ILLINOIS NATURAL HISTORY SURVEY
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Status of the redside dace (*Clinostomus elongatus*) in Illinois

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Abstract

The redside 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. It has been found once (2000) in Illinois, which was in the East Fork Raccoon Creek (Pecatonica River - Rock River drainage), Winnebago County. I collected fishes four times at 19 sites in the Raccoon Creek basin in Winnebago County, Illinois, and Rock County, Wisconsin, from May 2011 to October 2011. Each site was sampled for up to 2 hours using a barge electro-shocker set at 200 volts, a Smith-Root Model 12 DC backpack electrofisher, or a 3.05 m minnow seine. Although I failed to find *C. elongatus* in Illinois, I did collect it at 5 sites in Wisconsin, including a site <0.5 km upstream from the Illinois-Wisconsin state-line. Based on the current survey, the dace is expected to periodically occur in the Illinois portion of the Raccoon Creek basin. Because its distribution in Illinois is limited to this small watershed, the redside dace should be considered for listing in Illinois.

Introduction

The redside dace *Clinostomus elongatus* (Figure 1) is a small (<100 mm), thin, laterally compressed minnow (Cyprinidae). 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 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 dace has experienced drastic declines in its distribution and now occurs in isolated, disjunct populations (Trautman 1981; Becker 1983). Sabaj (2000) was the first to document *C. elongatus* in Illinois after finding seven individuals at one site in the East Fork Raccoon Creek (Pecatonica River – Rock River drainage) in Winnebago County. He speculated that the dace periodically occurs in the Illinois portion of the Raccoon Creek basin. Although individuals have been found in the headwaters of Raccoon Creek in Wisconsin, no other individuals have been recorded in Illinois since Sabaj's study (data from the Illinois Natural History Survey Fish Collection, Champaign). I preformed fish surveys in the Raccoon Creek basin in Winnebago County, Illinois, and Rock County, Wisconsin, with the objective of obtaining data on distribution and abundance of the redside dace in Illinois.

Methods

I collected fishes four times at 19 sites (Table 1; Figure 2) in the Raccoon Creek basin in Winnebago County, Illinois, and Rock County, Wisconsin, from May 2011 to October 2011. Each site was sampled for up to 2 hours using a barge electro-shocker set at 200 volts, a Smith-Root Model 12 DC backpack electrofisher (Figure 3), or a 3.05 m minnow seine. 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 in the Illinois Natural History Survey (INHS) Fish Collection, Champaign. Fishes collected but not vouchered were returned without harm to their native habitat. Nomenclature follows Page and Burr (1991). In addition, fishes housed at the Academy of Natural Sciences, Philadelphia (ANSP), Field Museum of Natural History, Chicago (FMNH), 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) were searched for voucher specimens of *C. elongatus* collected from Illinois and Wisconsin. Museum names and codes follow Leviton et al. (1985).

Results

Fifty-six species of fishes, including *C. elongatus*, were collected during the study (Table 2); however, *C. elongatus* was not collected in Illinois. All redside dace encountered were collected on the Wisconsin side of the Raccoon Creek basin, including <0.5 km from the Wisconsin-Illinois state line (Table 1). Three adults were collected on 1 August 2011 in East Fork Raccoon Creek, 7.3 km W Beloit (Site 12 in Table 1 and Figure 2) with a seine. These three individuals were collected in a clear pool containing gravel/cobble substrates (Figure 4). This site was ~1 km upstream of where the Illinois specimens were collected in 1998 (Figure 5; Site 13 in Table 1 and Figure 2). Of the museums examined, only the INHS and MPM had redside 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, 42.52617ºN, 89.12562 ºW (INHS 46977). The MPM had specimens collected by Fago (1982), who reported the dace from sites on the Wisconsin side of the Raccoon Creek basin (Table 1; Figure 2).

Discussion

Resident populations of *C. elongatus* occur in the Wisconsin headwaters of East Fork Raccoon Creek and Raccoon Creek (Table 1; Figure 2); 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 on the Illinois side. 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 down from upstream.

As reported by Koster (1939), *C. elongatus* was commonly collected with blacknose dace *Rhinichthys atratulus*, creek chubs *Semotilus atromaculatus*, 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 (creek chub and hornyhead chub *Nocomis biguttatus*) were found throughout the Raccoon River basin. However, habitat suitable for pebble-nests (e.g., gravel substrates) was rather uncommon in the Illinois portion of this system. Two small tributaries to Raccoon Creek (see site 18 and 19, Figure 2) afford the best habitat for pebble-nests and are thereby the best candidates for supporting viable populations of *C. elongatus*, although collections in these tributaries yielded no specimens.

When Sabaj (2000) documented *C. elongatus* in Illinois, the total number of fish species reported as native to Illinois waters increased to 192 (Burr and Page 2009). 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 crossopterum* 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 *Crystallaria 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 of nonindigenous 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). Raccoon Creek was listed as a Biological Significant Stream (Page et al. 1992), so it should not come as a surprise that the Raccoon Creek basin had a diverse fauna, including the Illinois state-threatened starhead topminnow *Fundulus dispar* and Iowa darter *Etheostoma exile* (Table 2). Also, although not formally sampled, I did encounter a diverse mussel fauna with 10 live species, including the Illinois state-threatened slippershell *Alasmidonta viridis*. However, the Pecatonica River basin, including Raccoon Creek, is threatened by siltation and agricultural pollution (Smith 1971; Page et al. 1992). Additionally, Raccoon Creek is altered by a headwater impoundment (Mill Pond) near Site 4 (Table 1; Figure 2). In addition to changing habitat and blocking dispersal of fishes, dams effects include stocking of sportfish (Taylor et al. 2001; Tiemann et al. 2007). I collected several top predators near Site 4, including largemouth bass *Micropterus salmoides* (Figure 6) and northern pike *Esox lucius*, which were not collected elsewhere in the basin. Multiple authors have noted a decrease in the overall range and abundance of the redside dace, primarily as a result of activities that increase turbidity, silt deposition, mean water temperature in small streams (either as a result of dams or removal of riparian areas), and introduction of top predators (Harlan and Speaker 1951; 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, which is a taxon that is in imminent danger of becoming threatened throughout all or a significant portion of its range species (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 1951; Lyons et al. 2000; COSEWIC 2007). Several populations of *C. elongates* have disappeared from the upper Rock

River basin in Dane County, Wisconsin (Lyons et al. 2000). The continued occurrence of the redside 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 redside dace to periodically appear in Illinois waters. While it is possible that the specimens collected in East Fork Raccoon Creek (all juveniles) in 1998 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 when considering adults have been found within 0.5 km of the Wisconsin-Illinois state line. Because its distribution in Illinois is limited to this small watershed, the redside dace should be considered for listing in Illinois.

Acknowledgements

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Table 1. Sampling sites for the *Clinostomus elongatus* survey. Stream includes 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 state gazetteers. Site refers to site number on Figure 2. 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 preformed by Fago (1982).

Stream	State: County	Latitude	Longitude	Reference Point	Site	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
EFRC	IL: Winn.	42.4850	-89.1374	Confluence with RC	13	1998
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	
trib RC	IL: Winn.	42.4939	-89.1708	Pomeroy Rd	17	
trib RC	IL: Winn.	42.4768	-89.1266	Yale Bridge Rd	18	
trib RC	IL: Winn.	42.4676	-89.1381	Clover Rd	19	

Table 2. Fishes collected during the 2010-2011 survey in the Raccoon Creek basin. Special status: ST = Illinois state-threatened and I I = Illinois introduced species.

INHS Fish Collection Species List
Fishes of the Raccoon Creek basin

This printout is provided with the understanding that the Illinois Natural History Survey (INHS) is acknowledged in any publications, reports, etc. resulting from the use of the data.

Petromyzontidae
- *Lampetra appendix* - American brook lamprey

Clupeidae
- *Dorosoma cepedianum* - gizzard shad

Cyprinidae
- *Campostoma anomalum* - central stoneroller
- *Clinostomus elongatus* - redside dace
- *Cyprinella spiloptera* - spotfin shiner
- *Cyprinella whipplei* - steelcolored shiner
- *Cyprinus carpio* - common carp I I
- *Hybognathus hankinsoni* - brassy minnow
- *Luxilus cornutus* - common shiner
- *Lythrurus umbratilis* - redfin shiner
- *Nocomis biguttatus* - hornyhead chub
- *Notemigonus crysoleucas* - golden shiner
- *Notropis atherinoides* - emerald shiner
- *Notropis dorsalis* - bigmouth shiner
- *Notropis hudsonius* - spottail shiner
- *Notropis ludibundus* - sand shiner
- *Notropis percobromus* - carmine shiner
- *Phenacobius mirabilis* - suckermouth minnow
- *Phoxinus erythrogaster* - southern redbelly dace
- *Pimephales notatus* - bluntnose minnow
- *Pimephales promelas* - fathead minnow
- *Rhinichthys atratulus* - blacknose dace
- *Semotilus atromaculatus* - creek chub

Catostomidae
- *Carpiodes cyprinus* - quillback
- *Catostomus commersoni* - white sucker
- *Hypentelium nigricans* - northern hog sucker
- *Ictiobus cyprinellus* - bigmouth buffalo
- *Minytrema melanops* - spotted sucker
- *Moxostoma anisurum* - silver redhorse
- *Moxostoma erythrurum* - golden redhorse
- *Moxostoma macrolepidotum* - shorthead redhorse

Ictaluridae
- *Ameiurus melas* - black bullhead
- *Noturus flavus* - stonecat

Esocidae
- *Esox americanus* - grass pickerel
- *Esox lucius* - northern pike

Umbridae
- *Umbra limi* - central mudminnow

Salmonidae
- *Salvelinus fontinalis* - brook trout

Fundulidae
- *Fundulus dispar* - starhead topminnow ST
- *Fundulus notatus* - blackstripe topminnow

Gasterosteidae
- *Culaea inconstans* - brook stickleback

Cottidae
- *Cottus bairdi* - mottled sculpin

Centrarchidae
- *Ambloplites rupestris* - rock bass
- *Lepomis cyanellus* - green sunfish
- *Lepomis gibbosus* - pumpkinseed
- *Lepomis macrochirus* - bluegill
- *Micropterus dolomieu* - smallmouth bass
- *Micropterus salmoides* - largemouth bass
- *Pomoxis nigromaculatus* - black crappie

Percidae
- *Etheostoma exile* - Iowa darter ST
- *Etheostoma flabellare* - fantail darter
- *Etheostoma microperca* - least darter
- *Etheostoma nigrum* - johnny darter
- *Etheostoma zonale* - banded darter
- *Perca flavescens* - yellow perch
- *Percina maculata* - blackside darter
- *Sander vitreus* - walleye

17 January 2012

Figure 1. Redside dace *Clinostomus elongatus* from Site 2 (WI: Rock County, Raccoon Creek, ~11.5 km SSW Hanover, WI, or ~13 km NW Rockton, IL, at the W Beloit-Newark Road bridge) on 19 July 2011.

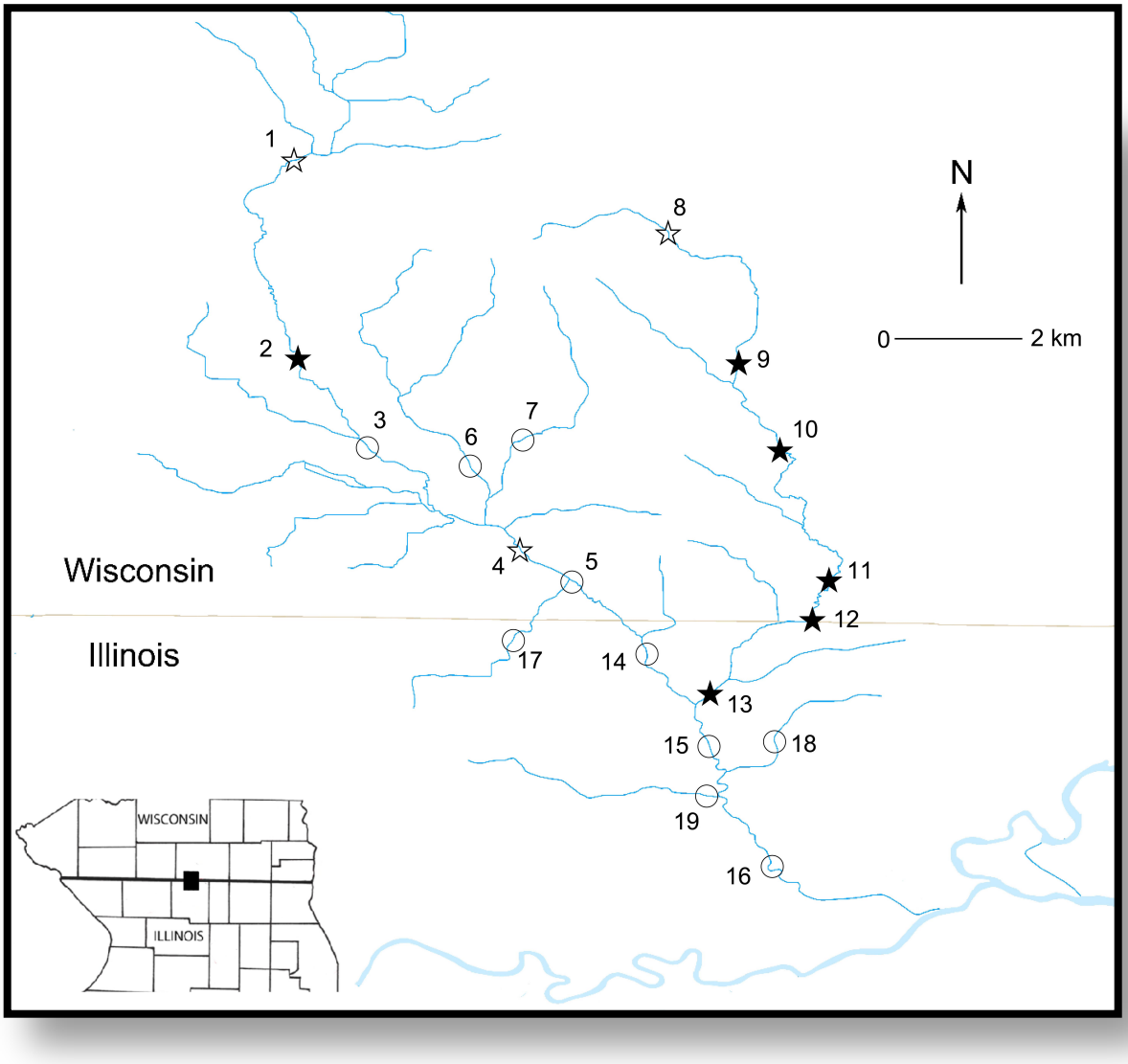

Figure 2. Map of the study area. Solid stars indicate sites where *Clinostomus elongatus* was collected during the 1997-2000 (Site 13) and 2010-2011 (sites 2, 9, 10, 11, and 12) surveys, open stars show where Fago (1982) reported the fish, and open circles designate those sites where I failed to collect the dace during my survey.

Figure 3. Sampling fishing using a Smith-Root Model 12 DC backpack electrofisher at Site 13 (IL: Winnebago County, East Fork Raccoon Creek, ~4.5 km NW Rockton, at Williams Tree Farm, which is where *Clinostomus elongatus* was found in 1998).

Figure 4. Site 12 (WI: Rock County, East Fork Raccoon Creek, ~7.5 km W Beloit, WI, or ~4.5 km NNW Rockton, IL, near the Wisconsin-Illinois state line) is the downstream most site where *Clinostomus elongatus w*as collected during this 2010-2011 status survey (fish collected on 1 August 2011).

Figure 5. Site 13 (IL: Winnebago County, East Fork Raccoon Creek, ~4.5 km NW Rockton, at Williams Tree Farm) is where Sabaj (2000) collected *Clinostomus elongatus* on 31 May 1998.

Figure 6. Juvenile largemouth bass *Micropterus salmoides* consuming a fantail darter *Etheostoma flabellare* at Site 4 (WI: Rock County, Raccoon Creek, ~11 km W Beloit, WI, or ~8 km NW Rockton, IL) on 5 October 2011.