

FISHES OF PADDY'S RUN CREEK AND THE DRY FORK OF THE WHITEWATER RIVER, SOUTHWESTERN OHIO¹

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Abstract. A survey of the fishes from Paddy's Run Creek, tributary to the Big Miami River, and the Dry Fork of the Whitewater River in Ohio disclosed the presence of 40 species and 2 hybrids. The fauna of both streams was dominated by members of the families Cyprinidae and Centrarchidae. Two specimens of the bigeye shiner, *Notropis boops*, were collected in Paddy's Run Creek and may represent the first known collection of this minnow from western Ohio in the present century. Factors which appeared to influence distribution and abundance of fishes in Paddy's Run were fluctuations in stream flow, farming practices along the stream, and industrial effluents.

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Dry Fork flows into the Whitewater River approximately 4.2 km north of the confluence of the Whitewater and Big Miami rivers (fig. 1). Before entering Whitewater River, Dry Fork attains a magnitude of fourth order following the scheme of Kuehne (1962). Paddy's Run is a third order stream, draining directly into the Big Miami River approximately 17 air km upstream from the confluence of the Whitewater and Big Miami Rivers.

Paddy's Run is considerably shorter than Dry Fork, a stream it parallels, and the 2 bodies of water are separated by less than 3 km. During the study period in 1972-1973, two small chemical plants drained effluents into Paddy's Run at a point immediately below collecting station 3 (fig. 1). Additional pollution occurred because of crop fertilization, feedlot runoff and soil erosion resulting from field preparation. Dry Fork was used essentially as a control stream, since it received only agricultural runoff. This study was initiated as a comparative survey of the fishes of Paddy's Run Creek and of Dry Fork since previous ichthyo-

logical investigations in this area were limited to those of Trautman (1957).

METHODS AND MATERIALS

Fishes were collected by seining and by 30 min intervals of electrofishing at the 2 study streams between December 30, 1972 and October 26, 1973. Each station was sampled completely as to all available habitats with concerted effort to sample an area with both pool and riffle habitat. Nine collecting stations were established on Dry Fork and 6 were chosen on Paddy's Run Creek (see fig. 1).

Specimens were preserved in 10% formalin, later transferred to 40% isopropanol and deposited in the Eastern Kentucky University Collection of Fishes. The common and scientific names used are those approved by the American Fisheries Society (1970), except in the case of *Notropis cornutus* for which the authors choose to follow Miller (1968) and Resh *et al* (1971).

Stream orders were assigned according to the Horton system (1945) as modified by Kuehne (1962). Primary tributaries, whether intermittent or constantly running, are termed order 1. The union of any 2 streams of equal order creates a stream of the next higher order but no order change is associated with the junction of a stream of lower order (i.e.

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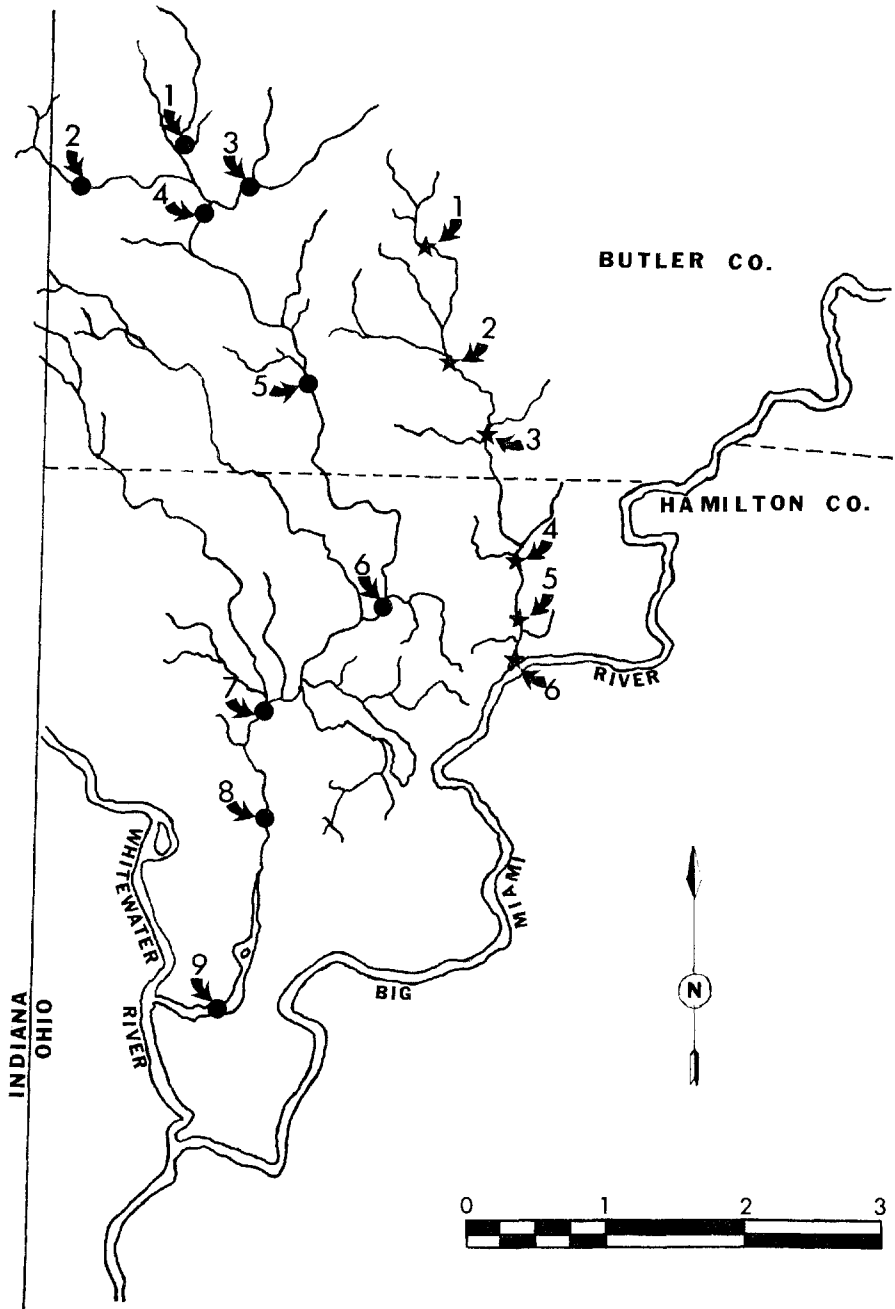


FIGURE 1. Drainage Map of Study Streams; stars represent collecting stations on Paddy's Run Creek, circles those on Dry Fork of the Whitewater Creek.

union of two order 2 streams creates an order 3)..

COLLECTING STATIONS

Paddy's Run Creek

1. 2.4 km north of Shandon, at crossing of State Highway 748, Butler County. 12 October 1973.
2. 0.19 km east of Shandon, at crossing of Hamilton New London Road, Butler County. 12 October 1973.
3. 2.4 km southeast of Shandon below crossing of State Highway 126, Butler County. 27 July 1973.
4. Private drive off of Paddy's Run Road approximately 0.6 km north of Fernald, Hamilton County. 30 December 1972.
5. Crossing of New Haven Road approximately 0.8 km west of Fernald, Hamilton County. 30 December 1972.
6. Mouth of Paddy's Run Creek at entrance into Big Miami River, 0.4 km below State Highway 128, Hamilton County. 27 July 1973.

Dry Fork of the Whitewater River

1. 3.6 km north of Okeana, 0.8 km north of State Highway 126 just off of Weaver Road, Butler County. 12 October 1973.
2. 4.8 km northwest of Okeana just off of Hines Road, Butler County. 16 August 1973.

3. 1.6 km north of Okeana, small tributary east of State Highway 126, Butler County. 27 July 1973.
4. 1.6 km north of Okeana in the main stream just west of State Highway 126, Butler County. 16 August 1973.
5. 4.0 km southeast of Okeana and 3.0 km west of Shandon at crossing of Alert New London Road, Butler County. 26 October 1973.
6. 0.8 km east of New Haven at crossing of New Haven Road, Hamilton County. 30 December 1972.
7. Crossing of West Road, 0.8 km east of Dry Fork Road, Hamilton County. 26 October 1973.
8. Crossing of Interstate Highway 74 and Harrison Road approximately 5.6 km northwest of Miami town and 4.0 km southeast of Harrison, Hamilton County. 16 August 1973.
9. Crossing of Kilby Road, 0.4 km east of the mouth of the stream, Hamilton County. 16 August 1973.

RESULTS AND DISCUSSION

Because of the splitting of old species, elevation of subspecies to species rank, merger of species, and confusion of species, it is difficult to assess the older records. The habitats where the species were collected however, generally agreed

TABLE 1
The Fish Fauna of Paddy's Run Creek

Species	Collecting Station No.					
	1	2	3	4	5	6
<i>Dorosoma cepedianum</i>	—	—	—	—	—	9
<i>Campostoma anomalum</i>	4	31	4	13	1	—
<i>Ericymba buccata</i>	5	94	1	—	—	—
<i>Notropis ardens</i>	11	3	19	—	—	—
<i>N. atherinoides</i>	—	—	—	—	—	1
<i>N. boops</i>	—	—	—	—	—	2
<i>N. cornutus</i>	74	18	3	3	4	—
<i>N. spilopterus</i>	4	8	36	53	125	—
<i>N. stramineus</i>	—	—	2	—	—	—
<i>Phoxinus erythrogaster</i>	—	32	—	—	—	—
<i>Pimephales notatus</i>	—	37	4	2	2	8
<i>P. promelas</i>	1	1	1	—	—	—
<i>Rhinichthys atratulus</i>	—	41	—	—	—	—
<i>Catostomus commersoni</i>	—	1	3	—	—	—
<i>Lepomis cyanellus</i>	—	6	1	—	—	—
<i>L. macrochirus</i>	6	5	2	—	1	—
<i>L. megalotis</i>	—	1	6	—	—	—
<i>L. cyanellus</i> X <i>L. macrochirus</i>	1	—	—	—	—	—
<i>Micropterus salmoides</i>	3	1	—	—	—	—
<i>Etheostoma nigrum</i>	—	29	—	—	—	—
<i>E. spectabile</i>	—	38	3	—	—	—
<i>E. flabellare</i>	1	18	25	—	—	—
No. Species	10	17	14	4	5	4
Stream Order	2	3	3	3	3	3

with those presented by Forbes and Richardson (1920) and Trautman (1957).

Members of the family Cyprinidae dominated the ichthyofauna of both streams, constituting 59% of the total number of species in Paddy's Run and 38% of the total in Dry Fork. Three species of the family Ictaluridae were collected in Dry Fork while no members of this family were found in Paddy's Run (tables 1 and 2). Whiteside and McNatt (1972) noted that the general trend for fish distribution in Plum Creek, Tex. was the addition of species with increasing stream order, rather than replacement.

They felt that this resulted from the addition of new stable habitats with increased stream size. In the present study, the control stream follows this same trend while Paddy's Run has a complete reversal of this phenomenon, most noticeably in the family Ictaluridae.

Perhaps most notable among the fishes collected were 2 specimens of the bigeye shiner, *Notropis boops*, collected at station 6 of Paddy's Run Creek. They may represent the first known specimens from southwestern Ohio in the present century (Trautman 1957). Trautman found that the bigeye shiner disappeared from

TABLE 2
The Fish Fauna of Dry Fork of the Whitewater River

Species	Collecting Station No.								
	1	2	3	4	5	6	7	8	9
<i>Dorosoma cepedianum</i>	—	1	—	1	—	—	—	2	4
<i>Cyprinus carpio</i>	—	—	—	—	—	—	2	—	1
<i>Campostoma anomalum</i>	3	—	47	5	9	22	14	4	5
<i>Ericymba buccata</i>	—	—	5	6	7	40	42	—	28
<i>Hybopsis x-punctata</i>	—	—	—	—	—	—	2	—	4
<i>Notropis ardens</i>	25	58	17	34	90	13	60	23	—
<i>N. atherinoides</i>	—	—	—	—	—	—	—	—	15
<i>N. cornutus</i>	17	6	37	11	16	46	22	9	21
<i>N. photogenis</i>	—	—	—	—	—	—	—	1	—
<i>N. spilopterus</i>	—	—	—	1	6	17	17	11	27
<i>N. stramineus</i>	1	1	10	13	23	134	58	4	66
<i>Phenacobius mirabilis</i>	—	—	—	—	—	—	17	4	—
<i>Pimephales notatus</i>	1	—	9	2	4	64	24	3	35
<i>Rhinichthys atratulus</i>	—	—	—	—	—	—	2	—	—
<i>Semotilus atromaculatus</i>	—	—	18	4	1	5	1	—	—
<i>Carpoides cyprinus</i>	—	—	—	—	—	—	1	—	4
<i>C. velifer</i>	—	—	—	—	—	—	—	—	1
<i>Moxostoma erythrurum</i>	—	—	—	—	5	—	—	—	2
<i>M. macrolepidotum breviceps</i>	—	—	—	—	4	—	5	—	4
<i>M. duquesnei</i>	—	2	3	1	—	23	—	10	—
<i>Catostomus commersoni</i>	—	—	—	—	—	10	—	—	—
<i>Hypentelium nigricans</i>	—	2	—	2	2	2	3	4	1
<i>Ictalurus natalis</i>	—	1	—	—	—	—	—	1	1
<i>Noturus flavus</i>	—	—	—	—	—	—	—	—	2
<i>N. miurus</i>	—	—	—	—	—	—	—	—	1
<i>Lepomis cyanellus</i>	—	—	—	—	—	—	2	—	—
<i>L. macrochirus</i>	—	2	—	2	—	—	3	9	5
<i>L. megalotis</i>	2	3	—	4	—	15	—	—	—
<i>L. cyanellus</i> X <i>L. megalotis</i>	—	—	—	—	—	—	—	1	—
<i>Micropterus dolomieu</i>	—	1	—	2	—	1	—	1	1
<i>M. punctulatus</i>	—	—	—	—	—	—	—	—	2
<i>M. salmoides</i>	1	—	—	—	—	—	—	—	4
<i>Etheostoma blennioides</i>	—	4	—	6	2	—	—	—	2
<i>E. caeruleum</i>	—	3	—	4	34	6	—	3	—
<i>E. flabellare</i>	10	5	2	15	3	2	13	2	—
<i>E. nigrum</i>	—	—	2	6	—	2	5	—	—
<i>E. spectabile</i>	—	—	2	—	—	—	14	—	—
<i>E. zonale</i>	—	—	—	—	—	—	—	—	2
No. Species	8	13	11	18	14	16	20	17	24
Stream Order	2	2	2	3	3	3	4	4	4

streams following the accumulation of large amounts of silt which covered the gravel bottoms. Station 6, the site of the present collection does contain large amounts of silt and therefore, the authors feel that the two specimens collected were simply waifs from the Big Miami River. The collection of *N. boops* from this portion of Ohio could indicate stream improvement in the Big Miami.

Factors which appeared to influence distribution and abundance of fishes in Paddy's Run were fluctuations in stream flow, farming practices along the stream, and industrial effluents. Effects of the first 2 factors were exerted throughout the stream, but the influence of the industrial pollution was localized (i.e., just below the point of pollutant introduction). Station 3 yielded 15 species of fish from 4 families (table 1). Station 4, however, only yielded 4 species, all of the family Cyprinidae. Stations 5 and 6 also demonstrated a drastic reduction in species composition containing only 7 and 4 species, respectively. A superficial investigation of the aquatic invertebrate fauna during the study showed similar changes in faunal diversity.

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