# Records of the Arkansas Darter, *Etheostoma cragini* Gilbert, in Harper and Beaver Counties in Oklahoma.

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The Arkansas darter, *Etheostoma cragini* (Percidae), is endemic to the Arkansas River basin from southwestern Missouri, northwestern Arkansas, and northeastern Oklahoma westward to southern Kansas and eastern Colorado. Miller and Robinson (1) reported that the species was restricted to the Grand River system in northeastern Oklahoma, and Cross (2) found this species to be common only in the tributaries of the Crooked Creek drainage in Mead County, Kansas. In the Kansas location, the darter was common only in densely vegetated, soft-bottom pools. Recently (summer, 1983) Cross (pers. comm.) collected the Arkansas darter from the mainstream of the Cimarron River in Mead County, Kansas. He concluded that the species had been forced into the mainstream of the river because a falling water table was drying up most of the springs.

On June 7, 1983, we collected two specimens (OSDH #1049) of this species from the Cimarron River in western Oklahoma, 4 miles (6.4 km) south of Englewood, Kansas, in SE 1/4, Sec. 23, T29N, R26W, Harper County, Oklahoma, 8 miles (12.8 km) downstream from the mouth of Crooked Creek. Two additional specimens were collected at this site on July 19, 1983 and 37 more on June 6, 1984. By July 24, 1984, the river was dry at this site.

The Cimarron river site in Oklahoma did not conform to the typical habitat described for this species and the fish collected may represent overflow populations from more typical habitat. Crooked Creek, which originates in Kansas northwest of Mead, Kansas, and flows southeastward to its confluence with the Cimarron River west of Englewood, Kansas, and Horse Creek appeared to be possible sources for the individuals in the Cimarron River (Table 1). During June, 1984, five specimens were taken from two sites in Crooked Creek drainage. However, Crooked Creek and its major tributaries are intermittent plains streams with shifting sand/silt bottom, and did not appear to provide typical habitat. A total of 153 specimens were obtained from a series of four very small, densely vegetated, soft-bottom pools in Horse Creek. These pools were 3 × 3 × 0.3 ft, 15 × 20 × 1.7 ft, 8 × 2 × 0.5 ft, and 2 × 6 × 0.3 ft, with only subsurface flow between the pools, and contained dense stands of *Chara* sp. and filamentous green algae. Thick growths of cattails and rushes surrounded each of the pools and each had a thick layer (0.5 ft) of soft black organic sediments.

The habitat in Horse Creek appears to be favorable to this darter (Table 2), whereas the summer habitat in both the Cimarron River and Crooked Creek (high dissolved solids, such as chlorides, low flow, high temperature and low dissolved oxygen) appears to be suboptimal (Table 3). Horse Creek appears to support a fairly stable population of darters and may be the source of darters found in the Cimarron River.

The fish species associated with these darters are typical of those in western Oklahoma streams (Table 4) except that there are few predator fishes (green sunfish, *Lepomis cyanellus,* and black bullhead, *lctalurus melas).*

The presence of this rare darter at four widely separated sites indicates that there are isolated populations of the Arkansas darter in Beaver and Harper Counties in Oklahoma. The unusual habitats of Horse Creek and rare status of the species would seem to warrant limitations on additional collecting in the Horse Creek drainage. Heavy cattle usage observed at the Horse Creek location may necessitate special protection.

TABLE 1. Sites where the Arkansas darter has been collected and dates on which it was collected in Harper and Beaver Counties in western Oklahoma.

| Stream | Location | Legal Description | Collection Dates |
|---|---|---|---|
| Cimarron River | 4 miles south of Englewood, Kansas | Sec 24, T29N, R26W, Harper County, Oklahoma | 7-16-81<br>6-15-82<br>6-07-83[a]<br>7-19-83[a]<br>6-06-84[a]<br>7-24-84(dry) |
| Crooked Creek Site One | 8 miles west, 2 miles south of Englewood, Kansas | Sec 23, T29N, R27E, Beaver County, Oklahoma | 4-21-84<br>6-06-84[a] |
| Crooked Creek Site Two | 12 miles west, 1 mile south of Englewood, Kansas | Sec 09, T06N, R27E, Beaver County, Oklahoma | 6-06-84[a] |
| Horse Creek | 7 miles north of Gage, Oklahoma | Sec 04, T05N, R28E, Beaver County, Oklahoma | 4-21-84<br>6-06-84[a]<br>7-24-84 |

[a]Dates on which the Arkansas darters were collected.

TABLE 2. Water quality in the four pools in Horse Creek, Beaver County, Oklahoma, where the largest numbers of Arkansas darters were collected.

| Pool | Calcium hardness (mg/L) | pH | Total alkalinity (mg/L) | Chloride (mg/L) | Sulfate (mg/L) | Total hardness (mg/L) | Spec. cond. (SU) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|---|
| #1 | 145.5 | 7.4 | 300 | 151 | 125 | 277 | 791 | 29 |
| #2 | 170.5 | 7.5 | 216 | 94 | 118 | 286 | 856 | 50 |
| #3 | 215.9 | 7.5 | 254 | 56 | 64 | 276 | 642 | 51 |
| #4 | 188.7 | 7.5 | 310 | 75 | 49 | 283 | 642 | 28 |

TABLE 3. Water quality at sites where the Arkansas darters were collected in Harper and Beaver Counties in Oklahoma.

| Stream | Dissolved oxygen (mg/L) | pH | Water temp. (°C) | Specific cond. (μmho/cm) | Turbidity (NTU) |
|---|---|---|---|---|---|
| Cimarron River | 8.2-10.6 | 8.1-8.5 | 18.2-28.1 | 3276-4788 | 75.0-280.0 |
| Crooked Creek (Site One) | 10.4 | 8.3 | 9.0-18.0 | 3278 | 5.6 |
| Crooked Creek (Site Two) | 9.9 | 8.3 | 17.8 | 3778 | 5.6 |
| Horse Creek | 4.3-11.5 | 7.4-7.6 | 18.0-23.8 | 535-856 | 14.0-51.0 |

TABLE 4. Species associations at the sampling sites from which the Arkansas darter was collected in Harper and Beaver Counties in Oklahoma.

| | Cimarron River | | | | | | Crooked Creek Site One | | Crooked Creek Site Two | Horse Creek | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dates | | | | | | Dates | | Dates | Dates | |
| Species | 7-16 1981 | 6-15 1982 | 6-7 1983 | 7-19 1983 | 6-6 1984 | 7-24 1984 | 4-21 1984 | 6-6 1984 | 6-6 1984 | 4-21 1984 | 6-6 1984 |
| *Cyprinus carpio* | 1 | – | – | – | – | – | – | – | – | – | – |
| *Campostoma anomalum* | – | – | – | 1 | – | – | – | – | – | – | – |
| *Hybognathus placitus* | 67 | 95 | 105 | 59 | 52 | – | – | 2 | 7 | – | – |
| *Notropis bairdi* | – | 27 | 84 | – | – | – | – | – | – | – | – |
| *Notropis blennius* | – | – | 4 | – | – | – | – | – | – | – | – |
| *Notropis buchanani* | – | – | 12 | – | – | – | – | – | – | – | – |
| *Notropis girardi* | – | 2 | – | – | – | – | – | – | – | – | – |
| *Notropis lutrensis* | 5 | 40 | 112 | 128 | 29 | – | 13 | 192 | 7 | 1 | – |
| *Notropis stramineus* | 73 | 11 | – | 1344 | 556 | – | 57 | 727 | 81 | – | – |
| *Pimephales promelas* | – | – | 1 | 94 | 14 | – | – | 8 | 1 | – | 3 |
| *Ictalurus punctatus* | – | – | 1 | – | – | – | – | – | – | – | – |
| *Ictalurus melas* | – | – | – | – | – | – | – | 1 | – | – | – |
| *Ictalurus natalis* | – | – | 1 | – | – | – | – | 2 | – | – | – |
| *Fundulus zebrinus* | 679 | 221 | 154 | 1178 | 358 | – | 144 | 676 | 232 | 30 | 146 |
| *Gambusia affinis* | 2 | 2 | 7 | 227 | 1 | – | – | 1 | 1 | 45 | 207 |
| *Lepomis cyanellus* | – | – | – | – | – | – | – | – | – | 1 | 7 |
| *Lepomis humilis* | – | – | – | – | 1 | – | – | – | – | – | – |
| *Etheostoma cragini* | – | – | 2 | 2 | 37 | – | – | 2 | 3 | – | 153 |

## REFERENCES


1. R.J. Miller and H.W. Robinson, *The Fishes of Oklahoma*, Mus. Natur. Hist. Ser. No. 1, Oklahoma State Univ. Press, Stillwater, 1973.

2. F.B. Cross, *Handbook of Fishes of Kansas*, Mus. Natur. Hist., Univ. of Kansas, Misc. Publ. 45: 1 - 357, 1967.