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that the gross anatomy of the cervix alone does not yield a reliable index to age or reproductive history.

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The Orangethroat Darter (*Etheostoma spectabile*) in Eastern Iowa

KARL E. GOELLNER¹

Abstract. The orangethroat darter, thought possibly to be extinct in Iowa, has been collected from a limited area north of Marion in Linn County, and from Des Moines County, near Burlington. An unpublished record from Davenport has not been confirmed. Another record from Taylor's Slough at Ft. Madison, in Lee County, is considered doubtful.

Conservationists, ecologists, and biologists generally have concern about changes in the fauna and flora. Loss of a species formerly present is a matter of regret, especially when the apparent cause is some aspect of human activity. It is a truism to say that pollution, growth of cities, and intensification of farming practices all take their toll of native animals, particularly the aquatic forms with limited tolerances in habitat preference. The status of any rare or threatened species is of scientific concern because of the evidence it provides of changing conditions, which affect management and conservation efforts. And it is of moral concern to those who give thought to man's responsibility to the other animals and to his future generations. Certainly the trend toward setting aside sanctuaries and preserves on national, state, and county levels is based on these concerns.

Among the poorly known species for which there is need and

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opportunity for special study, before it is too late, may be mentioned the longear sunfish in the upper Cedar River. Among amphibians, the central newt and the Jefferson's salamander are imperfectly known in eastern Iowa; all records of the latter are in need of restudy in view of its confusion with the blue-spotted salamander, according to Conant (1958). Among mammals, records of the harvest mouse and the pocket mouse in eastern Iowa are scanty and probably incomplete. Polder (1953) and Miller (1954) both urged increased attention to our small mammal populations. A few recent specimens of all of these from eastern Iowa are in the Coe collections, but many more are needed. Here are good opportunities for local field research projects for undergraduates and small college faculty members with limited time and funds.

The orangethroat darter is a species of fish whose range in Iowa is now very limited, and whose numbers are few.

RANGE AND HABITAT

Hubbs and Lagler (1949) give the range and habitat of the orangethroat darter as "From eastern Kansas through most of Missouri and parts of northern Arkansas to Iowa, Illinois, southwestern Michigan and the western three-fifths of Ohio, south-eastward to the Tennessee River system of Tennessee and Virginia. . . Frequenting the shallow gravelly riffles in relatively slow to moderately swift waters of smaller creeks." Thus the Iowa records are at the northern edge of its range. Cleary (1952 and 1953) does not mention it in his Wapsipinicon River check list, and lists it as rare in the Iowa- Cedar River drainage systems. Cleary (in Harlan and Speaker's Iowa Fish and Fishing, 1956) lists this darter as a "clear-water riffle form" but provides no distribution map for it. Harlan and Speaker (*ibid*) discuss the orangethroat as follows: "This species has been taken only twice in the state waters and then in two localities in one county. Bailey took specimens in swift water over rubble bottom in Big and Indian Creeks in Linn County in 1940 and 1942. Recent coverage in the same areas failed to uncover the species. Pollution from the city of Marion probably accounts for the extirpation in Indian Creek."

NEW RECORDS

It is now clear that the orangethroat darter is not extinct but persists in at least two, perhaps three, widely separated places in eastern Iowa (Fig. 1). We first found it in collections made with a field biology class in December, 1962, in the "Marion Springs," north of Marion in Linn County. These specimens were damaged by class use and are not included in the

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following list. Subsequent collections, all made with a 6-foot, nylon, common sense minnow seine, were as follows:

Date	Locality	Number of specimens	Stream Type
Mar. 2, 1963	Linn Co., Marion Sprgs., trib. to Indian Cr., Sec. 36, T.84N., R.7W.	11	fast water, stony, above pools
May 5, 1963	Linn Co., Dry Run, N. of Cedar Rapids, Sec. 34, T.84N., R.7W.	7	sand, coarse gravel, mud, fast riffle
May 5, 1963	Linn Co., intermittent trib. to Marion Sprgs., N. of road, Sec. 34, T.84N., R.7W.	6	rubbly riffle and pool just below spring in limestone bank
May 5, 1963	Linn Co., Dry Run, Sec. 35, T.84N., R.7W.	8	fast riffle, coarse stones
July 30, 1963	Linn Co., Marion Sprgs. (as on Mar. 2)	(saw several, took none)	cold, stony, spring-fed pools
Sept. 22, 1963	Linn Co., Indian Cr., N. edge Marion at Alburnett Rd., Sec. 26, T.84N., R.7W.	3	moderate current, coarse rubble
Sept. 22, 1963	Linn Co., Indian Cr., Sec. 30, T.84N., R.6W.	4	rough, stony, moderate current
April 4, 1963	Des Moines Co., in Knotty Cr., Sec. 12, Flint R. Twp.	10	fast clear riffle over coarse stones

Six specimens of the March 2, 1963, collection were sent to Dr. Reeve M. Bailey, at the University of Michigan Museum of Zoology. Three were put into the collection at Iowa State University. Dr. Bailey confirmed the identification as *Etheostoma spectabile* and kindly supplied these additional unpublished records from collections in the Michigan museum:

Cat. No.	Locality and Collector	Date
UMMZ 86331	Iowa: Branch of Hawkeye, Burlington Dr. Rauch	unknown
UMMZ 86333	Iowa: Davenport, Prof. Sheldon	unknown
UMMZ 138991	Iowa: Taylor's Slough, adjoining Miss. River, near city limits of Ft. Madison, Lee Co. W. W. Aitken	IV: 29: 1942
.....	Iowa: Linn Co., Squaw Cr., Sec.'s 8-9, Bertram Twp. R. M. Bailey	III: 24: 1942 (two specimens)

On April 4, 1964, we visited Taylor's Slough at Ft. Madison, in Lee County. There are two sloughs, one called Taylor's, the other nearer the Mississippi River. Conditions in both suggest that there may be some error in the Aitken record from that place. Both sloughs are 2 or more feet deep, with bottoms of soft mud or sand, littered with trash and scrap, with no apparent current; the one nearer the river is full of dense algae, sticks, etc. A few minnows were taken from each slough, one being a

small carp, and one small bluegill from the slough nearer the river. Altogether the situation does not fit the rather consistent habitat preference indicated above, and I doubt this darter was taken there. Time and weather conditions that day did not permit our checking the Davenport record.

Bailey, in a letter, also recalled taking the orangethroat darter from Indian Creek below a mill dam at Marion. Specimens from this creek are now in the Iowa State University collection. I saw these a year ago. But I am unable to find this darter in that part of Indian Creek now, nor in the Squaw Creek location he listed, nor in Big Creek.

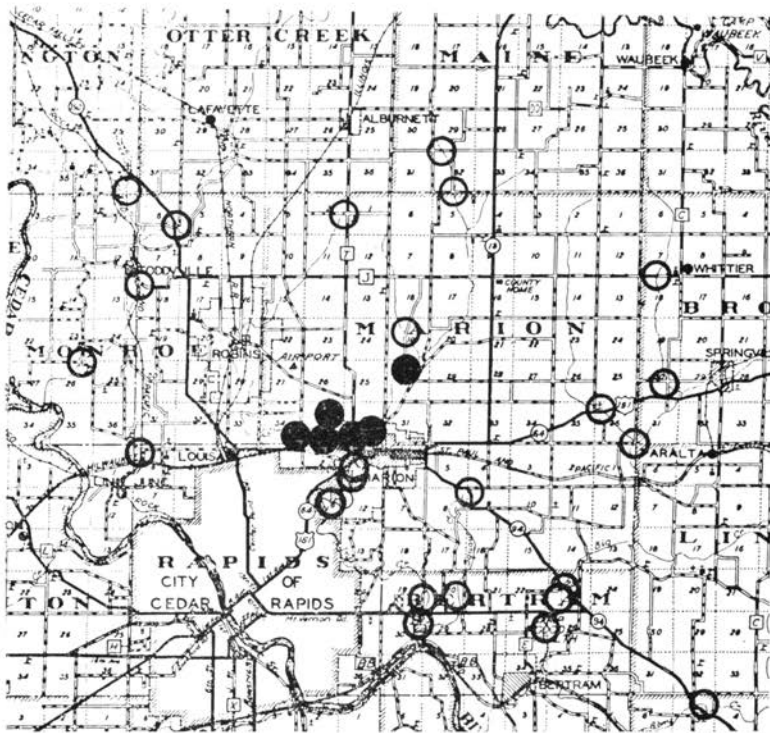


Fig. 1. Distribution of the orangethroat darter in Linn County, Iowa. Present — ●, absent — ○.

DISCUSSION

More collecting is needed in the appropriate stony riffle habitats to delineate the full range of this species in the eastern counties. Its restricted occurrence in Linn County is emphasized by the

county map (Fig. 2), in which it is shown to have been found only in a few square miles in the Indian Creek system just north of Marion. Three of the places are in intermittent streams subject to summer drying, and a major sewer line has recently been installed through this valley. The annexation of outlying areas, and subdivision and real estate developments, are proceeding rapidly in this area. It is entirely likely that the limited favorable habitat may be destroyed within a few years. Already we cannot find this darter in Indian Creek below Marion, or in Squaw Creek.

The orangethroat darter may well be confused by casual collectors with the rainbow darter (*Etheostoma caeruleum*). In Linn County, the rainbow darter is fairly common in the Otter Creek system. It is a heavier fish, with slightly different markings, gill membranes, lateral line systems, etc. (Bailey, 1956). It is my impression that it perhaps prefers larger creeks and less coarse gravels than the orangethroat. I have not taken them together. In Knotty Creek, in Des Moines County, the orangethroat was the only darter seen; there were only minnows in the slower pools. Both species make fine, colorful aquarium fishes, as do other darters. Both take live food readily and seem to live well as long as such food is supplied and water temperatures are reasonably low. On the other hand, it would be unwise to publicize them as aquarium fishes, lest commercial and amateur collectors extirpate them from our small streams. It is hoped that further studies will add new records and information on habits and ecology of both species.

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