

RECORDS OF THE GREENSIDE DARTER, *ETHEOSTOMA BLENNIOIDES* FROM THE SUSQUEHANNA RIVER DRAINAGE IN PENNSYLVANIA¹

ROBERT F. DENONCOURT, Department of Biological Sciences, York College of Pennsylvania, York, PA 17405; WAYNE A. POTTER, Department of Biology and Center for Environmental Studies, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061 and JAY R. STAUFFER, JR., Appalachian Environmental Laboratory, University of Maryland, Frostburg State College Campus, MD 21532

Abstract. A population of the greenside darter, *Etheostoma blennioides* Rafinesque, is recorded for the first time from the Susquehanna River drainage. Meristics are significantly different from populations in the adjacent Allegheny and upper Genesee drainages for dorsal rays and least caudal peduncle scales. Taxonomic comparison places it in the subspecies *E. b. blennioides*. The population is believed to have entered the Susquehanna drainage via stream capture from the Allegheny. Its presence until now has been undetected because emphasis on taxonomic-distributional research has centered in other geographic areas.

OHIO J. SCI. 77(1): 38, 1977

Etheostoma blennioides Rafinesque, the greenside darter, has an extensive distribution in the Tennessee and Ohio River drainages, the southwestern tributaries to the Mississippi River, tributaries to the southeastern Great Lakes drainage, and the Potomac River drainage. Schwartz (1956a) discussed its distribution and dispersal to the Potomac River, and Miller (1968) described the systematic variation and dispersal throughout the known range. No record of *E. blennioides* for the Susquehanna drainage was given by the above authors, in surveys of the Susquehanna (Greeley 1936—New York, Bielo 1963—Pennsylvania), or in reports of Pennsylvania fishes (Fowler 1919; 1940).

In August 1975 we collected specimens representative of three year-classes in tributaries to Sinnemahoning Creek, tributary to the West Branch Susquehanna River (fig. 1). Subsequent research revealed that the Pennsylvania Fish Commission had taken specimens from the same subdrainages since 1962.

The purposes of this paper are to record a range extension of *E. blennioides* to the Susquehanna River drainage, to

record deposition of specimens, and to compare specimens from the Susquehanna drainage with data given in Miller (1968) for populations in the Allegheny and upper Genesee drainages.

METHODS AND MATERIALS

Fishes were collected by seine from the headwaters of the Susquehanna, Genesee and Allegheny drainages in August 1975. The kicking technique in riffles and runs was unsuccessful for *E. blennioides* in the Susquehanna and upper Genesee drainages. It was necessary to surround individual shale boulders with the seine. Each boulder was carefully turned and the seine rapidly scooped. Kicking was successful for *E. blennioides* in the Allegheny drainage where typical rubble of glaciated regions was found.

Counts and measurements (lateral line scales, transverse scales, least caudal peduncle scales, pectoral rays, dorsal spines, dorsal rays, anal rays, and standard length) on the *E. blennioides* collected by us were made as in Hubbs and Lagler (1958); snout type, lip tip, belly squamation, and lateral blotches as in Miller (1968). Analysis of variance was used in conjunction with the Duncan's new multiple range test (Steel and Torrie 1960) to compare data on spine, ray and scale counts; and on number of lateral blotches.

Specimens collected or located were deposited at the Appalachian Environmental Laboratory (AEL), University of Maryland, Frostburg State College Campus, Frostburg, Maryland; at The Academy of Natural Sciences at Philadelphia (ANSP), and at Pennsylvania State University (PSU), State College.

¹Manuscript received May 18, 1976 and in revised form November 10, 1976 (#76-43).

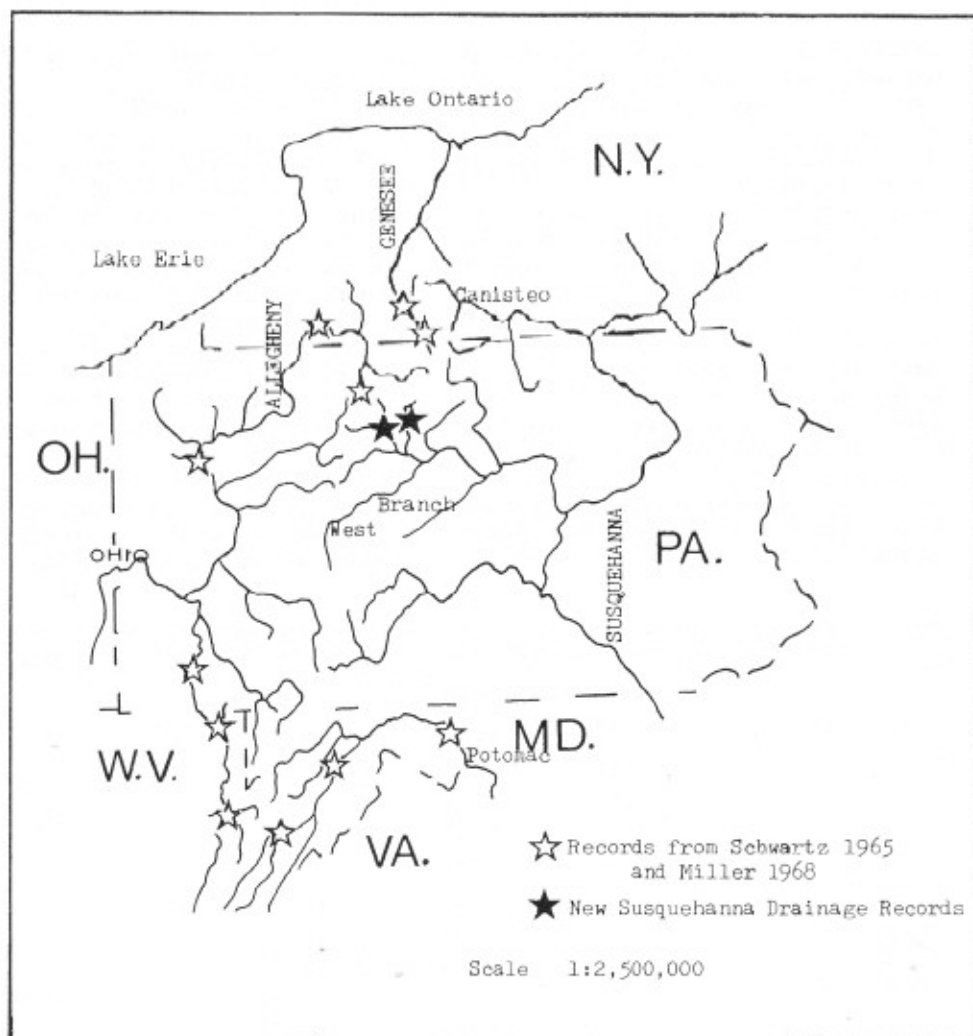


FIGURE 1. Location of new records of the greenside darter, *Etheostoma blennioides blennioides*, in the Susquehanna River drainage and the general distribution based on literature records of adjacent drainages.

RESULTS AND DISCUSSION

We collected 22 *E. blennioides* from the Susquehanna drainage on 11 August 1975: 2 specimens (AEL 43, 65.8 and 78.1 mm standard length) from the First Fork of Sinnemahoning Creek about one mile below Costello, Potter County; and 20 specimens (AEL 42, 33.1 to 76.5 mm) from Driftwood Branch of Sinnemahoning Creek below the bridge at Sterling, Cameron County. Examination of the Sinnemahoning proper showed severe acid mine pollution, and records

of the Pennsylvania Fish Commission indicated similar conditions for at least 50 years.

In addition 119 specimens of *E. blennioides* were taken with rotenone by the Pennsylvania Fish Commission from Bailey Run, tributary to the First Fork Sinnemahoning Creek in Potter County on 24 August 1962. A subsample of 10 were deposited at ANSP (134071) and the remainder at PSU. Records of other collections by the Pennsylvania Fish Commission (specimens not available) in-

clude: 34 specimens from the Driftwood Branch of Sinnemahoning Creek 1.5 miles south of Emporium in Portage Township, Cameron County on 16 August 1963; 4 specimens from Hunt's Run, tributary to the Driftwood Branch, two miles above the first bridge in Lumber Township, Cameron County on 21 August 1963; 55 specimens from four stations in the First Fork Sinnemahoning Creek, Cameron and Potter Counties on 29 August 1969; 7 specimens from the First Fork Sinnemahoning Creek just below the mouth of Bailey Run, 3 miles southwest of Wharton, Potter County on 30 May 1970.

The following species were taken from the Sinnemahoning tributaries in the same collections as *E. blennioides* on 11 August 1975: *Salmo trutta*, *Esox niger*,

Exoglossum maxillingua, *Camptostoma anomalum*, *Nocomis micropogon*, *Natropis cornutus*, *N. rubellus*, *Pimephales notatus*, *Rhinichthys atratulus*, *R. cataractae*, *Semotilus atromaculatus*, *S. corporalis*, *Catostomus commersoni*, *Hypentelium nigricans*, *Noturus insignis*, *Micropterus dolomieu*, *M. salmoides*, *Etheostoma flabellare*, *E. olmstedii*, and *Collis bairdi*. The Pennsylvania Fish Commission also lists *Salvelinus fontinalis* and *Ictalurus nebulosus*.

Meristics and the following characteristics of the Susquehanna drainage samples fit the description and diagnosis of *E. b. blennioides* given in Miller (1968). The snout was rounded and extended beyond the premaxilla, the lip tip had a slight projection, and the belly was completely scaled or with a small naked area anteriorly. The characteristics appro-

TABLE 1

Comparison of meristic data from samples of three populations of the greenside darter, *Etheostoma b. blennioides*: Allegheny Race and Genesee Race (Miller 1968) with Susquehanna Race.

	Lateral Line Scales																\bar{X}
	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
Allegheny	1	—	1	4	2	11	6	9	9	8	13	7	6	2	2	1	65.15
Genesee	—	—	—	2	—	2	4	4	10	8	9	8	5	—	1	—	65.91
Susquehanna	—	—	—	1	—	—	2	3	5	3	1	2	1	2	1	1	66.18

	Least Caudal Peduncle Scales								\bar{X}
	19	20	21	22	23	24	25	26	
Allegheny	—	3	13	21	32	11	2	—	23.50
Genesee	—	1	1	12	14	13	8	3	23.40
Susquehanna	1	5	12	2	2	—	—	—	20.91

	Transverse Scales						\bar{X}
	15	16	17	18	19	20	
Allegheny	4	21	20	21	5	1	17.07
Genesee	1	16	16	12	7	1	17.21
Susquehanna	4	10	7	—	1	—	16.32

	Anal Rays				Lateral Blotches				
	7	8	9	\bar{X}	7	8	9	10	\bar{X}
Allegheny	16	58	9	7.90	10	26	40	3	8.49
Genesee	3	25	25	8.42	5	20	24	4	8.51
Susquehanna	1	16	5	8.18	—	13	6	3	8.54

	Dorsal Spines				Dorsal Rays					
	12	13	14	\bar{X}	11	12	13	14	15	\bar{X}
Allegheny	11	55	16	13.06	4	26	37	10	—	12.69
Genesee	12	40	1	12.79	1	—	17	26	2	13.61
Susquehanna	6	15	1	12.77	—	4	13	5	—	13.04

priately assigned the population to this taxon.

Distributions and means for meristic data were similar for all population samples (table 1). There were, however, significant differences ($p < .05$) among all three populations for dorsal rays and least caudal peduncle scales (table 2). Specimens from the Susquehanna drainage were significantly ($p < .05$) different from those of the upper Genesee in number of transverse scales and from those in the Allegheny in number of dorsal rays. The Allegheny data also differed significantly from those based on upper Genesee samples in number of dorsal spines and number of anal rays.

The presence of *E. b. blennioides* in the upper Susquehanna of Pennsylvania and closer geographically to the Allegheny drainage than to the Genesee drainage suggests a dispersal from the Allegheny directly to the Susquehanna. This movement was suggested in Lachner and Jenkins (1971) for *Vocomis micropogon*, a theory with which we presently agree. Exactly where the transfer occurred is speculative and under investigation.

Extensive collections have been made in New York in the Genesee and Susquehanna drainages (by Greeley 1936, and Cornell University students). And Allegheny drainage (Raney 1938, Lachner 1956, and Schwartz 1965b). The area

TABLE 2

Summary of Duncan's new multiple range test on meristics from samples of three populations of the greenside darter, *Etheostoma b. blennioides*: Allegheny Race and Genesee Race (Miller 1968) with the Susquehanna Race (significance at $p < .05$).

Drainages Compared	Dorsal Spines	Dorsal Rays	Anal Rays	Least Caudal Peduncle	Transverse Scales	Lateral Line Scales	Number Lateral Blotches
Allegheny/Genesee	S	S	S	S	NS	NS	NS
Susquehanna/Genesee	NS	S	NS	S	S	NS	NS
Susquehanna/Allegheny	S	S	NS	S	NS	NS	NS

*S = significant; NS = not significant.

There was no significant difference among any samples in the number of lateral line scales or number of lateral blotches. Snout shape and belly squamation on the Susquehanna specimens more closely resembled the descriptions given in Miller (1968) for the Allegheny Race; while the lip tip more closely resembled that for the upper Genesee Race. Overall, the evidence suggested the Susquehanna population may be a separate race, distinct from both the Allegheny and Genesee Races.

Dispersal of fishes into the Allegheny, Genesee and Susquehanna drainages was discussed by Lachner and Jenkins (1971), Miller (1968), Ross (1958), and Gibbs (1957). Most of these authors suggested post-Pleistocene fish movement via the Ohio River into the present upper Allegheny River, then to the Genesee via the Cuba outlet and to the Susquehanna in present New York State via the Canisteo outlet.

from which our Susquehanna specimens were taken appeared to have received little attention. The only faunal literature we located was Keim (1915) and Fowler and Carlson (1927). The Pennsylvania Fish Commission had recent file records from surveys in the 1960s. Thus, it was our opinion that this species had always been present, but not collected.

We believe *E. b. blennioides* entered the Susquehanna via stream capture and not via the Canisteo outlet. Collections in the New York portion of the Susquehanna drainage have been thorough and no *E. b. blennioides* were reported. It probably entered the Susquehanna drainage from the Allegheny in relatively recent geological (post-pleistocene) time, perhaps at about the same period as the precursor of the upper Genesee Race. In any case, a distinct population of *E. b. blennioides* exists in the northeast tributaries of the West Branch Susquehanna River. Subsequent collections are needed

to determine the extent of the range within the Susquehanna drainage. The range may have been limited in part, and the population exterminated in part, by acid mine runoff which has existed in the area for over 50 years.

Acknowledgments. Acknowledgment is given to Dr. Edwin L. Cooper of Pennsylvania State University and members of the Pennsylvania Fish Commission (Delano Graff, Robert Hesser and Richard Snyder) who made records and specimens available. Donat G. Denoncourt was a valuable aid in field collection. The full cooperation of all members of the Pennsylvania Fish Commission is greatly appreciated.

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