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SPECIES DOMINANCE IN THE FISH POPULATIONS OF THE PEARL RIVER AT TWO STUDY AREAS IN MISSISSIPPI AND LOUISIANA: 1966-1988

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ABSTRACT

Two long-term data sets for the Pearl River, Mississippi and Louisiana, are presented. The Mississippi study area yielded 287,758 fishes of 17 families and 87 species in 16 years. The Louisiana study area yielded 342,899 fishes of 19 families, 92 species and two hybrids in 22 years. Seven families of fishes (Clupeidae, Cyprinidae, Catostomidae, Ictaluridae, Cyprinodontidae, Centrarchidae, and Percidae) accounted for 99.34% of the Mississippi catch. In six of the seven families listed above, a single species constituted a clear majority of the total catch per family (all but the Percidae). In the Louisiana study area, the same seven families of fishes listed above for Monticello accounted for 98.80% of the total catch. There was but one dominant species in each of the seven families at Bogalusa. The major conclusion of this paper was that for each of the seven families at both study areas, with one exception as noted, there was just one numerically dominant species.

INTRODUCTION

A general pattern of biotic communities is that the majority of species are rare, with relatively few species contributing most to numbers of individuals (Smith, 1986). Stream fish assemblages follow this general pattern (Sheldon, 1987) and may, in addition, show numerical dominance patterns within families. For instance, the channel catfish (*Ictalurus punctatus*) tends to dominate ictalurid populations in the rivers studied.

An important aspect in determining the patterns of numerical dominance in stream fish assemblages is whether the pattern is persistent over space and time. In a broader sense, the understanding of long-term population trends of organisms is of importance to both basic and applied ecology. Yet, in spite of the now recognized need for long-term studies (Wiens, 1984; Strayer, 1986), few have actually been published. As pointed out by Strayer (1986), long-term may be in the context of the life span of the organisms studied, or in comparison with the normal duration of ecological studies.

We present two long-term data sets on fishes from the Pearl River in Louisiana and Mississippi which document patterns of numerical dominance. The Mississippi data set spans 16 years while the Louisiana data set spans 22 years. These durations exceed the normal life spans of essentially all the species commonly collected in our study. For instance, most small, southeastern US stream fishes have life spans of seven or fewer years (Ross et al., 1985). Our study durations also exceed or are equivalent with most other 'long term' studies of stream fishes (Grossman et al., 1982; Ross et al., 1985; Ross et al., 1987; Matthews et al., 1988; Meffe and Berra, 1988).

METHODS

The Mississippi study area was a 42km (26 mile) segment of the Pearl River upstream and downstream from Monticello (Lawrence Co.). A total of 512 fish collections was made along the shoreline at eight stations sampled quarterly for 16 years (1973-1988) in the months of February, May, August, and November. The predominant substrate was sand, however, considerable gravel and silt occurred in some localities. The Louisiana study area consisted of 16.1 km (10 miles) of the Pearl River both upstream and downstream from Bogalusa (Washington Parish). A total of 528 fish collections was made at Bogalusa (six stations sampled quarterly for 22 years in July, October, January, and April). The predominant substrate was sand, although gravel and silt also occurred in some localities.

A typical shoreline fish collection covered 30-60 meters (100-200 feet) of stream and required 30 minutes, except when the river was flooded and depth limited sampling. At each station, an effort was made to sample consistently in all micro-habitats over all types of substrate and under all current regimes. Although we realize that larger fishes are not sampled adequately by the 2 X 3 meter seine (0.47 cm Ace mesh) used in this study, we consider the samples to be quantitative enough to indicate relative abundance. As Matthews (1986) has pointed out, "No sampling method for stream fishes is without bias, but in stream habitats without serious obstructions, vigorous collecting with seines provides a good estimate of relative abundance of the small fishes" (see Matthews, 1986 for references). "Seine collections are commonly used to quantify relative abundance of fishes in streams ranging from small creeks to wide, shallow rivers" (Matthews, 1986).

All fish specimens were fixed in the field in 10% commercial formalin, and subsequently stored in 50% isopropanol at the Tulane University Museum of Natural History.

TABLE 1. Number of fishes collected from the

Family and Species	Number collected per year										
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Clupeidae											
Dorosoma cepedianum	5	38	72	94	55	18	58	363	2	22	106
Dorosoma petenense	42	65	642	47		2	149	339	15	362	46
1 species with <1.00% of clupeids											
Cyprinidae											
Notropis venustus	4,637	3,970	2,246	9,712	9,068	10,142	7,561	6,430	19,750	22,578	12,831
Hybognathus nuchalis	2,468	3,025	894	3,812	3,513	541	6,057	1,212	1,152	525	1,436
Notropis longirostris	1,196	783	588	295	1,600	1,094	502	1,359	1,588	1,533	1,539
Pimephales vigilax	1,001	626	359	1,681	1,242	1,304	610	926	1,161	1,831	819
Notropis volucellus	558	976	396	1,091	789	474	247	216	238	582	138
Notropis texanus	508	748	434	904	646	176	340	525	359	168	377
Notropis atherinoides	735	1,194	222	299	156	121	73	224	198	97	641
Hybopsis aestivalis	306	105	42	222	209	1,011	159	333	112	477	71
11 species each with <1.00% of cyprinids											
Catostomidae											
Carpiodes velifer	25	19	43	51	131	127	39	22	237	106	164
Hypentelium nigricans	20	5	1	11	1	9	11	3	3	10	7
5 species each with <1.00% of catostomids											
Ictaluridae											
Ictalurus punctatus	576	122	50	192	70	283	76	182	181	15	5
Noturus munitus *	8	19	1	9	10		139	29	6	2	1
6 species each with <1.00% of ictalurids											
Cyprinodontidae											
Fundulus notatus	8	16	25	8	49	249	42	79	22	326	174
Fundulus olivaceus	13	6	11	33	28	68	7	20	2	84	26
Fundulus catenatus	12	5	5	3	1	31	29	6	5	13	11
1 species with <1.00% of cyprinodontids											
Centrarchidae											
Lepomis megalotis	270	209	353	198	427	369	321	203	329	347	142
Pomoxis annularis	14	22	28	15	57	239	107	127	2	35	59
Micropterus punctulatus	70	75	66	57	58	45	53	89	93	102	31
Lepomis macrochirus	44	71	59	35	12	43	79	58	13	47	55
Micropterus salmoides	14	49	22	44	16	8	9	10	4	25	9
Elassoma zonatum	3	191				2					
Lepomis humilis	2	21	2	2		2	4	8			2
8 species each <1.00% of centrarchids											
Percidae											
Ammocrypta beani	255	300	163	153	497	196	104	107	24	252	179
Percina vigil	251	65	23	73	80	144	104	46	17	44	2
Percina sciera	58	28	3	40	28	40	72	32	5	56	3
Percina caprodes			10	12	17	6	28	12	10	1	3
Ammocrypta vivax	6	2		3	7	11		3		17	4
13 species and one hybrid each <1.00% of percids											
Total fishes of seven most abundant families ** in the sample (74 species)***											

* Collection of *Noturus munitus* was permitted through 1983.

** Two families had more total specimens than some families designated as most abundant families defined as those having three or more species represented in the populations.

*** Scientific and common names of fishes follow Robins, *et al.*, 1980, with a few exceptions.

Pearl River at Monticello, Mississippi: 1973-1988.

1984	1985	1986	1987	1988	Total	Percent	Freq. of Occur. N= 16
6	53	1	73		966	28.76	15
17	8	403	246	7	2,390	71.15	15
					3	0.09	
					3,359	100.00	
11,533	6,251	10,124	15,727	17,500	170,060	64.62	16
1,992	210	112	388	1,064	28,401	10.79	16
1,437	2,189	532	1,762	2,234	20,231	7.69	16
799	690	1,744	1,368	1,244	17,405	6.61	16
467	516	436	807	1,688	9,619	3.65	16
347	16	62	18	19	5,647	2.15	16
505	240	79	21	27	4,832	1.84	16
504	131	41	65	7	3,795	1.44	16
					3,187	1.21	
					263,177	100.00	
88	88	720	104	166	2,130	91.61	16
6	9	41	14	11	162	6.97	16
					33	1.42	
					2,325	100.00	
181	8	52	11	27	2,031	88.85	16
					224	9.80	*
					36	1.35	
					2,291	100.00	
23	111	69	45	44	1,290	71.11	16
2	12	10		13	335	18.47	15
10	21	9	6	8	175	9.65	16
					14	0.77	
					1,814	100.00	
166	225	521	189	316	4,585	54.39	16
79	391	45	16	18	1,254	14.88	16
35	47	64	22	23	930	11.03	16
31	65	43	176	50	881	10.45	16
18	27	4	26	2	286	3.39	16
		1			197	2.34	4
2	26	4	21	2	99	1.17	13
					199	2.35	
					8,431	100.00	
102	101	69	201	101	2,804	62.78	16
3	3	4	1		860	19.26	15
14		26	9	18	432	9.67	15
7		2	1	2	111	2.49	13
2		10	1	6	72	1.61	12
					187	4.19	
					4,466	100.00	
					285,863		

RESULTS AND DISCUSSION

Monticello Study Area

The total sample over the 16-year period at Monticello included 285,863 fishes of the families Clupeidae, Cyprinidae, Catostomidae, Ictaluridae, Cyprinodontidae, Centrarchidae, and Percidae, representing 74 species and 99.34% of the total sample (Table 1), and 1,895 fishes of the families Petromyzontidae, Lepisosteidae, Amiidae, Esocidae, Anguillidae, Aphredoderidae, Belonidae, Poeciliidae, Atherinidae and Sciaenidae (Table 3), representing 13 species and 0.66% of the total catch (Table 3).

The threadfin shad (*Dorosoma petenense*) was the dominant clupeid species comprising 71.15% of the clupeid catch; the gizzard shad (*D. cepedianum*) ranked second with 28.76% of the catch (Table 1). Both species were taken in 15 of the 16 years of this study. Three specimens of the skipjack (*Alosa chrysochloris*) were taken in 16 years.

The blacktail shiner (*Notropis venustus*) was the dominant cyprinid; 170,060 specimens (64.62%) were taken in 16 years (Table 1). Ross *et al.*, (1987) reported that *Notropis roseipinnis* made up 53.8% of the cyprinids collected from the upper reaches of Black Creek, Mississippi, and that the minnows (Cyprinidae) were the numerical dominants comprising 64.7% of the total number of fishes collected. The silvery minnow (*Hybognathus nuchalis*) was the second-ranking minnow at Monticello with 28,401 specimens, although the abundance has declined in recent years (Table 1). The longnose shiner (*Notropis longirostris*) was the third-ranking minnow with 20,231 specimens (Table 1). The bullhead minnow (*Pimephales vigilax*) ranked fourth with 17,405 specimens (Table 1); the numbers of specimens for this species were rather stable throughout the 16-year period. The weed shiner (*Notropis texanus*) ranked sixth in relative abundance over 16 years with a precipitous decline from 1985-1988 (Table 1). This decline was sustained through 1989 when 58 specimens were taken (Gunning and Suttkus, unpublished data). Note that the eight top-ranking species were taken in all 16 years of this study (Table 1).

The highfin carpsucker (*Carpiodes velifer*) was the dominant catostomid in our catches (2,130 specimens, 91.61% of the sucker catch) (Table 1), followed by the hogsucker (*Hypentelium nigricans*) with 162 specimens and 6.97% of the catostomid catch (Table 1). Both species were taken in all 16 years of this study.

The channel catfish was the dominant catfish in our samples with 2,031 specimens and 88.85% of the ictalurid catch (Table 1). The frecklebelly madtom (*Noturus munitus*) was the second-ranking ictalurid with 224 specimens and 9.80% of the ictalurid catch (Table 1). The latter is a protected species in Mississippi; permission was granted for us to collect the frecklebelly madtom through 1983; prior to that time we had collected this species in 10 of 11 years of this study (Table 1).

The blackstripe topminnow (*Fundulus notatus*) was the most abundant species of cyprinodontid at Monticello (1,290 specimens; 71.11% of the cyprinodontid catch - Table 1). The blackspotted topminnow (*F. olivaceus*) ranked second with 335 specimens and 18.47% of the catch. The northern studfish (*F. catenatus*) ranked third with 175 specimens and 9.65% of the catch (Table 1).

The most abundant sunfish in the Monticello study area was the longear sunfish (*Lepomis megalotis*) with 4,585 specimens comprising 54.39% of the centrarchid catch (Table 1). Following second to fifth in abundance were the white crappie (*Pomoxis annularis*), spotted bass (*Micropterus punctulatus*), bluegill (*Lepomis macrochirus*), and the largemouth bass (*Micropterus salmoides*) (Table 1). The pygmy sunfish (*Elassoma zonatum*) ranked sixth in abundance with 197 specimens and 2.34% of the total centrarchid catch (Table 1). This species was collected in only four of the 16 years of this study. The orangespotted sunfish (*Lepomis humilis*), in comparison, ranked eighth in relative abundance with 1.17% of the centrarchid catch (Table 1), but was collected in 13 of the 16 years of this study (Table 1). The relative abundance of the pygmy sunfish in the total catch of centrarchids is misleading in that 191 pygmy sunfish were collected February 12, 1974 at Atwood Water Park on the Pearl River at Monticello; only six additional specimens were taken in 1973 (3), 1978 (2), and 1986 (1) (Table 1). This was likely a prespawning aggregation since the species spawns in mid-March to early May (Böhlke and Rohde, 1979).

The naked sand darter (*Ammocrypta beani*) was the most abundant species in our percid catch with 2,804 specimens (62.78% of the total catch), and it was taken in all 16 years of this study (Table 1). The saddleback darter (*Percina vigil*) ranked second in abundance over the 16 years (860 specimens, 19.26%), however it declined progressively from a high of 251 specimens in 1973 to a low of 2 specimens in 1983, 3 specimens in 1984 and 1985, 4 specimens in 1986, a single specimen in 1987, none in 1988 (Table 1) and 4 specimens in 1989 (Gunning and Suttkus, unpublished data). The latter species was taken in 15 of 16 years.

Bogalusa Study Area

The threadfin shad (*Dorosoma petenense*) was the dominant clupeid in the Bogalusa study area (941 specimens, 82.26% of clupeid catch) (Table 2), followed by gizzard shad (*Dorosoma cepedianum*) second (182 specimens, 15.91%). Two additional species, the skipjack and the Alabama shad (*Alosa alabamae*) were taken in small numbers (Gunning and Suttkus, 1990a, Table 2).

The blacktail shiner was the dominant cyprinid at Bogalusa (140,874 specimens, 45.54% of cyprinid catch – Table 2), and the silvery minnow ranked second (37,509 specimens, 12.13% of the catch – Table 2).

The highfin carpsucker was dominant at Bogalusa with 1,017 specimens in 22 years and 87.52% of the catostomid catch (Table 2).

The channel catfish was the dominant ictalurid at Bogalusa with 6,977 specimens comprising 94.69% of the ictalurid catch (Table 2) while the frecklebelly madtom ranked second (255 specimens; 3.46% of the total ictalurid catch). This latter species occurred in 19 of the 22 years (Table 2), from 1966-67 through 1980-81 (15 straight years), in 1983-84 and 1985-88. Years in which the frecklebelly madtom did not appear in the annual catches were in the latter part of this study.

The blackspotted topminnow was the dominant species at Bogalusa with 2,885 specimens and 64.86% of the cyprinodontid catch, followed by the blackstripe topminnow with 1,535 specimens (34.46% of the cyprinodontid catch – Table 2). The golden

topminnow (*Fundulus chrysotus*) was the third-ranking species collected at Bogalusa.

The longear sunfish ranked first at Bogalusa with 2,575 specimens (55.53% of the total centrarchid catch) and the bluegill ranked second with 788 specimens and 17.00% of the catch (Table 2). We attribute the abundance of longear sunfish to their tolerance of the current along the shoreline of the Pearl River, whereas the largemouth bass, bluegill and white crappie inhabit the backwaters along the river away from the faster current (Gunning and Suttkus, 1990b).

The naked sand darter ranked first at Bogalusa (4,908 specimens; 33.41% of the percid catch), and the saddleback darter a close second (4,417 specimens; 30.06% of the catch) (Table 2). Percids are thus an apparent exception to our general observation that there is usually just one dominant species for each family in both of our study areas on the Pearl River in that two species were numerically codominant at Bogalusa (Table 2). Gunning and Suttkus (in press) showed that the saddleback darter was the dominant species at Bogalusa for six straight years (1966-67 through 1971-72), and then the naked sand darter was the dominant species for 14 of the 15 remaining years of this study (1972-73 through 1986-87, with the exception of 1973-74 when the saddleback darter was dominant over the naked sand darter, 378 specimens versus 319 specimens, respectively) (Gunning and Suttkus, in press).

Comparison of Two Study Areas in Mississippi and Louisiana

The threadfin shad was dominant in both study areas and the gizzard shad ranked second at both. The threadfin shad occurred in 15 of 16 years at Monticello and in 15 of 22 years at Bogalusa.

The blacktail shiner and silvery minnow ranked first and second, respectively, in the two study areas (Tables 1 and 2). Populations of the weed shiner experienced a precipitous decline at Monticello in 1985-88; there was a concurrent decline at Bogalusa in 1984-85 through 1987-88, but not as marked as at Monticello (Tables 1 and 2). The emerald shiner decreased in abundance at Monticello in 1986-88 and also at Bogalusa from 1985-86 through 1987-88 (Tables 1 and 2). It is these concurrences in data which we feel substantiate seining as a collecting method when used properly. Also, note the marked decline in abundance of the speckled chub at Monticello (1986-88), and a less marked decline at Bogalusa for this period (Tables 1 and 2).

The highfin carpsucker was the dominant catostomid in both study areas and was taken in all years at both study areas (Tables 1 and 2). The northern hog sucker ranked second at Monticello, while blacktail redhorse and northern hog sucker were almost identical in numbers and frequency of occurrence over the 22 years at Bogalusa (Table 2).

The channel catfish ranked first at both study areas and the frecklebelly madtom ranked second (Tables 1 and 2). The frecklebelly madtom was taken in 10 of 11 years at Monticello and 19 of 22 years at Bogalusa.

The dominant cyprinodontid at Monticello was the blackstripe topminnow and the blackspotted topminnow ranked second; the order was reversed at Bogalusa (Tables 1 and 2). The northern studfish made up a significant proportion of the cyprinodontid populations at Monticello (9.65%) (Table 1).

For the centrarchids, the five top-ranked species of sunfishes were the same at both study areas, although the relative abundance among the five species varied (Tables 1 and 2). The longear sunfish was clearly the dominant species. The spotted sunfish was rare (cf. Sheldon, 1987) at the Monticello study area, one specimen taken in 16 years (Table 1), but comprised 1.21% of the centrarchid catch (56 specimens, taken in 11 of 16 years – Table 2) at Bogalusa. The spotted bass was more abundant than the largemouth bass at both study areas (11.03% and 3.39%, respectively, at Monticello, and 10.18% and 4.55 % at Bogalusa) (Tables 1 and 2). These comparative data on the basses are further confirmation of the collecting method utilized. Likewise, the white crappie was dominant at both study areas over the black crappie (Tables 1 and 2).

Three species, the naked sand darter, the saddleback darter and the dusky darter ranked first through third, respectively, at both study areas (Tables 1 and 2); as stated earlier, the saddleback darter was dominant in the early years of the study at Monticello and dwindled to near extinction toward the end of the study (Table 1), but persisted at Bogalusa in sizeable numbers (Table 2). Based on extensive field notes for the entire study, the demise of the saddleback darter was likely due to substrate changes over time; this species prefers clean, unsilted gravel substrate (Thompson and Cashner, 1979) which is diminished in the Monticello study area. The logperch (*Percina caprodes*) had declined since 1982 at both Monticello (Table 1) and Bogalusa (Table 2). The crystal darter (*Ammocrypta asprella*) is a protected species in Mississippi (Johnson, 1987); it was collected in 13 of 16 years at Monticello, and in all 22 years at Bogalusa (Table 2), where it is not protected (Johnson, 1987) and has been taken in smaller numbers since 1981-82 (Table 2). A total of 21 bluntnose darters (*Etheostoma chlorosomum*) (<1.00% of percids – Table 1) was taken at Monticello and 486 specimens were taken at Bogalusa (3.31% of percids – Table 2). Only 23 specimens of the harlequin darter (*Etheostoma histrio*) (<1.00% – Table 1) were taken at Monticello, but 341 specimens (2.32% – Table 2) were taken at the Bogalusa study area.

Only two lampreys of one species were taken at the Monticello study area (Table 3), the southern brook lamprey (*Ichthyomyzon gagei*). Two species of gars (Lepisosteidae), the spotted gar (*Lepisosteus oculatus*), and the longnose gar (*L. osseus*) were collected at both study areas (Table 3). The bowfin (*Amia calva*) was also collected in small numbers at both study areas (Table 3). Two species of pickerel (Esocidae), the redfin pickerel (*Esox americanus*), and the chain pickerel (*E. niger*), were taken. A single specimen of the American eel (*Anguilla rostrata*) was taken at Monticello in 1973; by chance, one of us (G.E.G.) was present when a fisherman caught an American eel from the Monticello study area on August 2, 1990. A total of 93 American eels was collected at Bogalusa (in 12 of 22 years), most of them less than six inches total length. The mooneye (*Hiodon tergisus*) was taken in three of 22 years at Bogalusa (Table 3). It was taken in the early years of the survey, the last specimen in 1973-74.

The pirateperch (*Aphredoderus sayanus*) was taken in five of 16 years at Monticello (13 specimens, Table 3), and in 13 of 22 years at Bogalusa (75 specimens, Table 3). The Atlantic needlefish (*Strongylura marina*) was taken at both study areas, in one of

TABLE 2. Number of fishes collected from the

Family and Species	Number collected per year											
	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1971-1972	1972-1973	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978
Clupeidae												
Dorosoma petenense	4	7	7	1	6	27	22	12	3	45	232	10
Dorosoma cepedianum			3	7		13	1	1	15	2	36	2
2 species with <1.00% of clupeids												
Cyprinidae												
Notropis venustus	4,813	3,181	6,218	7,181	7,665	3,787	5,177	2,329	2,719	1,767	5,460	5,567
Hybognathus nuchalis	384	62	744	835	1,757	1,642	40	2,639	2,546	3,270	4,448	1,775
Notropis texanus	1,250	785	3,599	1,632	2,654	1,721	614	3,445	996	1,412	1,064	1,054
Hybopsis aestivalis	2,539	1,266	1,225	2,105	1,762	1,690	768	424	642	1,497	340	2,864
Pimephales vigilax	501	209	732	565	337	400	894	331	544	386	1,643	849
Notropis atherinoides	1,443	136	211	82	1,169	678	429	1,428	678	336	1,005	817
Notropis volucellus	66	46	22	101	175	145	232	394	876	466	861	522
Notropsis longirostris	37	104	143	103	111	138	91	427	189	223	277	454
10 species each with <2.00% of cyprinids												
Catostomidae												
Carpiodes velifer	21	66	116	17	17	15	98	21	6	5	85	18
Moxostoma poecilurum	3	1			5	1		1		1		
Hypentelium nigricans	5		2	2	1	4		8	1		3	
Minytrema melanops				1	8		3			2		
Carpiodes cyprinus				25								
4 species each with <1.00% of catostomids												
Ictaluridae												
Ictalurus punctatus	381	420	519	604	735	811	188	497	489	73	84	40
Noturus munitus	24	4	5	1	21	8	10	19	101	2	8	6
8 species each with <1.00% of ictalurids												
Cyprinodontidae												
Fundulus olivaceus	6	20	26	7	2	2	4	19	22	8	4	
Fundulus notatus	6	8	33		2	1	2	7	2	1	7	2
1 species with <1.00% of cyprinodontids												
Centrarchidae												
Lepomis megalotis	142	171	126	118	167	159	187	131	106	92	120	110
Lepomis macrochirus	30	80	152	60	96	52	48	47	25	11	13	11
Micropterus punctulatus	40	18	28	9	32	22	20	26	13	22	18	18
Micropterus salmoides	11	6	11	9	6	8	8	10	13	2	10	4
Pomoxis annularis	3	10	7	29	18	13	2	10	3	2	1	20
Ambloplites ariommus	5	2	1	2	7	6	4	9	1	9	5	10
Pomoxis nigromaculatus	7	7	2		7	21	3	1	4	4		
Lepomis punctatus	3					2		5	1	10	1	
7 species and one hybrid each <1.00% of sunfishes												
Percidae												
Ammocrypta beani	36	30	11	24	29	138	139	319	365	153	278	337
Percina vigil	305	86	285	640	801	351	99	378	139	135	102	235
Percina sciera	83	33	23	18	41	51	36	71	68	74	28	55
Etheostoma swaini	17	49	82	36	45	45	14	71	68	74	28	97
Ammocrypta asprella	65	1	46	10	247	47	20	88	70	9	9	38
Ammocrypta vivax	63	32	18	7	20	67	31	28	23	11	25	11
Etheostoma chlorosomum	28	7	33	7	39	53	32	82	15	30	7	12
Percina caprodes	29	21	58	20	69	44	29	47	19	15	7	12
Etheostoma histrio	32	12	61	4	55	50	25	25	6	5	3	
10 species and one hybrid each <2.00% of percids												
Total fishes of seven most abundant families* in the sample (78 species and 2 hybrids)**												

* Two families had more total specimens than some families designated as most abundant families defined as those having three or more species represented in the populations.

Pearl River at Bogalusa, Louisiana: 1966-1988.

1978-1979	1979-1980	1980-1981	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987	1987-1988	Total	Percent	Freq. of Occur. N=22
1	238	3	203	54	2	2	10	47	5	941	82.26	22
10	28			36	1	23	4			182	15.91	15
										21	1.83	
										1,144	100.00	
6,998	3,063	13,509	13,963	5,709	8,088	3,929	8,852	10,653	10,248	140,874	45.54	22
479	1,973	1,999	1,176	1,073	2,529	1,582	2,385	1,204	2,857	37,509	12.13	22
1,486	1,653	2,285	1,017	1,119	1,928	458	371	1,157	580	32,280	10.43	22
1,527	1,010	2,301	1,063	957	247	1,420	886	188	455	27,216	8.80	22
1,480	1,036	2,306	2,032	688	2,196	2,240	1,736	2,823	2,543	26,545	8.58	22
377	715	777	589	714	1,611	180	141	37	174	13,727	4.44	22
578	385	439	539	589	372	1,687	309	502	1,834	11,140	3.60	22
306	389	281	353	521	603	699	1,244	705	739	8,137	2.63	22
										11,919	3.85	
										309,347	100.00	
62	2	36	134	51	31	16	6	75	119	1,017	87.52	22
	1	3	1	1	1	2	18	3		42	3.61	14
5	3		3					1		41	3.53	13
		5					7			26	2.24	6
										25	2.15	1
										11	0.95	
										1,162	100.00	
541	133	188	410	3	17	238	502	76	28	6,977	94.69	22
15	2	4			2		3	18	2	255	3.46	19
										136	1.85	
										7,368	100.00	
2	56	78		8	15	3	4	2		288	64.86	19
5	30	32	1	8	1	2	1	1	1	153	34.46	21
										3	0.68	
										444	100.00	
156	112	81	24	46	154	102	60	139	72	2,575	55.53	22
13	22	49	1	10	22	10	15	4	17	788	17.00	22
21	53	41	9	12	19	5	26	13	7	472	10.18	22
4	7	45	8	4	17	8	11	6	3	211	4.55	22
32	5	34	7		1	3	1		5	206	4.44	20
7	3	7	5	1	3			1	3	91	1.96	20
		4		1			1			62	1.34	12
		4		1	12			6	11	56	1.21	11
										176	3.79	
										4,637	100.00	
322	318	194	268	340	384	342	343	221	317	4,908	33.41	22
133	87	180	57	66	26	74	27	61	150	4,417	30.06	22
30	114	57	22	54	55	39	23	51	38	1,031	7.02	22
35	102	69	4	55	40	8	16	20	22	997	6.79	22
86	10	18	3	4	2	3	10	6	1	793	5.40	22
32	12	23	20	18	44	30	9	7	28	559	3.80	22
3	23	66	1	5	14	7	15	3	4	486	3.31	22
8	10	9	50	3	8	4	5	7	7	481	3.27	22
2	8	10	18	2	5	3	4	4	7	341	2.32	21
										679	4.62	
										14,692	100.00	
										338,794		

** This paper reports specifically on 92 species and two hybrids in the Pearl River at Bogalusa. An additional five species are known from other collections in additional years at nearby locations.

16 years at Monticello and in six of 22 years at Bogalusa (Table 3). The mosquitofish (*Gambusia affinis*) was taken in all 16 years at Monticello and in all years except 1983-84 at Bogalusa. The brook silverside (*Labidesthes sicculus*) was taken at both study areas (Table 3) and a single specimen of the tidewater silverside (*Menidia beryllina*) was taken at Monticello in 1987. We raise the possibility that this single specimen may be an introduction since we have never collected the species downstream at Bogalusa. The freshwater drum (*Aplodinotus grunniens*) was represented at both study areas (Table 3). The striped mullet (*Mugil cephalus*) was taken at Bogalusa (Table 3) in three of 22 years. A small percentage of mullets that enter a small seine are actually collected, and these by luck and not design.

The hogchoker (*Trinectes maculatus*) was absent in the Monticello study area but was collected in abundance at Bogalusa (Table 3); in fact, in all of 22 years (1,605 specimens). All of these specimens, except 60, were taken downstream of Pools Bluff Sill, a low concrete dam across the Pearl River downstream from the City of Bogalusa. This sill, in our opinion, serves as an effective barrier to dispersal of all species at low water levels on the Pearl River, and affects upstream movement even in flood conditions when the river inundates the dam. The hogchoker is generally found on or near the bottom of the Pearl River. Forty-one of the 60 specimens collected upstream from the sill (dam) were taken in a single collection at one station in 1968-69. We suggest that the upstream movement of hogchokers was facilitated by high water on the Pearl River, however there is also the possibility that upstream movement was made possible by the presence of the Pearl River Canal, a man-made structure.

The family Percichthyidae was not represented either at the Monticello study area (287,758 specimens – Tables 1 and 3), or the Bogalusa study area (342,899 specimens – Tables 2 and 3). Douglas (1974) and Cook (1959) did not report specimens from the Pearl River. This family is, however, represented by specimens reported in Burgess (1978) from the Pearl River farther downstream.

The large size of our two data sets permits some general observations on the extent of hybridization in natural fish populations. For the families Centrarchidae and Percidae, no hybrid combinations were taken at Monticello. At Bogalusa, however, a single specimen of the sunfish hybrid combination, *Lepomis cyanellus* x *Lepomis gulosus*, was taken, and also at the Bogalusa study area, 11 specimens of the darter (Percidae), *Percina nigrofasciata* x *Percina sciera* (Suttkus and Ramsey, 1967) were taken in seven different years out of a total of 22 years, 1976-77 (2 specimens), 1977-78 (1), 1978-79 (3), 1979-80 (2), 1982-83 (1), 1986-87 (1), and 1987-88 (1).

The infrequently collected freckled darter, *Percina lenticula*, was not taken at Monticello, but was taken in 4 of 22 years at Bogalusa, 1966-67 (1), 1975-76 (7), and 1977-78 (1); the last freckled darter taken was in 1979-80 (1). Other infrequently collected darters in our study areas included the blackside darter (*Percina maculata*) (2 specimens in 1978-79 at Bogalusa), the goldstripe darter (*Etheostoma parvipinne*) (2 specimens in 1968-69 and 1972-73 at Bogalusa), and the banded darter (*E. lynceum*) (one specimen in 1971-72, one specimen in 1978-79, and one specimen in 1987-88 at Bogalusa). One specimen of the blue sucker (*Cycleptus elongatus*) was taken in 1966-67 at Bogalusa and its presence in the Pearl river was cited by both Cook (1959) and Gilbert (1978). Although the blue sucker has not been collected by us from the Pearl River since 1966-67, we have observed this species in a discarded commercial catch (several specimens were obtained and preserved). We could not establish the exact location from which the specimens were taken, however. The river redhorse (*Moxostoma carinatum*) was represented by single specimens in four (1972-73, 1973-74, 1986-87, and 1987-88) of 22 years at Bogalusa.

Table 3. Fishes collected from the Pearl River that belong to less abundant families: 1966-1988.

Family	Monticello		Bogalusa	
	Number of species	Number of specimens	Number of species	Number of specimens
Petromyzonidae	1	2		
Lepisosteidae	2	8	2	15
Amiidae	1	4	1	1
Esocidae	2	28	2	31
Anguillidae	1	1	1	93
Hiodontidae			1	3
Aphredoderidae	1	13	1	75
Belonidae	1	1	1	11
Poeciliidae	1	1,537	1	1,986
Atherinidae	2	258	1	254
Sciaenidae	1	43	1	27
Mugilidae			1	4
Soleidae			1	1,605
Totals	13	1,895	14	4,105

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In Memorium

Gerald E. Gunning, biologist, teacher, researcher and consultant passed away 10 February, 1991, in New Orleans, Louisiana. A faculty member at Tulane University since 1959, Gerry earned his B.S. and M.S. degrees at Southern Illinois University at Carbondale and his Ph.D. in 1958 under Shelby Gerking at Indiana University. While in the biology department at Tulane, he directed twelve doctoral students and influenced countless undergraduates as an extremely popular lecturer. His contributions and legacy to our endeavor are greatly appreciated, and he will be fondly remembered by all who knew him.