

RECORDS OF FRESHWATER FISHES IN FLORIDA

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Since the publication of the first statewide checklist of Florida fishes (Evermann and Kendall, 1900), each subsequent publication concerning the ichthyofauna of the state has added to the total number of species recorded from its freshwaters (Carr, 1937; Carr and Goin, 1955; Briggs, 1958; Kilby, Crittenden, and Williams, 1959). Our collections during the last ten years disclose the presence of nine additional species not included in the latest checklist. Of these nine species, six have been collected for the first time, two have been resurrected from synonymies as valid species, one has been parenthetically mentioned as occurring in Florida in a paper describing a new cyprinid. In addition, several undescribed minnows and darters are known to occur in the state. The widespread interest in ichthyological problems in the southeastern states prompts us to record these findings in this manner, since a more extensive treatise on the distribution of the fishes in this region is still incomplete.

Persons who have assisted in the collection or identification of these fishes are acknowledged under the accounts of species. We are especially indebted to James M. Barkuloo of the Florida Game and Fresh Water Fish Commission, whose tireless efforts and cooperation have furnished many valuable specimens and data. His scientific interests and awareness of biological problems have contributed immeasurably to our knowledge of Florida fishes. We also wish to acknowledge the many contributions of Ardith B. Cochran during the two-year period that he was associated with the senior author.

Species accounts include the catalog number (FSU - Florida State University, USNM - United States National Museum, TU - Tulane

University, and UF - University of Florida, CU - Cornell University fish collections), in parentheses the number of specimens followed by the range of standard length in millimeters, locality, county, date of collection, and names of collectors. In addition to standard compass directions, with the following "of" deleted, these abbreviations are used: Co.=County, Cr.=Creek, mi.=mile(s), R.=River, trib.=tributary (of).

Moxostoma duquesnei (LeSueur)

Black redbhorse

Apalachicola River System.—Apalachicola R. at Chattahoochee, from Jim Woodruff Dam to 3 mi. downstream, Gadsden - Jackson Cos. FSU 4900 (1, 390), June 5, 1959, James M. Barkuloo. FSU 5680 (4, 292-374), Aug. 19-20, 1959, Barkuloo and Ernie Grover. TU 22380 (3, 281-324), Aug. 26, 1959, Barkuloo and Grover. FSU 5268 (3, 314-342), Oct. 1, 1959, Barkuloo, Grover, B. Corbin, and J. Willis. TU 22694 (5, 306-380), Nov. 6, 1959, Royal D. Suttkus, Barkuloo, Grover, Donald Stone. TU 22847 (31, 248-417), Dec. 15, 1959, Barkuloo and Grover. TU 22899 (9, 313-384), Mar. 28-29, 1960, Suttkus, Barkuloo and Grover. TU 23655 (17, 163-388), July 7-8, 1960, Suttkus, John Ramsey, Barkuloo, Grover, Phil Hester.

The recent use of electrical shocking gear in western Florida by Game and Fresh Water Fish Commission personnel has revealed the presence of a species of *Moxostoma* which we tentatively refer to as *M. duquesnei*. Robins and Raney (1956: 14) found that meristic data of five yearling *M. duquesnei* (CU 17128) from the Apalachicola River system (Chattahoochee River in Georgia) did not conform with other populations. In some respects the Apalachicola specimens are similar to *M. erythrum*; however, with regards to meristic data the Apalachicola material seemingly "falls-in" nicely with *M. duquesnei*, as the southern end of a typical north-south cline. Morphometric data, scale and fin ray counts are presented in tables I, II and III respectively

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for specimens of *Moxostoma* from the Apalachicola River in Florida.

The lateral line scale count of 15 specimens of *M. duquesnei* from Pennsylvania, West Virginia and New York ranges from 45 to 50, but is usually 46 or 47. The pelvic fin ray counts for these same specimens are as follows: 2, 9—10: 2, 10—9 and 11, 10—10. The dorsal fin ray counts are as follows: 1, 12; 12, 13 and 2, 14. The body circumference scale counts are: 1, 33; 4, 34; 2, 35; 2, 36; 2, 37; and 1, 38. Caudal peduncle scale counts are: 7, 5—2—5; 4, 6—2—5; 2, 6—2—6; 1, 7—2—5 and 1, 7—2—7. The ranges and average values for these various meristic characters are higher for the northern specimens which typifies a usual north-south cline; however, data of northern and

adjoining populations are too few to be dogmatic about a cline or even to be positive about the species identification of the Apalachicola form.

Proportional measurements were determined for the *M. duquesnei* (15 specimens—CU 820: 1,242mm. in standard length; CU 4559: 1,117; CU 5637: 1,220; CU 5639: 3,191-243; CU 5733: 1,201; CU 8152: 1, 221; CU 10347: 4,36-183; CU 28473: 1,207; CU 32406: 1,232; CU 32557: 1,200) from Pennsylvania, West Virginia and New York, and for two samples of *M. erythrurum* from Ohio and Arkansas (16 specimens—CU 30830: 12, 64-177; TU 10285: 4,116-129) and for 66 specimens of *Moxostoma duquesnei* from the Apalachicola River in Florida and for 7 specimens of *Moxostoma*

TABLE 1.
Proportional Measurements of Nine Specimens of *Moxostoma duquesnei* from the
Apalachicola River in Florida
All Proportions Are Expressed in Thousandths of the Standard Length

Measurement	TU 22899											
	Females						Males					
	Range						Range					
Total length in mm.	420	429	453	470	420-470		386	387	417	445	457	386-457
Standard length in mm.	341	342	370	384	341-384		313	314	343	357	373	313-373
Dorsal origin to snout	495	502	515	533	495-533		507	486	500	532	527	486-532
Dorsal origin to caudal base	556	551	529	512	512-566		545	546	529	532	517	517-546
Dorsal origin to occiput	304	303	318	332	303-332		325	302	314	333	326	302-333
Pelvic insertion to snout	544	511	550	535	511-550		539	521	549	557	554	521-557
Anal origin to caudal base	234	211	216	225	211-234		236	238	232	215	225	215-238
Body, greatest depth	271	266	292	281	266-292		287	260	272	290	255	255-290
greatest width	179	189	187	194	179-194		181	185	184	208	179	179-208
Caudal peduncle, length	144	125	125	140	125-144		149	133	136	129	140	129-149
least depth	99	96	99	105	96-105		102	100	102	106	99	99-106
Head, length ¹	239	261	240	256	239-261		227	230	225	238	245	225-245
depth at occiput	182	190	184	196	182-196		176	168	172	185	198	168-198
width	154	165	162	166	154-166		148	148	145	156	163	145-163
Interorbital, least fleshy	114	123	122	119	114-123		115	109	109	116	126	109-126
Snout, length	126	140	127	145	126-145		125	122	124	124	134	122-134
Orbit, length	37	34	40	39	34-40		37	37	36	42	39	36-42
Postorbital, from orbit to upper opercular margin	73	81	73	78	73-81		67	66	65	73	72	65-73
Dorsal fin, origin to tip of anterior lobe	184	208	171	192	171-208		190	193	180	190	183	180-193
Dorsal fin, depressed length	249	243	240	259	240-259		270	272	255	273	270	255-273
Anal fin, depressed length	205	214	189	213	189-214		226	246	236	247	248	226-248
Caudal fin, length to tip of upper lobe	231	257	225	242	225-257		238	251	224	245	227	224-251
Pectoral fin, length	162	212	154	191	154-212		194	188	178	197	192	178-197
Pelvic fin, length	140	157	138	141	138-157		166	165	161	171	175	161-175
Distance from insertion of pectoral fin to insertion of pelvic fin	312	268	311	271	268-311		301	293	320	318	304	293-320

¹ Measured from tip of snout to bony margin of opercle

duquesnei from the upper Apalachicola River system in Georgia (TU 12217: 6,112-181; TU 12139: 1,149). Table 1 contains values for numerous proportional measurements of nine of the 66 specimens from the Apalachicola River in Florida. Most of these specimens were spawning at the time of capture (March 28-29, 1960); eggs streamed from the females and milt from the males during handling from the dip net to the container in the boat. Several other fishes taken along with *M. duquesnei* were ripe; spotted sucker, *Minytrema melanops*; carp, *Cyprinus carpio*; quillback, *Carpiodes cyprinus*; and Alabama shad, *Alosa alabamiae*. The ripe males of *M. duquesnei* have large tubercles on all anal rays. There are large tubercles also on lower caudal rays but small to medium-size tubercles on upper caudal rays. The lower sur-

face of the caudal peduncle is rough and the entire peduncle is angled upward as is characteristic of most male spawning suckers. The lack of tubercles on the head is in agreement with *M. duquesnei* of northern waters, whereas male *M. erythrurum* have tubercles on the head as well as on the posterior parts of body. The ripe females of the March 28-29 collection also had tubercles on caudal and anal fins; however, these tubercles are smaller and fewer than on males. The skin on the lower surface of the caudal peduncle is rough and thickened. The males in the December 15, 1959 collection (TU 22847) have small tubercles only.

Certain ratios have been used by various workers to distinguish *M. duquesnei* from *M. erythrurum*, e.g. caudal peduncle depth in caudal peduncle length; eye in snout;

TABLE 2.
Scale Counts in Sixty-six Specimens of Moxostoma duquesnei from the Apalachicola River in Florida

Predorsal scales								Mean
15	16	17	18	19	20	21	22	
3	3	29	22	7	1	0	1	17.53
Lateral line scales								Mean
41	42	43	44	45	46	47		
1	9	31	22	2	0	1		42.28
Circumferential scales								Mean
29	30	31	32	33				
20	30	10	4	2				30.06
Circumference of peduncle scales								Mean
4—2—5	5—2—5	6—2—5	6—2—6	7—2—5	7—2—7			
1	49	10	1	4	1			

TABLE 3.
Fin Ray Counts in Sixty-six Specimens of Moxostoma duquesnei from the Apalachicola River in Florida

Dorsal Rays				Anal Rays		
11	12	13	Mean	6	7	Mean
3	47	16	12.19	1	65	6.98
Pelvic Rays						
9—6	9—9	9—10	10—9	10—10	10—11	
1	40	4	8	12	1	

and postorbital distance in snout. These ratios are useful but one must be certain that specimens of comparable size are being compared. Table 4 is a comparison of four grouped samples with respect to the three ratios mentioned above. The largest specimens are from the Apalachicola River in Florida, the smallest from the upper reaches of the same system. The means for these three ratios indicate that both large and small specimens of *Moxostoma* from the Apalachicola River are in better agreement with typical *M. duquesnei* than with *M. erythrurum*.

The means for the ratios of the three samples of *M. duquesnei* are evidence that at least some proportional measurements change considerably with increase in size. The caudal peduncle deepens, and the snout lengthens in relation to both length of eye and postorbital distance.

Since tubercle patterns, meristic characters and proportional measurements of the Apalachicola material agree favorably with typical *Moxostoma duquesnei* of the north, we tentatively use the name *duquesnei* for the Apalachicola material. Perhaps a thorough study of Alabama and Tennessee river specimens will indicate the need for a change in name.

Moxostoma carinatum (Cope)
River redhorse

Escambia River System.—TU 15946 (3, 97-346) Conecuh R., 3 mi. SE Flomaton, Escambia Co., Ala., July 18, 1957, Suttkus, Jack Dendy, Homer S. Swingle, et al. TU 15966 (4, 89-267) Conecuh R., 3 mi. E Flomaton, Escambia Co., Ala., July 18, 1957, Suttkus, Dendy, Swingle, et al. FSU 3763 (1, 264) Conecuh R., 7 mi. above bridge on Rt. 4 E Century, Escambia Co., Alabama, Aug. 27, 1958, Barkuloo, Keith Byrd, Joe Burgess, and Henry Carpenter.

During rotenone surveys of the Conecuh River in the vicinity of the Alabama-Florida state boundary, members of the Florida and Alabama survey teams collected many redhorse suckers. Most of these were *Moxostoma poecilurum*, the blacktail redhorse which is common from the Choctawhatchee River in west Florida west along the Gulf Coast to eastern Texas. Several specimens as noted above were *M. carinatum*. Although the exact point along the river from which these specimens were collected is not known, obviously the species occurs on both sides of the state boundary, i.e., in both Alabama and Florida. Actually some of the pick-up of fishes was within the state of Florida.

The data for these specimens are as follows: dorsal rays: 3 specimens with 12 and 5, 13; anal rays: 8, 7; pectoral rays: 1, 12—16; 4, 16—16; 3, 17—17; pelvic rays: 1, 8—8; 7, 9—9; predorsal scales: 1, 16;

TABLE 4.
Comparison of three ratios of samples of Moxostoma

	Number of specimens Range in size—mm. Mean size—mm.	Caudal peduncle length		Snout		Snout	
		Caudal peduncle depth		Eye		Postorbital	
	Range	Mean		Range	Mean	Range	Mean
Apalachicola, Fla.	66						
<i>M. duquesnei</i>	163–417 336	1.2–1.5	1.35	2.7–4.1	3.24	1.5–1.9	1.73
Pa., W. Va., N. Y.	11						
<i>M. duquesnei</i>	183–243 213	1.4–1.9	1.59	2.2–2.8	2.49	1.6–1.8	1.70
Upper Apalachicola, Ga.	7						
<i>M. duquesnei</i>	112–181 132	1.4–1.6	1.54	2.1–2.4	2.23	1.5–1.7	1.61
Ohio, Ark.	7						
<i>M. erythrurum</i>	147–177 161	1.2–1.4	1.25	1.9–2.1	2.01	1.3–1.5	1.42

4, 17; 1, 18; 1, 19; 1, 20; lateral line scales: 3, 42; 3, 43; 2, 44; body circumference scales: 5, 13—2—15; 1, 13—2—17; 2, 14—2—16; scales around caudal peduncle: 8, 5—2—5. The upper caudal lobe is typically longer than lower lobe and is pointed rather than rounded as is the lower lobe. The caudal fin is bright red in life and usually has a narrow black margin. The anal, margin of dorsal, and upper surface of pectoral and pelvic fins, are orange-red.

These records are a notable extension of the range of this little known species. Moore (1957:83) described its range as from Iowa east to Michigan, Ohio, and Pennsylvania, south to Georgia and Alabama, and west to Oklahoma. Robins and Raney (1957:154) reported two specimens (TU 2051) from the Pearl River, Louisiana, and indicated that it could be expected through the lower Mississippi River system and other Gulf rivers as far east as the Pearl. Since their paper, several additional specimens have been obtained from the Pearl River system, and because the fauna of the Choctawhatchee River appears to be similar to that of the Escambia (Bailey, Winn and Smith, 1954:155), *Moxostoma carinatum* may be expected to occur in the Choctawhatchee River.

Hybopsis aestivalis (Girard)

Speckled chub

Escambia River System.—TU 15948 (6, 31-48) Conecuh R. 3 mi. SE Flomaton, Escambia Co., Ala., July 18, 1957, Suttkus, Dendy, Swingle et al. FSU 3534 (2, 36 and 38) and FSU 4366 (4, 34-37) Escambia R., 5-6 mi. (by river) upstream from highway bridge on Rt. 4 E Century, Escambia Co., Aug. 26, 1958, Barkuloo, Byrd, and Burgess.

Choctawhatchee River System.—TU 20811 (28, 20-34), Choctawhatchee R., 3 mi. S Browns on Hwy. 2, or 6 airline mi. S Geneva (Ala.), Holmes Co., July 24, 1959, Suttkus, Barkuloo, Grover, and Byrd. FSU 5457 (21, 21-37), same locality, September 11, 1959, Ralph W. Yerger and Ardith B. Cochran.

Formerly recorded from the Rio Grande and other Gulf Coast rivers of Texas and the Mississippi River, the speckled chub now is known to occur east along the Gulf Coast to the Choctawhatchee River in the Florida Panhandle (Suttkus, 1961:234). Here is another example which bears out the conclusion by Bailey, Winn, and Smith (1954) that the Choctawhatchee and Escambia rivers have similar faunas, and together represent a distinct faunal break in western Florida.

As in the case of *Moxostoma carinatum*, the speckled chub in the Escambia River was taken on one side or the other of the Alabama-Florida line, but unquestionably occurs in the Florida sections of the river.

The specimens in the Escambia River collection of July 18, 1957 and those in the Choctawhatchee River collection of July 24, 1959 were in spawning condition. The females contain large ova and the males are tuberculate.

Both Escambia and Choctawhatchee river specimens have the tetranemus condition. The anterior pair of barbels is well developed in all specimens; i.e. there are no rudimentary or intermediate conditions. This tetranemus condition is common to the populations of *H. aestivalis* in the Arkansas region but not so in the Pearl River population. Although hundreds of specimens from the Pearl River were examined, none has four barbels. Specimens of *H. aestivalis* from the Cahaba River of the Alabama River system have only one pair of barbels like those in the Pearl River. In addition, the Cahaba specimens differ from the other mentioned populations in their darker coloration.

Notropis welaka (Evermann and Kendall)

Bluenose shiner

St. Johns River System.—Type, USNM 48786 (1), St. Johns River near Welaka, Fla., Feb. 19, 1897, W. C. Kendall. TU 12467 (24, 23-44), Wekiwa R. under bridge Fla. Hwy 46 at (Seminole-Lake) county line—R 29 E, T 19 S, No. 21, April 7, 1956, S. T. Tucker, Spence, Bateman. UF 6251 (4, 20-28), Alexander Spring run, Astor Park, Lake Co., D. L. Taber and Melvin T. Huish. UF 6252 (28, 17-38), Alexander Spring run below Fla. 445 bridge, Lake Co., Dec. 13, 1949, William McLane. UF 6253 (1, 25), Alexander Spring boil and adjacent run area, 6 mi. SW Astor Park, Lake Co., Sept. 7, 1949, McLane. UF 6254 (3, 21-25), Oklawaha R. at Davenport Landing, approx. 6 mi. upstream from mouth, Marion Co., Oct. 7, 1948, McLane and Giovannoli. McLane (1955) listed these additional localities: Oklawaha R. at Wells Landing, 25 mi. upstream from mouth of river; Wekiwa R., Seminole Co.; and mouth of Juniper Springs Creek, Lake Co.

Apalachicola River System.—FSU 1563 (27, 32-50) fish hatchery landing, Dead Lakes near Wehatche, Chipola R. drainage, Gulf Co., May 8, 1953, F. Gerry Banks and G. W. Nelson.

Choctawhatchee River System.—FSU 674 (4, 34-45), Holmes Creek, 4.6 mi. W Chipley, on Rte. 90, Washington-Holmes Cos., May 4, 1952, Yerger and ichthyology class. TU 22257 (10, 24-43), trib. of river, ½ mi. upstream from Ebro, Washington Co., July, 1959, Byrd.

Yellow River System.—FSU 7037 (3, 32-36), trib. of Yellow R., 6 (airline) mi. SSE Milton, Santa Rosa Co., May 16, 1961, Byrd and Hester. FSU 7123 (100, 23-45), Nichols Creek, approx. 9 (airline) mi. SSE Milton, Santa Rosa Co., June 22, 1961, Yerger, Carter Gilbert, Byrd, Hester, William Weaver, Louis Prevatt.

The strikingly beautiful bluenose shiner, which occurs from the St. Johns River in eastern Florida along the Gulf coast westward to the Pearl River in Mississippi and Louisiana, was for a long time considered to be an undescribed species. While examining type specimens of cyprinids in the U. S. National Museum in March 1957, Suttkus discovered that the bluenose shiner was conspecific with *Notropis welaka* Evermann and Kendall, a name which Bailey, Winn, and Smith (1954:129) included in the synonymy of *N. maculatus* (Hay).

The wide gap in the range of this species, from the St. Johns River in Central Florida to the Chipola River in the Panhandle, may reflect inadequate collecting in this region, or may be another example of disjunct populations.

Notropis zonistius (Jordan)

Bandfin shiner

Apalachicola River System.—FSU 4035 (6, 39-72), trib. Flint R., 2.4 mi. N. Mt. Pleasant, Gadsden Co., Jan. 26, 1959, Yerger, Cochran, Rhodes Holliman. TU 20641 (5, 23-29), Flat Creek about 10 mi. S Chattahoochee, on Hwy. 269, Gadsden Co., July 22, 1959, Suttkus and Barkuloo. UF 4940 (157, 25-62), S Mosquito Cr. at iron bridge 2 mi. S Oak Grove, Gadsden Co., April 8, 1955, John D. Kilby et al. UF 4925 (32, 24-66), Flat Creek 4 mi. SE river junction, Gadsden Co., Apr. 8, 1955, Kilby et al. UF 4719 (3, 32-46), pond on Butler Rd., 3.6 mi. N U.S. 90, Jackson Co., Mar. 26, 1954, Fred Berry and Wilder.

Earlier records of the bandfin shiner were restricted to the Chattahoochee River of Georgia and Alabama (Moore, 1957:126). These recent collections reveal, as might have been suspected, that the species occurs in tributaries of the Flint River and also of the main or lower division of the Apalachicola system. The tributary of the Flint River from which one of these series was collected originates in Gadsden County, Florida, flows northwestward into Decatur County, Georgia, where the species has also been collected, and enters the Flint River between Recovery, Georgia, and Chattahoochee, Florida.

Notropis leedsii (Fowler)

Ochoopee shiner

Ochlockonee River System.—FSU 1261 (1, 56), trib. Ochlockonee R., 0.4 mi. E Quincy on Fla. 12, Gadsden Co., Mar. 28, 1952, Yerger and ichthyology class. FSU 1633 (11, 35-57), Rocky Comfort Cr., 3.2 mi. ENE Wetumpka, Gadsden Co., Mar. 5, 1954, Yerger and ichthyology class. FSU 3400 (1, 53), same locality. Mar. 31, 1958, Yerger and ichthyology class. FSU 3576 (90, 33-70), Ochlockonee R. at Rocky Bluffs, Leon Co., Sept. 28, 1958, Yerger, Cochran, and William Ragsdale. FSU 3808 (5, 45-60), Ochlockonee R. 1.8 mi. down-

stream from Lake Talquin Dam, Leon Co., Oct. 10, 1958, Yerger and Cochran. FSU 4416 (2, 30-33), Ochlockonee R., on U.S. 27, 9 mi. NW Tallahassee, Leon Co., Dec. 19, 1958, Yerger and Cochran. TU 22630 (6, 47-69), Ochlockonee R. at Jackson Bluff, Hwy. 20, Leon Co., Dec. 14-15, 1959, Suttkus, Barkuloo, and Grover.

In a strict sense, this is not the first report of the Ochoopee shiner from Florida. In the introduction to their original description of *Notropis callitaenia*, Bailey and Gibbs (1956) mentioned the distribution of *Notropis leedsii* from the Savannah River southward to the Ochlockonee in Georgia and Florida. The unpublished portion of Gibbs dissertation dealing with *Notropis leedsii* lists a single Florida specimen from Liberty County, and two collections from Georgia in the Ochlockonee drainage.

Prior to the fall of 1958, single specimens had been collected for the FSU collection but never identified. Beginning in October 1958, several large series were taken from the main river channel below Lake Talquin Dam. A combination of factors permitted seining operations in areas which normally would be inaccessible to collectors. Part of the dam had been destroyed by spring floods, and after repairs were completed in September, the gates were closed to allow the refilling of the lake. A severe drought was in progress, with the result that for several miles below the dam the river channel at many places was less than three feet deep.

This species appears to frequent the channel in the main river and its larger tributaries. It has been taken only from areas with a sandy bottom devoid of vegetation, and with a moderate current.

It has been collected in the Apalaha River (Lanier County) and in the Withlacoochee River (TU 16069 [1, 50], 12.1 mi. W. Valdosta, Brooks Co., July 29, 1957, R. D. and J. S. Suttkus), Georgia, and therefore may be expected to occur in the Suwannee River System in Florida as well as in the Ochlockonee River.

Etheostoma histrio (Jordan and Gilbert)

Harlequin darter

Escambia River System.—FSU 5911 (4, 27-35), Mitchell Cr., trib. Escambia R., 0.4 mi. N McDavid on Rte. 29, Escambia Co., Aug. 14, 1959, Yerger and Cochran. TU 15942 (1, 32), Conecuh R., 3 mi. SE Flomaton, Escambia Co., Ala., July 18, 1957, Suttkus, Dendy, Swingle, et al.

Previous records of the harlequin darter extended eastward to Louisiana and Mississippi, and these new collections extend

the range to the Escambia River of western Florida (Suttkus, 1961:234). Although the Tulane series is labeled "Alabama", it is another instance of a collection made very close to the state line, and the species may appropriately be recorded in the faunal lists of both Alabama and Florida.

Dr. Reeve M. Bailey verified the identification of the series in the FSU collection.

Etheostoma parvipinne (Gilbert and Swain)
Goldstripe darter

Choctawhatchee River System.—FSU 5128 (1, 46), Hurricane Cr. (trib. Pea R.), 1 mi. W Sweet Gum Head, Holmes Co., Feb. 23, 1958, Byrd and Barkuloo. FSU 5326 (1, 48), trib. Holmes Cr., just N Vernon, Washington Co., Mar. 23, 1958, Byrd and Barkuloo. FSU 4678 (2, 47-53), trib. Holmes Cr., 14.1 mi. N Ebro, on Rte. 79, Washington Co., Jan. 12, 1958, O. V. and J. M. Barkuloo.

Bailey, Winn, and Smith (1954:144) cited records of this fish in the Escambia River in Alabama, and as far east as the Flint River in Georgia. The Choctawhatchee River is approximately midway between these two drainages. Dr. Reeve M. Bailey kindly verified the identification of these specimens.

Etheostoma okaloosae (Fowler)
Okaloosa darter

Northern Gulf Coast Drainage (tributaries of Choctawhatchee Bay).

The validation, description, distribution, and relationships of this darter are discussed in a recent paper by Collette and Yerger (In press). It is restricted to several small streams (Rocky, Swift, Turkey, and Toms creeks) in the vicinity of Niceville, in Okaloosa and Walton counties.

DISCUSSION

Since the earliest days of exploration in North America, naturalists have been attracted to Florida to study its varied flora and fauna. Many ichthyologists have made state-wide collections, and one might surmise that the freshwater fishes of the region have been adequately known for a long time. This idea can quickly be dispelled by a resume of ichthyological investigations during the last 60 years. Almost as many species of freshwater fishes have been added to the state list in the last six years as were added in the period from 1900 to 1955.

In the original checklist of Florida fishes, Evermann and Kendall (1900) recorded 61

species from the freshwaters of the state, but since some of these are euryhaline, and others have been reduced to synonymy, only 45 species may be recognized as freshwater types. (It is not always a simple matter, especially in Florida waters, to designate a species as belonging to a freshwater, marine, or euryhaline category, and ichthyologists cannot always agree on the proper placement. In discussing these publications on Florida fishes, we arbitrarily have followed the categorization of Briggs [1958], although we do not necessarily agree in every case.)

Carr (1937) included 102 species in his key, but of these only 59 were freshwater forms, the others were euryhaline or marine invaders of freshwater streams. In their guide to the cold-blooded vertebrates of Florida, Carr and Goin (1955) recorded 154 species in freshwater, of which we consider 77 as belonging in the freshwater category. Three years later Briggs (1958) compiled the most recent checklist and recognized 88 species of "true" freshwater fishes.

But the list continues to expand. Six more species were recorded from western Florida by Kilby, Crittenden, and Williams (1959). Our present paper adds nine more, for a total of 103 species of freshwater fishes known from Florida at the present time. While additional species undoubtedly will be added to this list, it is unlikely that the number will be very great.

Two facts of considerable interest should be noted from this list of fishes newly reported from Florida. First, all of the species are limited to western Florida, or the Panhandle region as it is commonly called. Furthermore, of the 26 additions to the state list since 1955, all but two are restricted to the Panhandle. This is not surprising, however, for this region offers the greatest diversity of habitats to be found anywhere in Florida, and it is an area where many species belonging to the Mississippi Valley fauna reach their eastern limits of distribution. Many of these species have simply gone unnoticed, for until recent years, collections in this area have been few.

The other obvious fact is that earlier collections have inadequately sampled the faunas in the larger rivers. Recent surveys in the Apalachicola and Conecuh rivers have revealed the presence of two additional

suckers belonging to the genus *Moxostoma*, whereas for many years only one member of this genus had been known from Florida. More surveys of this kind are needed, and very likely would yield several more unrecorded species.

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ABSTRACT

Extensive collections in western Florida have added nine species of freshwater fishes to the faunal list of the state: *Moxostoma duquesnei*, *M. carinatum*, *Hybopsis aestivalis*, *Notropis welaka*, *N. zonistius*, *N. leedsi*, *Etheostoma histrio*, *E. parvipinne*, and *E. okaloosae*. All but one (*Notropis welaka*) are restricted to the Panhandle. Although they do not agree in all respects with populations in northern states, specimens of *Moxostoma* from the Apalachicola River are tentatively identified as *M. duquesnei*. Considered as synonyms for many years, both *Notropis welaka* and *Etheostoma okaloosae* are now recognized as valid species. The present total of 103 species of primary freshwater fishes in Florida will likely be increased by further surveys in the larger rivers.