

Illinois Status Survey of the Redside Dace *Clinostomus elongatus*: The Newest Addition to the State's Native Fish Fauna

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ABSTRACT

The redbase dace *Clinostomus elongatus* is a small, laterally compressed cyprinid commonly found in small streams with moderate to high gradients, clear and cool water, and substrates of clean gravel, sand, or bedrock. Fish surveys in Winnebago County, Illinois, and Rock County, Wisconsin, conducted from 1997-2000 and 2010-2011 discovered the dace at a single site in Illinois in East Fork Raccoon Creek (Pecatonica River – Rock River Drainage). This is the first documented record of this species in Illinois and raises the known total of state native fishes to 192. Based on these surveys, *C. elongatus* is expected to periodically occur in the Illinois portion of the Raccoon Creek basin, and therefore should be considered a peripheral species in Illinois.

INTRODUCTION

The redbase dace *Clinostomus elongatus* is a small, laterally compressed minnow (Cyprinidae) with a large oblique mouth and long pointed snout. It commonly inhabits small streams with moderate to high gradients, clear and cool water, and substrates of clean gravel, sand, or bedrock (Trautman, 1981; Becker, 1983). The dace is drawn to particular habitat features, and generally orients toward stream positions with slower current velocities, greater depths, and closer to woody debris (Novinger and Coon, 2000; Zimmerman, 2009). *Clinostomus elongatus* is distributed across once glaciated regions of the northeastern United States and southern Ontario in watersheds draining into the Mississippi River, Ohio River, Great Lakes, and Atlantic Ocean (COSEWIC, 2007). The western-most populations occur in a few isolated, disjunct populations throughout the upper Mississippi River basin, including the Raccoon Creek basin (Pecatonica River – Rock River Drainage) in Rock County, Wisconsin (Gilbert, 1980; Becker, 1983). However, the species had never been documented in Illinois. We performed fish surveys in the Raccoon Creek basin to determine the presence of *C. elongatus* in Illinois.

METHODS

Two assessment surveys were performed in the Raccoon Creek basin (Pecatonica River - Rock River Drainage). The first assessment occurred from November 1997 to April 2000 and was conducted by MHSP (Sabaj, 2000), whereas the second was conducted by JST and occurred from June 2010 to October 2011. During the first assessment, fishes were collected at 10 sites in the basin with a 2.43 m minnow seine and a Smith-Root backpack electrofisher (model 12-B) powered by a 24 volt, 12Ah battery for up to 4 hours per site; each site was visited 1-5 times during the Spring-Summer and/or Fall-Winter (Sabaj, 2000). During the second assessment, fishes were collected at 20 sites (Table 1) for up to 2 hours per site using a barge electro-shocker set at 200 volts, a Smith-Root Model 12 DC backpack electrofisher, or a 3.05 m minnow seine; each site was visited four times. During each site-visit, all fishes collected were identified to species in the field. A subsample of fishes representing the total diversity collected at each site was vouchered and deposited in the Illinois Natural History Survey Fish Collection, Champaign (INHS). Fishes collected but not vouchered were returned without harm to their native habitat. Nomenclature follows Page and Burr (2011). In addition, the Wisconsin Department of Natural Resources' (WDNR) Fish Mapper was accessed (<http://infotrek.er.usgs.gov/wdnrfish/map/index>), and fishes housed at the following museums were searched for voucher specimens of *C. elongatus* collected from Illinois and Wisconsin: Academy of Natural Sciences, Philadelphia (ANSP), Field Museum of Natural History, Chicago (FMNH), INHS, Milwaukee Public Museum (MPM), University of Kansas Museum of Natural History, Lawrence (KU), Southern Illinois University Fish Collection, Carbondale (SIUC), University of Michigan Museum of Zoology, Ann Arbor (UMMZ), and United States National Museum - Smithsonian Institution, Washington D.C. (USNM). Museum names and codes follow Sabaj Pérez (2012).

RESULTS

The two assessments of the Raccoon Creek basin yielded 55 native species of fishes, including *C. elongatus* (Table 1). However, only once was *C. elongatus* collected in Illinois. Eight juveniles were taken on 31 May 1998 in East Fork Raccoon Creek, 4.3 km NW Rockton, Winnebago County, 42.48508°N, 89.13744°W (Figure 1 – Site 17). Seven specimens were vouchered (INHS 46430) and one was returned live to the stream at the place of capture. All specimens were collected in a relatively deep (ca. 3-3.5 ft.) and partially shaded pool (side pocket of the main channel) with a thick silt and mud substrate. In the previous year, a beaver dam stretched across the channel just below the mouth of the pocket, inundating a short stretch of the creek. The beaver dam had been removed by the landowner prior to the 1998 visit; however, the pool retained water and provided refuge for the redbreast dace and many other juvenile minnows including bigmouth shiners *Notropis dorsalis*, southern redbelly dace *Chrosomus erythrogaster*, fathead minnows *Pimephales promelas*, creek chubs *Semotilus atromaculatus* and brassy minnows *Hybognathus hankinsoni*. The same pool was sampled on eight additional occasions, once before collecting the redbreast dace and seven times after, but only the one visit yielded any dace.

Table 1. Sampling sites for the *Clinostomus elongatus* survey. Streams include Raccoon Creek (RC), unnamed tributaries to Raccoon Creek (Trib RC), East Fork Raccoon Creek (EFRC), and unnamed tributary to East Fork Raccoon Creek (Trib EFRC). Latitude and longitude are in decimal degrees. Reference Point is approximate location of site on gazetteer. Point on map (PoM) refers to site number on Figure 1. Asterisks (*) are the sites sampled by Sabaj (2000). Last observed (Last obs.) is when *Clinostomus elongatus* was last observed at the site and includes the 1997-2000 and 2010-2011 surveys as well as those performed by Fago (1982).

Stream	State: County	Latitude	Longitude	Reference Point	PoM	Last obs.
RC	WI: Rock	42.5751	-89.2079	S Luther Valley Rd	1	Fago (1982)
RC	WI: Rock	42.5416	-89.2072	W Beloit Newark Rd	2	2011
RC	WI: Rock	42.5265	-89.1955	WI Rte 81	3	
RC	WI: Rock	42.5092	-89.1696	Mill Pond Rd	4	Fago (1982)
RC	WI: Rock	42.5038	-89.1609	W St Lawrence Rd	5	
trib RC	WI: Rock	42.5234	-89.1781	WI Rte 81	6	
trib RC	WI: Rock	42.5278	-89.1692	Co Hwy H	7	
EFRC	WI: Rock	42.5628	-89.1446	W Gravedale Rd	8	Fago (1982)
EFRC	WI: Rock	42.5408	-89.1326	W Beloit Newark Rd	9	2011
EFRC	WI: Rock	42.5261	-89.1256	W Spring Creek Rd	10*	2011
EFRC	WI: Rock	42.5041	-89.1173	W St Lawrence Rd	11	2011
EFRC	WI: Rock	42.4974	-89.1202	State line	12*	2011
trib EFRC	WI: Rock	42.5255	-89.0949	W Spring Creek Rd	13*	
RC	IL: Winn.	42.4916	-89.1482	Power line crossing	14*	
RC	IL: Winn.	42.4760	-89.1377	Yale Bridge Rd	15*	
RC	IL: Winn.	42.4557	-89.1270	W Rockton Rd	16*	
EFRC	IL: Winn.	42.4850	-89.1374	Confluence with RC	17*	1998
Trib RC	IL: Winn.	42.4939	-89.1708	Pomeroy Rd	18*	
Trib RC	IL: Winn.	42.4768	-89.1266	Yale Bridge Rd	19*	
Trib RC	IL: Winn.	42.4676	-89.1381	Clover Rd	20*	

The dace was collected throughout the Wisconsin side of the Raccoon Creek basin including <0.5 km from the state line during the second survey (Table 1). Three adults were collected on 1 August 2011 in East Fork Raccoon Creek, 7.3 km W Beloit, Rock County, 42.49969°N, 89.11987°W (Figure 1 – Site 12). One specimen was vouchered (INHS 104899) and two were returned live to the stream at the place of capture. These three individuals were collected in a clear pool containing gravel/cobble substrates. This site was ~1 km upstream of where the Illinois specimens were collected in 1998. Of the museums examined, only INHS and MPM had redbreast dace specimens from the Raccoon Creek basin. On 8 June 1998, 24 adult specimens were collected in the East Fork Raccoon Creek, 8.0 km W Beloit, in Rock County, Wisconsin, 42.52617°N, 89.12562°W (INHS 46977). MPM had specimens collected by Fago (1982), who reported the dace from another locality in the upper East Fork and 3 localities in upper Raccoon Creek, Rock County, Wisconsin (Table 1; Figure 1). According to the WDNR's Fish Mapper, the only stream flowing into Illinois that contained *C. elongatus* was Raccoon Creek.

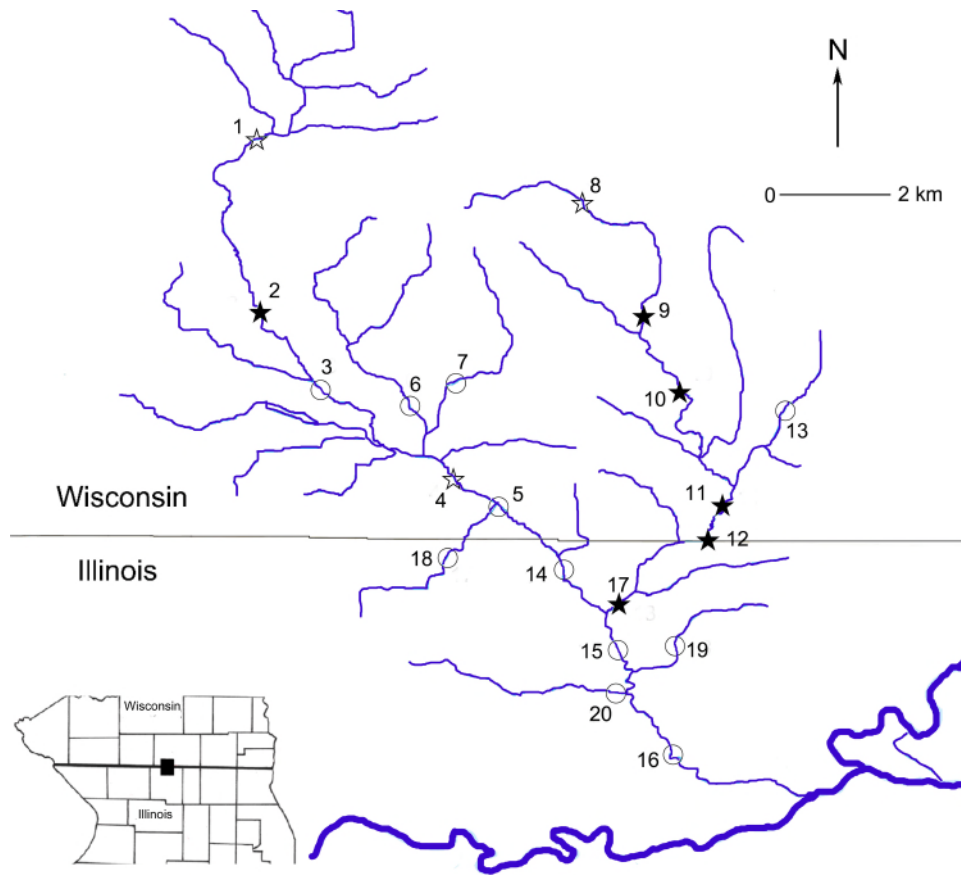


Figure 1. Map of the study area. Solid stars indicate sites where *Clinostomus elongatus* was collected during the 1997-2000 and 2010-2011 surveys, open stars show where Fago (1982) reported the fish, and open circles designate those sites where we failed to collect the dace during our surveys.

DISCUSSION

This study is the first to document *C. elongatus* in Illinois, and increases the total number of fish species reported as native to Illinois waters to 192 (Burr and Page, 2009). Resident populations of *C. elongatus* occur in the Wisconsin headwaters of East Fork Raccoon Creek and Raccoon Creek; however, the dace is evidently a peripheral species in Illinois. The substrate changed from predominantly gravel and cobble over mud and sand on the Wisconsin side of the basin to largely sand with scattered patches of gravel and small cobble in Illinois. Although its occurrence in the state has been confirmed, it remains undetermined whether this species reproduces in Illinois and maintains a resident population or is just an occasional transient that is washed downstream.

As reported by Koster (1939), *C. elongatus* was commonly collected with blacknose dace *Rhinichthys atratulus*, creek chubs, white suckers *Catostomus commersoni*, and Johnny

darters *Etheostoma nigrum*. Redside dace typically reproduce over the pebble-nests of other minnows in small headwater streams dominated by gravel substrates (Koster, 1939). Two pebble nest-building species (hornyhead chub *Nocomis biguttatus* and creek chub) were found throughout the Raccoon River basin in Illinois. However, habitat suitable for pebble-nests (e.g., clean gravel substrates) was rather uncommon in the Illinois portion of this system, which is dominated by sand. Two small tributaries to Raccoon Creek (see sites 18 and 20, Figure 1) offered the best habitats for pebble-nests and are thereby the best candidates for supporting viable Illinois populations of *C. elongatus*. However, these streams were often dry and collections in these tributaries yielded no specimens.

Several other state native fishes have been discovered since Smith's (1979) comprehensive summary of the state's ichthyofauna. The bleeding shiner *Luxilus zonatus*, taillight shiner *Notropis maculatus*, and fringed darter *Etheostoma crossopterygion* were not reported in Smith (1979) but have been collected in Illinois in the last 30 years (Burr et al., 1988; Poly and Wilson, 1998; Hiland and Poly, 2000). The cypress minnow *Hybognathus hayi*, bigeye chub *Hybopsis amblops*, and crystal darter *Cystallaria asprella* were considered extirpated by Smith (1979), but since have been sporadically collected in Illinois (Warren and Burr, 1989; Burr et al., 1996; Tiemann et al., 2004; Stewart et al., 2005; Steuck et al., 2010). Although the northern studfish *Fundulus catenatus* is listed as part of the state's ichthyofauna, Smith (1979) stated that there was no evidence of a population in Illinois and the species was a "straggler from a Missouri tributary." A single specimen was collected in July 2007 in the West Fork Richland Creek (Kaskaskia River Drainage), St. Clair County (Randy Sauer, Illinois Department of Natural Resources, personal communication). These recent additions to the biodiversity of Illinois provide a refreshing, albeit fleeting departure from more common statewide trends such as species extirpations (e.g., Burr and Warren, 1986) and invasions by non-indigenous fishes (e.g., Laird and Page, 1996; Chick et al., 2003; Irons et al., 2006).

The Pecatonica River drainage, which includes the Raccoon Creek basin, has seen an increase in native fish species richness during the last 100 years (Retzer, 2005). In an evaluation of Illinois streams based on aquatic biodiversity, Page et al. (1992) listed Raccoon Creek as a Biologically Significant Stream so it is no surprise that the basin supports a diverse fish fauna, including the Illinois state-threatened starhead topminnow *Fundulus dispar* and Iowa darter *Etheostoma exile*. Though not formally sampled, we also encountered a diverse mussel fauna with 10 live species, including the Illinois state-threatened slippershell *Alasmidonta viridis*. However, the Pecatonica River basin, including Raccoon Creek, has been threatened by siltation and agricultural pollution (Smith, 1971; Page et al., 1992). Additionally, Raccoon Creek is altered by a headwater impoundment (Mill Pond) near our Site 4. In addition to altering habitat and blocking fish dispersal, dam effects include stocking of sportfish (Taylor et al., 2001; Tiemann et al., 2007). We collected several top predators near Site 4, including largemouth bass *Micropterus salmoides* and northern pike *Esox lucius*, that were not collected elsewhere in the basin.

Multiple authors have noted a decrease in the overall range and abundance of the redbite dace, primarily as a result of activities that increase turbidity, silt deposition, and mean water temperature in small streams (either as a result of dams, climate change, or removal

of riparian areas), or introduction of top predators (Harlan and Speaker, 1956; Trautman, 1981; Lyons et al., 2000; COSEWIC, 2007). Because of these threats and its limited distribution, the American Fisheries Society listed *C. elongatus* as vulnerable, the status applied to a taxon that is in imminent danger of becoming threatened throughout all or a significant portion of its range (Jelks et al. 2008). Within the upper Midwest, the dace is extirpated from Iowa, listed as endangered in Canada, Michigan, and Indiana, and listed as a species of special concern in Wisconsin (Harlan and Speaker, 1956; Lyons et al., 2000; COSEWIC, 2007). Several populations of *C. elongatus* have disappeared from the upper Rock River basin in Dane County, Wisconsin (Lyons et al., 2000).

The continued occurrence of the reidside dace in Illinois is largely dependent upon the integrity of the headwater habitats in Wisconsin that support reproductively viable populations. If the Wisconsin populations remain intact, one might expect the reidside dace to periodically appear in Illinois waters. While it is possible that the specimens collected in East Fork Raccoon Creek (all juveniles) had been washed downstream from source populations in Wisconsin headwaters, it is also likely that *C. elongatus* occurs in extremely patchy, isolated schools that are easily missed even during extensive sampling.

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