Mississippi River; however, flooding prevented trap placement and subsequent observation at these sites. Few bottomland forests are located in the expanse between the Mississippi and St. Francis Rivers due to its nearly complete conversion to agricultural lands supporting crops of cotton, soybean, corn, or rice. No traps were placed in this area, as it is unlikely that such lands could support populations of C. cursitans - the lone exception being Warbler Woods Conservation Area (Dunklin Co.), a small bottomland forest remnant. Survey activities were initiated 21 June and concluded 13 July to coincide with the presumed adult activity period for the species. A total of 69 traps were placed at the nine sites and checked every 6-8 days during the survey period. Direct observations were also made whenever traps were placed or checked to monitor for the presence of active adults. At least two and up to ten pitfall traps were placed at each site, with the number placed intended to provide adequate sampling of available pparently suitable habitat.

In 2009, four new sites in Cape Girardeau and Mississippi Counties were surveyed 20 June by direct observation (Fig. 1). Three of the sites are adjacent to the Mississippi River in the northernmost reaches o the Mississippi River Alluvial Basin, and forest adjacent to remnant swamp at Big Oak Tree State Park (Mississippi Co.) was also surveyed. Again, sites were selected based on the presence of wet bottomland forests similar to those seen at sites where C. cursitans had been observed in previous years In 2010, seven new sites in Butler and Dunklin Counties were surveyed 12 June by direct observation (Fig 1). The sites are located along on near the St. Fracies River and were selected based on presence of bottomland dorest and their proximity to a known C. *oursitans* population in Arkansas (Lavers 2007). Voucher spectmens were retained from all sites where the beetle was observed and are adjousited in the following collections: Cony B. Cross collection (CBCQ): Christopher R. Brown collection (CRBC); University of Missouri Delta Research Center collection (DRCC); Enns Entomology Research Museum, University of Missouri, Columbia (EERM); Richard S. Thoma cellection (RSTC); Ted C. MacRae collection (TCMC).

## ACKNOWLEDGEMENTS We thank the Missouri Departments of Conservation and Natural Resources (Jefferson City) and Robert Henry (New Madrid, Missouri) for permission to survey lands under their stewardship, and Cory Cro (Portageville, Missouri) and Richard Thoma (Monsanto Company, Creve Coeur, Missouri) for field assistance. Appreciation is also extended to Kris Simpson (University of Missouri, Columbia) and Mike assistance: Appreciator is any production of the scampe are compared to increase of the scampe and the scampe are compared to the scampe are scampe and the scampe are scampe are

(Bloomington, Minnesota) for discussion and ideas.

## LITERATURE CITED

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From T. L. and D. L. Penson, 2005. REATURE ON THE WESTERNUHMISPHERE CARADIDEA (COLEGATERA). THER CLASSIFICATION DISTRIBUTIONS & WAYS OF LIFE: CARADIDEA: INERRIFORMES and COLNELITAE PENSOR'S SPEES FAUNISTICAL. Ensuiti Publishere, Some Bugeria, 40:20, D. D. Bellow, C. Reards, Reards, C. Reards, C. Reards, C. Reards, C. Reards, C. Reards, C. Reards, Reards, C. Reards, C. Reards, Reards, C. Reards, C. Reards, Reards, Reards, Reards, C. Reards, Reards, Reards, Reards, C. Reards, Re



Figure 1. Sites surveyed in southeastern Missouri for Cylindera ursitans during 2007–2010. Site numbers are referenced in Table 1 (CRP = Cape Rock Park), with red stars indicating sites where C. cursitans was observed.

Table 1. Sites in southeastern Missouri where Cylindera cursitans was observed during 2007-2010, with site name, date, # observed, and voucher number and collection.

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ELS'S BEL	Date	#Observed	Vouchers
Bluff Trail River Access	12, vi.2010	1	TDRCC
na Access	09.vii.2007 28.vi.2008 13.vii.2008	8 many few	1 DRCC 3 CRBC
na Ferry Landing	22.vi.2008 28.vi.2008 06.vii.2008 13.vii.2008	5 many many 2	4 TCMC, 1 DRCC 35 TCMC 1 DRCC
n Memorial Conservation	23.vi.2007 29.vi.2007 06.vii.2007	2 nome 1	2 TCMC
m NE Birds Blue Hole 60 at Mississippi River e	20.vi.2009	-12	3 TCMC, 2 RSTC
rt Henry Property	22.vi.2008 28.vi.2008 06.vii.2008 13.vii.2008	none none 5 none	5 TCMC
art Towhead	19.vi.2007 29.vi.2007 06.vii.2007 03.viii.2009	1 none none 1	I EERM

nc., 506 Center Street West, Kimberly, ID 83341.

Figure 2. Cylindera cursitans in southeast Missouri: a) New Madrid Co., Girvin Memorial Conservatio ea, 6.vii.2007; b-c) Mississippi Co., Dorena Ferry Landing, 6.vii.2008; d) Mississippi Co., Hwy 60 at Mississippi River bridge, 20.vi.2009. Photos by CRB (a) and TCM (b-d).

#### **RESULTS & DISCUSSION**

Cylindera cursitans adults (Fig. 2) were encountered at a total of seven sites (Table 1). Despite the observation of numerous individuals at some sites, no individuals were captured in pitfall traps at any of the sites. This is an unexpected result, since another flightless tiger beetle, Tetracha virginica (L.), was collected in pitfall traps at many of the sites during this survey. We also found two specimens of this species in the personal collection of Mike Smart (Cape Girardeau, Missouri) with the following collection data: Missouri, Cape Girardeau Co., Cape Rock Park, 60 yards N of lower parking lot, 24 v 2001, coll. Mike Smart. This site lies at the northernmost extent of the Mississippi River Alluvial Basin (Fig. 1) and brings to eight the number of sites in Missouri known to support C. cursitans. Dates of adult occurrence in the study ranged from 24 May to 13 July. Cory Cross (Portageville, Missouri) collected a specimen at Stewart Towhead on 3 Aug 2009, extending the known temporal occurrence of *C. cursitians* in Missouri. The sites where *C. cursitians* was observed share similar features – wet bottomland forest adjacent to the Mississippi and St. Francis Rivers, with a canopy dominated by eastern cottonwood (Populus deltoides Bartram ex Marsh.), silver maple (Acer saccharinum L.), sycamore (Platanus occidentalis L.), and boxelde (Acer negundo L.), an open understory dominated by poison ivy (Toxicodendron radicans (L.) Kuntze) and trumpet creeper (Campsis radicans (L.) Seem. ex Bureau) (Fig. 3), and a ridge/swale topography of clay loam or sandy clay loam soil. Adults were found exclusively within these forests. This contrasts with the reported preference of this species for open roadside ditches and wet meadows (Brust et al. 2005, Pearson et al. 2006). Numerous larval burrows - presumably of this species - were also observed in the areas where robust adult populations were observed. Once a vast assemblage of bald cypress (Taxodium distichum L.) and tupelo gum (Nyssa aquatic L.) swamps and mixed deciduous bottomland forest, the Mississippi River Alluvial Basin of southeastern Missouri has been nearly completely drained, cleared, and converted to agriculture. Only small remnants of wet bottomland forest remain in the narrow corridors between the levees along the Mississippi and St. Francis Rivers and the rivers they confine. Nevertheles these forests seem to offer adequate and suitable habitat for C. cursitans in Missouri. The detection of populations, in forests adjacent to these rivers at multiple sites in Cape Girardeau, Dunklin, Mississipp and New Madrid Counties suggests that the species' status within the state is secure and that it does not and then machine obtaines suggests that the people status which make table is secure and that receive not require any special conservation measures at this time. What remains to be learned is whether the species occurs in similar habitats further north, or even along the Missouri River within the species' apparent disjunction zone. It is possible that *C. cursitans* is a more widespread species, undetected in much of Missouri due to its small size, limited temporal occurrence, habitat specificity, cryptic appearance, and lack of intensive field work (perhaps due in part to the hordes of deer flies, swarms of mosquitoes, and dense stands of poison ivy that confront those who attempt research in Missouri's wet bottomland forests). Another possibility, raised by Ron Huber (in tit), is that populations in the Ohio and lower Mississippi River basins (represented by *Cicindela alate* Lijeblad, type locality: Chicago, Illinois) are distinct from those in the upper twissouri River basin (represented by *Cicindela curstans* LeConte, type locality: Font Riley, Kansas). If this is the case, the absence of populations elsewhere in Missouri is the result of a true disjunction between two sister species or subspecies, with the populations in southeast Missouri likely representing the "alata" form. Clearly, additional studies to determine whether C. cursitans occurs in the apparent disjunction zone are warranted.

Figure 3. Poster background is wet bottomland forest, habitat for Cylindera cursitans in southeast Missouri (New Madrid Co., Robert Henry property). Photo by TCM.