

11-1-1991

Provenance and Disposition of Fish Specimens Appearing in Color Plates of Kuehne and Barbour's Book, *The American Darters*

Carter R. Gilbert

Stephen J. Walsh

Follow this and additional works at: <https://trace.tennessee.edu/sfcproceedings>



Part of the [Marine Biology Commons](#)

Recommended Citation

Gilbert, Carter R. and Walsh, Stephen J. (1991) "Provenance and Disposition of Fish Specimens Appearing in Color Plates of Kuehne and Barbour's Book, *The American Darters*," *Southeastern Fishes Council Proceedings*: No. 24.

<https://doi.org/10.7290/sfcp2432f0>

Available at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss24/3>

This article is brought to you freely and openly by Volunteer, Open-access, Library-hosted Journals (VOL Journals), published in partnership with The University of Tennessee (UT) University Libraries. This article has been accepted for inclusion in Southeastern Fishes Council Proceedings by an authorized editor. For more information, please visit <https://trace.tennessee.edu/sfcproceedings>.

Provenance and Disposition of Fish Specimens Appearing in Color Plates of
Kuehne and Barbour's Book, *The American Darters*

PROVENANCE AND DISPOSITION OF FISH SPECIMENS APPEARING IN COLOR PLATES OF KUEHNE AND BARBOUR'S BOOK, *THE AMERICAN DARTERS*

Carter R. Gilbert
and
Stephen J. Walsh

*Florida Museum of Natural History
University of Florida
Gainesville, FL 32611*

In 1983, Robert A. Kuehne and Roger W. Barbour published their monograph of the darters, the species of which comprise all but three of the North American members of the family Percidae. The book contains illustrated taxonomic keys, distribution maps, and general accounts for all species recognized as valid at the time, but its most outstanding feature is a series of 24 color plates, each containing six photographs, mostly of fresh specimens photographed immediately after preservation. A special effort was made to obtain material during the height of the breeding season, partly because of the aesthetically pleasing aspect of the brilliant nuptial coloration, but especially because these colors are highly species-specific. Most specimens were collected by the authors themselves, with the photographs being taken by Roger Barbour. In some cases specimens were donated or loaned by colleagues to be photographed, and for ten species color slides or prints were provided by other individuals, as indicated in the "Acknowledgments" section at the beginning of the book. The overall quality of the photographs is excellent, and for many species they represent the first published documentation of life colors, particularly of nuptial males.

Some widespread darter species exhibit notable geographic variation in life colors and/or pigmentation pattern. Kuehne and Barbour recognized this, as evidenced by the fact that five species (*Etheostoma blennioides*, *E. spectabile*, *E. stigmaeum*, *E. whipplei*, and *E. zonale*) were represented by two, and one species (*E. maculatum*) by three, different photographs. Sometimes this variation provides a clue that previously unrecognized species or subspecies are involved. Of the above, *E. maculatum* is now regarded as comprising three, and *E. zonale* two, distinct species (Page 1985, Etnier and Starnes 1986, Etnier and Williams 1989). There is unpublished evidence to suggest that *E. stigmaeum* is also a species complex (Howell 1968). Conversely, *E. atripinne*, which was listed as a valid species by Kuehne and Barbour, had earlier been downgraded to a subspecies of *E. simotermum* (Page and Mayden 1981), a decision that has gained general acceptance (Burr and Warren 1986, Bailey and Etnier 1988). Considering these points, the omission of accompanying locality data for all of the 144 specimens appearing in the color plates is especially puzzling, and remains an unfortunate flaw of this otherwise excellent book.

Bob Kuehne passed away on 18 December 1984 (Barbour 1985). Shortly before his death, he relayed to Roger Barbour his

wish that the fish collection he had assembled, which contained most of the specimens photographed for the book, be given to the Florida State Museum (now the Florida Museum of Natural History) for permanent deposition. This transfer was effected during the summer of 1985, and the material was shortly thereafter catalogued into our museum collection.

Several colleagues subsequently suggested that it would be desirable if the provenance and present disposition of the specimens used for the color plates of Kuehne and Barbour's book could be determined, and that an ideal outlet for this information would be the SFC Proceedings. It was initially assumed that this information could be obtained from Roger Barbour, but this unfortunately proved not to be the case. Roger suggested that much of the information might be available in Kuehne's file cards, which were transferred here along with the collection, and these have proved useful in a number of cases. We also contacted the University Press of Kentucky in order to confirm that these data were never included with the original manuscript. It soon became apparent that it would be necessary to examine individual series and compare the specimens with the photographs, and also to contact those individuals at other institutions who were involved in loans of specimens or photographs. In some cases, it has been easy to determine the fish used for particular photographs, especially if there is some obvious physical characteristic or peculiarity (fin tears, angles of fins, presence of encysted parasites on body, etc.) In other cases this has presented problems. Some of the photographed specimens exhibit no unusual physical characteristics, and in other cases there are large numbers of individuals present in a series that are very similar in size and appearance. Often the specimen was placed in a jar containing numerous other individuals. Since this was usually done before the fish had hardened completely, compression of the body or fins by other specimens in the container occasionally caused slight changes in body shape or angle of the fins to the body. It was Barbour's practice to tie a tag around each specimen photographed, which unfortunately sometimes resulted in one or more fins being depressed or torn. Although excessive fading or discoloration of specimens was seldom a problem, on rare occasions it was. In one case (*Etheostoma lynceum*) the photograph apparently was taken of the right side of the specimen, but was reversed so as to face in the same direction as other specimens on the plate. Considering all the above, it is possible that in some cases the specimens in question actually are in our collection, but have defied attempts to

identify them; in most cases, however, the specimen illustrated is so completely different from any of those available that we are satisfied it is not present. Although some specimens may have been lost, others presumably were sent on loan or exchange to ichthyologists; however, documentation relating to this is not available.

Confirmed locality and collection data have been ascertained for 117 of the 144 specimens used in the photographs, and probable locality and collection data have been determined for seven others. Of the specimens for which locality data are known, 100 are in the Florida Museum of Natural History collection, eleven are known to be in collections at other institutions, and the present disposition of thirteen is unknown. In the following list, the plates are listed in the sequence they appear in the book, with the respective positions identified by letters (LT = left top; LC = left center; LB = left bottom; RT = right top; RC = right center; RB = right bottom). For each plate and position, the genus and species name, as it originally appeared in Kuehne and Barbour, appears first. For those 18 taxa that have been the subject of subsequent nomenclatural changes, the updated name follows in parentheses. This is followed by sex and life-history stage of the specimen, standard length (to nearest half mm), museum catalogue number, locality data (state, county, and precise locality), date of collection, names of collectors, and Kuehne's reference number or collector's field number, if known. Museum catalogue numbers are identified by the following acronyms: UF = Florida Museum of Natural History, University of Florida; UT = University of Tennessee; UAIC = University of Alabama Ichthyological Collection; USNM = National Museum of Natural History. Two other collections are listed by their full names.

We have attempted to follow nomenclature appearing in the fifth edition of the Common and Scientific Names of Fishes (Robins et al. 1991). This presents no problem, except for the seven species collectively called the "sand darters," which Robins et al. have continued to retain in *Ammocrypta*, the genus in which they have traditionally been placed. However, Page and Burr (1991), in their recently published field guide to North American freshwater fishes, have chosen to follow the findings of Simons, who elevated *Crystallaria* to a full genus (Simons, in press [a]), and placed the remaining six species of *Ammocrypta* in the expanded genus *Etheostoma* (Simons, in press [b]). We here follow the nomenclature adopted by Page and Burr.

We would like to thank W.J.B. Miller, who was responsible for cataloguing the material and identified several of the specimens used in the book. We also would like to thank the following individuals who responded to specific inquiries: Bruce H. Bauer, Breedlove, Dennis and Associates, Orlando, Florida; George C. Becker, Rogers, Arkansas; Herbert T. Boschung and Richard L. Mayden, University of Alabama; Richard T. Bryant, Doraiville, Georgia; Thomas M. Buchanan, Westark Junior College, Arkansas; John H. Caruso, Tulane University; Robert C. Cashner, University of New Orleans; Jeffrey M. Clayton, National Museum of Natural History (formerly United States National Museum); William Jerome Crouch, University Press of Kentucky; Anthony A. Echelle, Oklahoma State University; David A. Etnier, University of Tennessee; Julian M. Humphries, Cornell University; Robert E. Jenkins, Roanoke College; William H. LeGrande, University of Wisconsin at Stevens Point; William L. Pflieger,

Missouri Fish and Game Department; Henry W. Robison, Southern Arkansas University; Kate Shaw, University of Kansas; and Bruce A. Thompson, Louisiana State University. We particularly wish to thank James W. Small, Jr., Rollins College (Florida), who helped collect a number of the specimens photographed, and recalled specific localities and circumstances relating to their use in the book.

PLATE 1

- LT *Percina aurolineata* (preserved adult male, 57.5 mm SL). UAIC 1798.01. Georgia: Gilmer Co., Coosawattee River 3 mi. S of Ellijay, 9 September 1965, W. Smith-Vaniz and W. Rogers.
- LC *Percina lenticula* (preserved adult). Provenance and disposition unknown.
- LB *Percina nigrofasciata* (adult male). Provenance and disposition unknown.
- RT *Percina sciera* (breeding male, 60.0 mm). UF 43928. Louisiana: Ouachita Psh. Bayou Choudrant at U.S. hwy. 80 bridge, about 5 mi. W of Calhoun, 13 March 1970, N. Douglas and T. Guidroz (RAK No. 127).
- RC *Percina nasuta* (preserved adult, 65.0 mm SL). Disposition unknown. Arkansas: Montgomery Co., Ouachita River 1 mi. S of Pine Bluff, 18 July 1976, H. W. Robison and J. L. Harris.
- RB *Percina oxyrhyncha* (= *P. oxyrhynchus*) (breeding male). Disposition unknown. Probably from Kentucky: Bath-Rowan Co., Licking River about 1 mi. above mouth of Scotts Creek and 2 mi. S of Farmers, 22 September 1969 (RAK 107A) (J.W. Small, pers. comm.).

PLATE 2

- LT *Percina phoxocephala* (breeding male, 56.0 mm SL). UF 43353. Missouri: Dallas Co., Niangua River about 4 mi. E of Buffalo on st. rte. 32, 16 May 1968, R.A. Kuehne, R.W. Barbour, and C. Ernst (RAK No. 43).
- LC *Percina squamata* (preserved adult). Disposition unknown. Kentucky: Jackson-Rockcastle Co., Horse Lick Creek 0.4 mi. S mouth of White Oak Creek, about 4.5 air mi. NE of Livingston, unmarked road just N of st. rte. 89 (J.W. Small, pers. comm.).
- LB *Percina crassa* (adult female, 58.0 mm SL). UT 91.1810. North Carolina: Richmond Co., stream at co. rd. 1005, 0.7 mi. S of co. rd. 1143, 4 mi. N of Rockingham, 28 April 1979, W.C. Dickinson, C.K. Dodd, Jr., D.A. Etnier, and J.D. Williams.
- RT *Percina gymnocephala* (adult male, 58.0 mm SL). UF 43795. Virginia: Floyd Co., West Fork Little River at st. rte. 8 crossing, 15 May 1969, R.A. Kuehne, R.W. Barbour, and R. Ross (RAK No. 84).
- RC *Percina macrocephala* (young adult, 55.5 mm SL). UF 43966. Tennessee: Blount Co., Little River at U.S. hwy. 411 bridge, 15 May 1970, R.A. Kuehne, D.A. Etnier, and J.W. Small (RAK No. 142).

RB *Percina maculata* (adult male, 58.0 mm SL). UF 43927. Louisiana: Union Psh., Meridian Creek at st. rte. 348 bridge, 0.25 mi. E of Conway, 15 March 1970, R.A. Kuehne, R.W. Barbour, and N.H. Douglas (RAK No. 126).

PLATE 3

LT *Percina notogramma* (adult male, 60.5 mm SL). UF 43692. Virginia: Botetourt Co., Craig Creek about 7 mi. E of Newcastle, 4 June 1968, R.A. Kuehne et al. (RAK No. 55).

LC *Percina pantherina* (preserved adult). Provenance and disposition unknown. Specimen supplied by H. W. Robison.

LB *Percina peltata* (adult male, 70.0 mm SL). UF 44035. Pennsylvania: Bedford Co., Raystown Branch, tributary of Juniata River, near Bedford, 26 July 1982, R.A. Kuehne and J. Stauffer.

RT *Percina roanoka* (breeding male, 44.0 mm SL). UF 43817. Virginia: Franklin Co., Blackwater River at old U.S. hwy. 220 bridge, 16 May 1969, R.A. Kuehne and R.W. Barbour (RAK No. 86).

RC *Percina (Alvordius)* sp. (young adult, 47.5 mm SL). UF 43969. Tennessee: Polk Co., Conasauga River at st. rte. 74 bridge to 0.5 mi. downstream, 16 May 1970, R.A. Stiles, J.L. Wilson, and D.A. Etnier (RAK No. 143).

RB *Percina evides* (breeding male, 49.5 mm SL). UF 43895. Kentucky: Rowan-Bath Co., Licking River about 1 mi. above mouth of Scotts Creek and 2 mi. S. of Farmers, 22 September 1969, R.A. Kuehne and R.W. Barbour (RAK No. 107A).

PLATE 4

LT *Percina palmaris* (breeding male). Disposition unknown. Probably from Alabama: Jefferson Co., Turkey Creek at st. rte. 79 bridge, N of Pinson, 10 April 1972, R.A. Kuehne and J.W. Small (RAK No. 171) (J.W. Small, pers. comm.).

LC *Percina cymatotaenia* (young adult, 43.0 mm SL). UF 43614. Missouri: Dallas Co., Niangua River at Moon Valley Ford, 15 May 1968, R.A. Kuehne, R.W. Barbour, and C. Ernst (RAK No. 41).

LB *Percina cymatotaenia* (= *P. cf. cymatotaenia*) (adult male). Disposition unknown. Probably from Kentucky: Powell Co., Red River at iron bridge, N of Nada, 27 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 29) (J.M. Clayton, pers. comm.).

RT *Percina aurantiaca* (breeding male, 88.5 mm SL). UF 43962. Tennessee: Blount Co., Little River off st. rte. 73 near Walland, 15 May 1970, R.A. Kuehne, J.W. Small, and D.A. Etnier (RAK No. 141).

RC *Percina copelandi* (adult male, 38.5 mm SL). UF 43516. Kentucky: Magoffin Co., Licking River 1 mi. S of Salyersville, 27 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 27).

RB *Percina antesella* (preserved adult female, 59.0 mm SL). USNM 210666 (ex UT 91.383). Tennessee: Polk Co., Conasauga River at st. rte. 74 bridge, 22 October 1969, R.A. Stiles, J.L. Wilson, and D.A. Etnier (RAK No. 143).

PLATE 5

LT *Percina ouachitae* (= *P. vigil*) (breeding male, 50.5 mm SL). UF 43937. Mississippi: Copiah Co., Bayou Pierre at st. rte. 18 bridge, 16 March 1970, R.A. Kuehne and R.W. Barbour (RAK No. 132).

LC *Percina shumardi* (adult male, 65.5 mm SL). UF 43886. Kentucky: Rowan-Bath Co., Licking River 4 mi. upstream from Farmers, 22 September 1969, R.A. Kuehne and R.W. Barbour (RAK No. 107).

LB *Percina tanasi* (breeding male, 58.0 mm SL). UT 91.2573. Tennessee: Bradley Co., South Chickamauga Creek just downstream from I-75 bridge, 5 April 1982, D.A. Etnier et al. (DAE 82-3).

RT *Percina uranidea* (preserved adult). Provenance and disposition unknown.

RC *Percina burtoni* (young adult, 74.5 mm SL). UF 43663. Virginia: Scott Co., Copper Creek just below mouth of Beecher Creek, at Spivey Mill at co. rte. 665 bridge, 2 June 1968, R.A. Kuehne and R.W. Barbour (RAK No. 52).

RB *Percina caprodes* (young adult). Provenance and disposition unknown.

PLATE 6

LT *Percina macrolepida* (young adult). Provenance and disposition unknown.

LC *Percina rex* (adult male, 71.0 mm SL). UF 43812. Virginia: Montgomery Co., South Fork of Roanoke River at Shawsville, 15 May 1969, R.A. Kuehne et al. (RAK No. 85).

LB *Ammocrypta asprella* (= *Crystallaria asprella*) (adult male, 96.0 mm SL). UF 44046. Mississippi: Lowndes Co., Tombigbee River 0.5 mi above U.S. hwy. 50 bridge, 9 mi. NW of Columbus, 1 December 1970, G. H. Clemmer, D.C. and G. Heins (GHC 846).

RT *Ammocrypta beani* (= *Etheostoma beani*) (preserved male). Provenance and disposition unknown.

RC *Ammocrypta bifascia* (= *Etheostoma bifascia*) (young adult). Provenance and disposition unknown.

RB *Ammocrypta clara* (= *Etheostoma clarum*) (adult male, 45.0 mm SL). UF 43978. Wisconsin: Sauk Co., Wisconsin River at Spring Green, 26 July 1970, G. and S. Becker (RAK No. 149).

PLATE 7

LT *Ammocrypta meridiana* (= *Etheostoma meridianum*) (young adult, 45.5 mm SL). UF 43999. Alabama: Macon-Montgomery Co., Line Creek at end of Brassell Road, 3.1 mi. NE of Waugh, 8 April 1972, R.A. Kuehne and J.W. Small (RAK No. 169).

LC *Ammocrypta pellucida* (= *Etheostoma pellucidum*) (adult male, 40.5 mm SL). UF 43893. Kentucky: Rowan-Bath Co., Licking River about 1 mi. above mouth of Scotts Creek and 2 mi. S of Farmers, 22 September 1969, R.A. Kuehne and R.W.

Barbour (RAK No. 107A).

LB *Ammocrypta vivax* (= *Etheostoma vivax*) (adult male, 48.5 mm SL). UF 43450. Mississippi: George Co., tributary of Black Creek at st. rte. 26 bridge, about 2 mi. W of junction with st. rte. 57, 21 March 1968, R.A. Kuehne, R.W. Barbour, and W. Davis (RAK No. 15).

RT *Etheostoma tuscumbia* (adult male, 40.0 mm SL). UF 43976. Alabama: Madison Co., Blue Spring at S edge of Huntsville, near edge of Redstone Arsenal, 18 June 1970, R.A. Kuehne et al. (RAK No. 147).

RC *Etheostoma nianguae* (breeding male). Provenance and disposition unknown. Photograph credited to C.A. Purkett, Jr. in Pflieger (1975), but to J.P. Henley in Kuehne and Barbour (1983).

RB *Etheostoma sagitta sagitta* (breeding male, 72.5 mm SL). UF 43922. Kentucky: Bell Co., Clear Creek several mi. SW of Pineville, 21 April 1970, J.W. Small and M. Creusere (RAK No. 117).

PLATE 8

LT *Etheostoma cinereum* (breeding male, 63.5 mm SL). UF 44038. Kentucky: Rockcastle-Jackson Co., Horse Lick Creek 1 mi. above confluence with Rockcastle River, 26 March 1977, R.A. Kuehne et al.

LC *Etheostoma blennioides blennioides* (breeding male, 58.5 mm SL). UF 43513. Kentucky: Magoffin Co., Licking River about 6 mi. N of Salyersville, 27 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 28).

LB *Etheostoma blennioides newmani* (breeding male, 58.5 mm SL). UF 43387. Arkansas: Montgomery Co., Jones Creek at Caddo Gap, 15 March 1968, R.A. Kuehne et al. (RAK No. 5).

RT *Etheostoma blennioides* (breeding male, 54.0 mm SL). UF 43503. Tennessee: Lawrence Co., West Branch of Shoal Creek 1 mi. N of Alabama state line, 21 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 23).

RC *Etheostoma euzonum* (adult male, 51.0 mm SL). UF 43868. Arkansas: Sharp Co., South Fork of Spring River 3 mi. W of Hardy at bridge, 1 June 196, R.A. Kuehne and R.W. Barbour (RAK No. 101).

RB *Etheostoma histrio* (breeding male, 42.5 mm SL). UF 43932. Mississippi: Copiah Co., Bayou Pierre at st. rte. 18 bridge, 16 March 1970, R.A. Kuehne and R.W. Barbour (RAK No. 132).

PLATE 9

LT *Etheostoma inscriptum* (breeding female, 50.0 mm SL). UF 44031. South Carolina: Edgefield Co., Turkey Creek at st. rte. 283 bridge, approx. 9 mi. W of Edgefield, 19 March 1974, R.A. Kuehne et al. (RAK No. 182-74).

LC *Etheostoma kanawhae* (breeding male, 52.0 mm SL). UF 43794. Virginia: Floyd Co., West Fork of Little River at st. rte. 8 bridge and above, 15 May 1969, R.A. Kuehne et al. (RAK No. 84).

LB *Etheostoma osburni* (breeding male, 70.5 mm SL). UF 43977. Virginia: Giles Co., Big Stoney Creek about 3 mi. above mouth, 21 June 1970, R.A. Kuehne et al. (RAK No. 148).

RT *Etheostoma rupestre* (adult male, 42.5 mm SL). UF 43967. Tennessee: Polk Co., Conasauga River at st. rte. 74 bridge to 0.5 mi. downstream, 16 May 1970, R.A. Kuehne, J. L. Wilson, and D.A. Etnier (RAK No. 143).

RC *Etheostoma sellare* (preserved adult). Disposition unknown. Maryland: Harford Co., Deer Creek 1.2 mi. above confluence with Susquehanna River, at Stafford Road crossing. (Photographed specimen among those listed by Knapp [1976]).

RB *Etheostoma swannanoa* (breeding male). Disposition unknown. Tennessee: Sevier Co., West Prong of Little Pigeon River near Norton Creek, just N of Gatlinburg, 21 May 1970, R.A. Kuehne and J.W. Small (RAK No. 144) (J.W. Small, pers. comm.).

PLATE 10

LT *Etheostoma tetrazonum* (breeding male, 53.0 mm SL). UF 43612. Missouri: Dallas Co., Niangua River at Moon Valley Ford, 15 May 1968, R.A. Kuehne et al. (RAK No. 41).

LC *Etheostoma thalassinum* (adult male, 50.5 mm SL). UF 43972. North Carolina: McDowell Co., Crooked Creek approx. 1.5 mi. SE of Old Fort, 23 May 1970, R.A. Kuehne et al. (RAK No. 145).

LB *Etheostoma variatum* (breeding male, 74.5 mm SL). UF 43654. Kentucky: Breathitt Co., Buckhorn Creek 0.75 mi. above mouth, below Laurel, 1 June 1968, R.A. Kuehne et al. (RAK No. 51).

RT *Etheostoma zonale zonale* (= *E. zonale*) (breeding male, 43.0 mm SL). UF 43536. Kentucky: Powell Co., Red River at iron bridge, N of Nada, 27 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 29).

RC *Etheostoma zonale lynceum* (= *E. lynceum*) (breeding male, 39.0 mm SL). UF 43933. Mississippi: Copiah Co., Bayou Pierre at st. rte. 18 bridge, 16 March 1970, R.A. Kuehne and R.W. Barbour (RAK No. 132) (photograph of right side of specimen, reversed on plate).

RB *Etheostoma atripinne* (= *E. simoterum atripinne*) (breeding male). Provenance and disposition unknown.

PLATE 11

LT *Etheostoma baileyi* (breeding male, 37.5 mm SL). UF 43533. Kentucky: Powell Co., Red River at iron bridge, N of Nada, 27 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 29).

LC *Etheostoma barrenense* (breeding male). Provenance and disposition unknown.

LB *Etheostoma coosae* (breeding male, 46.0 mm SL). UF 43548. Georgia: Floyd Co., cave spring in Cave Springs, and Montgomery Branch 1 mi W of Cave Springs, 3 May 1968, R.A. Kuehne and R.W. Barbour (RAK No. 34A).

RT *Etheostoma duryi* (breeding male, 57.5 mm SL). UF 43505.

- Tennessee: Lawrence Co., West Branch of Shoal Creek 1 mi. N of Alabama state line, 21 April 1968, R.A. Kuehne and R.W. Barbour (RAK No.23).
- RC *Etheostoma etnieri* (breeding male). Disposition unknown. Tennessee: White Co., Cherry Creek at st. rte. 84 bridge near Sparta, 19 April 1970, R.A. Kuehne and J.W. Small (RAK No.137) (J.W. Small, pers. comm.).
- RB *Etheostoma rafinesquei* (breeding male, 44.0 mm SL). UF 43789. Kentucky: Edmonson Co., Bylew Creek at Bylew Cave, 5 April 1969, R.A. Kuehne and R.W. Barbour (RAK No. 83).

PLATE 12

- LT *Etheostoma simoterum* (= *E. simoterum simoterum*) (breeding male, 55.5 mm SL). UF 43765. Tennessee: Hawkins Co., Bradley Creek at U.S. hwy. 11 bridge, 22 March 1969, R.A. Kuehne et al. (RAK No. 74).
- LC *Etheostoma (Ulocentra)* sp. ("Golden snubnose darter") (= *E. flavum*) (breeding male, 45.5 mm SL). UF 43914. Tennessee: Humphreys Co., Blue Creek at st. rte. 19 bridge, approx. 2.5 mi. S. of Waverly, 25 October 1969, R.A. Kuehne and R.W. Barbour (RAK No. 114).
- LB *Etheostoma (Ulocentra)* sp. ("Redbelly snubnose darter") (breeding male, 42.7 mm SL). UF 44011. Alabama: Calhoun Co., Shoal Creek 1 mi. E of White Plains, 10 April 1972, R.A. Kuehne and J.W. Small (RAK No. 172).
- RT *Etheostoma (Ulocentra)* sp. ("Gulfcoast snubnose darter") (breeding male). Disposition unknown. Probably from Alabama: Escambia Co., branch of Escambia River at st. rte. 31 bridge, near Atmore, 8 April 1972, R.A. Kuehne and J.W. Small (RAK No. 167).
- RC *Etheostoma (Ulocentra)* sp. ("Black Warrior snubnose darter") (breeding male, 47.0 mm SL). UF 44006. Alabama: Jefferson Co., Turkey Creek at st. rte. 79 bridge, N of Pinson, 10 April 1972, R.A. Kuehne and J. W. Small (RAK No. 171).
- RB *Etheostoma (Ulocentra)* sp. ("Upland snubnose darter") (breeding male, 43.7 mm SL). UF 44011. Alabama: Calhoun Co., Shoal Creek near White Plains, 10 April 1972, R.A. Kuehne and J.W. Small (RAK No. 172).

PLATE 13

- LT *Etheostoma (Ulocentra)* sp. ("Tallapoosa snubnose darter") (breeding male, 41.0 mm SL). UF 44000. Alabama: Elmore Co., southern tributary creek NW of Red Hill at st. rte. 229 bridge, 9 April 1979, R. A. Kuehne and J.W. Small (RAK No. 170).
- LC *Etheostoma jessiae* (breeding male, 53.5 mm SL). UF 43507. Tennessee: Lawrence Co., West Branch Shoal Creek 1 mi. N of Alabama state line, 21 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 23).
- LB *Etheostoma stigmaeum* (breeding male, 34.5 mm SL). UF 43481. Alabama: Tuscaloosa Co., Cottondale Creek at Keene Mill Rd. bridge, 19 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 21).

- RT *Etheostoma stigmaeum* (breeding male, 34.0 mm SL). UF 43827. Kentucky: Jackson Co., North Fork of Rockcastle River at st. rte. 82 bridge, near Jackson Co. line, 20 May 1969, R.A. Kuehne and R.W. Barbour (RAK No. 92).
- RC *Etheostoma longimanum* (breeding male, 54.0 mm SL). UF 43683. Virginia: Botetourt Co., Barbour's Creek at st. rte. 42 bridge, 5 mi. E of Newcastle, 3 June 1968, R.A. Kuehne et al. (RAK No. 55A).
- RB *Etheostoma nigrum* (breeding male). Provenance and disposition unknown.

PLATE 14

- LT *Etheostoma olmstedii* (adult male, 59.0 mm SL). UF 43756. North Carolina: Moore Co., stream below Southern Pines Golf Course, Southern Pines, 21 March 1969, R.A. Kuehne et al. (RAK No. 71).
- LC *Etheostoma perlongum* (young adult, 60.5 mm SL). UF 43749. North Carolina: Columbus Co., Lake Waccamaw, N shore and side pond, 19 March 1969, R.A. Kuehne et al. (RAK No. 70).
- LB *Etheostoma podostemone* (breeding male, 44.5 mm SL). UF 43815. Virginia: Franklin Co., Blackwater River at old U.S. hwy. 220 bridge, 16 May 1969, R.A. Kuehne and R.W. Barbour (RAK No. 86).
- RT *Etheostoma vitreum* (adult male, 50.0 mm SL). UF 43987. Virginia: Franklin Co., Pigg River along co. rte. 908, 8 air mi. SW of Rocky Mount, 14 March 1971, R.E. Jenkins et al. (RAK No. 163 and REJ 433).
- RC *Etheostoma chlorosomum* (adult female). Provenance and disposition unknown.
- RB *Etheostoma acuticeps* (adult male, 52.5 mm SL). Roanoke College uncat. Virginia: Washington Co., South Fork Holston River along co. rte. 711, between jct. rtes. 710-711 and jct. rtes. 711-810, 11 November 1972, R.E. Jenkins et al. (REJ 608).

PLATE 15

- LT *Etheostoma aquali* (adult male, length unknown). UT91.1673. Tennessee: Hickman Co., Duck River at st. hwy. 50, 0.25 air mi. SW of Centerville, 17 April 1985, D.E. Etnier et al. (Specimen now cleared and stained).
- LC *Etheostoma bellum* (breeding male). Provenance and disposition unknown.
- LB *Etheostoma camurum* (breeding male, 56.5 mm SL). UF 43906. Kentucky: Pulaski Co., Buck Creek at st. rte. 192 bridge, 13 October 1969, R.A. Kuehne and J.W. Small (RAK No.111).
- RT *Etheostoma chlorobranchium* (adult male). Disposition unknown. Tennessee: Sevier Co., West Prong of Little Pigeon River near Norton Creek, just N of Gatlinburg, 21 May 1970, R.A. Kuehne and J.W. Small (RAK No. 144) (J.W. Small, pers. comm.; collection of specimen discussed on p. 114 of book).
- RC *Etheostoma jordani* (breeding male, 39.0 mm SL). UF 43541.

Tennessee: Polk Co., Conasauga River at U.S. hwy. 441 bridge, 2 May 1968, R.A. Kuehne and R.W. Barbour (RAK No. 30).

- RB *Etheostoma juliae* (breeding male). Disposition unknown. Probably from Missouri: Greene Co., James River at st. rte. 125 bridge, about 8-10 air mi. SE of center of Springfield, 17 May 1968, R.A. Kuehne, R.W. Barbour, and C. Ernst (RAK No. 45) (J.W. Small, pers. comm.).

PLATE 16

- LT *Etheostoma maculatum maculatum* (= *E. maculatum*) (adult male, 47.5 mm SL). UF 43882. Kentucky: Casey Co., Green River 5 mi. W of Dunnville, 21 September 1969, R.A. Kuehne et al. (RAK No. 106).
- LC *Etheostoma maculatum sanguifluum* (= *E. sanguifluum*) (adult male, 70.0 mm SL). UF 43949. Tennessee: Scott Co., Big South Fork of Cumberland River at Station Camp Creek, 18 April 1970, R. A. Kuehne and J.W. Small (RAK No. 136).
- LB *Etheostoma maculatum vulneratum* (= *E. vulneratum*) (breeding male, 52.0 mm SL). UF 43965. Tennessee: Blount Co., Little River at U.S. hwy. 411 bridge near Maryville, 15 May 1970, R.A. Kuehne et al. (RAK No. 142).
- RT *Etheostoma microlepidum* (breeding male, 48.5 mm SL). UF 43463. Tennessee: Rutherford Co., Stones River 5 mi. N of Kitrell, 22 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 24).
- RC *Etheostoma moorei* (breeding male, 48.0 mm SL). UF 44101. Arkansas: Van Buren Co., Middle Fork of Little Red River just downstream from st. rte. 9 bridge (T12N, R13W, Sec 25), 21 May 1975, T.M. Buchanan and W. Shepherd.
- RB *Etheostoma rubrum* (adult male, 35.5 mm SL). UF 43934. Mississippi: Copiah Co., Bayou Pierre at st. rte. 18 bridge, 16 March 1970, R.A. Kuehne and R.W. Barbour (RAK No. 132).

PLATE 17

- LT *Etheostoma rufilineatum* (breeding male, 59.5 mm SL). UF 43580. Tennessee: Overton Co., West Fork of Obey River at st. rte. 85 bridge, near Crawford, 5 May 1968, R.A. Kuehne and R.W. Barbour (RAK No. 37).
- LC *Etheostoma tippecanoe* (breeding male, 25.0 mm SL). UF 44018. Kentucky: Owsley Co., South Fork of Kentucky River at Booneville, 13 August 1972, R.A. Kuehne, J. and C. Small (RAK No. 174).
- LB *Etheostoma edwini* (adult male, 32.0 mm SL). UF 43725. Florida: Columbia-Suwannee Co., Ichetucknee River at U.S. hwy. 27 bridge, 17 March 1969, R.A. Kuehne et al. (RAK No. 67).
- RT *Etheostoma okaloosae* (adult female). Disposition unknown. Probably from Florida: Okaloosa Co., stream entering Choctawatchee Bay at Niceville, or at st. rte. 285 bridge 7 mi. N of Niceville, 22 March 1968, R.A. Kuehne, R.W. Barbour, and W. Davis (RAK 16 or 17).

- RC *Etheostoma boschungii* (breeding male). Provenance and dis-

position unknown; probably from Cypress Creek, Alabama or Tennessee.

- RB *Etheostoma cragini* (breeding male, 44.0 mm SL). UF 43361. Missouri: Jasper Co., spring at st. rte. F bridge, 0.25 mi. W of st. rte. 37 intersection, 31 May 1969, R.A. Kuehne and R.W. Barbour (RAK No. 100).

PLATE 18

- LT *Etheostoma pallidiorum* (preserved male, 37.8 mm SL). UF 43930. Arkansas: Montgomery Co., Caddo River 7 mi. W of Black Springs, 7 March 1970, P. Hambrick et al. (RAK No. 129).
- LC *Etheostoma punctulatum* (breeding male). Provenance and disposition unknown.
- LB *Etheostoma trisella* (young female, 35.0 mm SL). UF 43968. Tennessee: Polk Co., Conasauga River at st. rte. 74 bridge to 0.5 mi. downstream, 16 May 1970, R.A. Kuehne, J.L. Wilson, and D.A. Etnier (RAK No. 143).
- RT *Etheostoma australe* (preserved adult). Provenance and disposition unknown.
- RC *Etheostoma asprigene* (breeding male, 46.5 mm SL). UF 43860. Arkansas: Green Co., Locust Creek ditch 5 mi. E of Paragould, 3 June 1969, R.A. Kuehne and R.W. Barbour (RAK No. 102).
- RB *Etheostoma caeruleum* (breeding male, 42.5 mm SL). UF 43630. Missouri: Christian Co., Swan Creek at st. rte. 125 bridge, 17 May 1968, R.A. Kuehne et al. (RAK No. 46).

PLATE 19

- LT *Etheostoma collettei* (breeding male, 43.5 mm SL). UF 43925. Louisiana: Union Psh., Meridian Creek at st. rte. 348 bridge, 0.25 mi. E of Conway, 15 March 1970, R.A. Kuehne, R.W. Barbour, and N.H. Douglas (RAK No. 126).
- LC *Etheostoma ditrema* (breeding male, 48.0 mm SL). UF 44015. Georgia: Murray Co., spring at intersection of st. rte. 225, near Conasauga River, 10 April 1972, R.A. Kuehne and J.W. Small (RAK No. 173).
- LB *Etheostoma exile* (adult male, 35.0 mm SL). UF 44037. Wisconsin: Portage Co., Collins Lake (T25N, R10E, Sec. 31), 19 November 1975, B. McKee and G. Lutterbie.
- RT *Etheostoma fricksium* (breeding male, length unknown). UT 91.2024. South Carolina: Aiken Co., Upper Three Runs Creek at co. rd. 114, lowest culvert crossing above Savannah River Plant Reservation, 19 May 1980, D.A. Etnier et al. (Specimen now cleared and stained).
- RC *Etheostoma grahami* (breeding male, putative specimen = 40.5 mm SL). UF 43408. Texas: Val Verde Co., Devil's River at Hudspeth Springs, below Juno, 18 March 1968, R.A. Kuehne et al. (RAK No. 10). No specimen was found that unequivocally matches the photograph, but a single distorted specimen (40.5 mm SL) had a Barbour tag tied around the body.
- RB *Etheostoma hopkinsi hopkinsi* (adult male, 41.0 mm SL). UF

43743. Georgia: Telfair Co., spillway of lake at Little Ocmulgee State Park, near McRae, 18 March 1969, R.A. Kuehne et al. (RAK No. 69).

PLATE 20

- LT *Etheostoma lepidum* (breeding male, 31.0 mm SL). UF 43401. Texas: Uvalde Co., Nueces River at U.S. hwy. 90 bridge, 17 March 1968, R.A. Kuehne et al. (RAK No. 9).
- LC *Etheostoma luteovinctum* (breeding male, 42.0 mm SL). UF 43958. Tennessee: Coffee Co., spring crossing at st. rte. 55 bridge, 6.4 mi. NE of Forest Mills, 19 April 1970, R.A. Kuehne and J.W. Small (RAK No. 138).
- LB *Etheostoma mariae* (breeding male, 48.5 mm SL). UF 43755. North Carolina: Moore Co., stream below Southern Pines Golf Course, Southern Pines, 21 March 1969, R.A. Kuehne et al. (RAK No. 71).
- RT *Etheostoma nuchale* (breeding male, 34.0 mm SL). UF 43443. Alabama: Jefferson Co., Glen Springs, Bessemer, 19 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 20).
- RC *Etheostoma parvipinne* (breeding female, 48.3 mm SL). UF 43923. Louisiana: Union Psh., spring trickle along st. rte. 2, approx. 9 mi. E of Farmerville, 15 March 1970, R.A. Kuehne et al. (RAK No. 125).
- RB *Etheostoma pottsi* (adult male). Baylor University uncat. Mexico: Estado Durango, Río Peñon Blanco del Covadonga, at Peñon Blanco, 5 January 1976, A. Echelle et al.

PLATE 21

- LT *Etheostoma radiosum* (breeding male, 50.5 mm SL). UF 43376. Arkansas: Glenwood-Pike Co., Caddo River at old low-water bridge, below old iron RR bridge, behind cemetery, 14 March 1968, R. A. Kuehne et al. (RAK No. 2).
- LC *Etheostoma spectabile spectabile* (breeding male, 40.0 mm SL). UF 43441. Kentucky: Fayette Co., upper end of Shelby Branch, Hickman Creek, 7 April 1968, R.A. Kuehne and R.W. Barbour (RAK No. 19).
- LB *Etheostoma spectabile squamosum* (breeding male, 44.0 mm SL). UF 43364. Missouri: Jasper Co., spring at st. rte. F bridge, 0.5 mi. W of st. rte. 37 intersection, 31 May 1969, R.A. Kuehne and R. W. Barbour (RAK No. 100).
- RT *Etheostoma swaini* (breeding male). Provenance and disposition unknown.
- RC *Etheostoma whipplei whipplei* (breeding male, 77.5 mm SL). UF 43929. Louisiana: Ouachita Psh., Cheniere Creek at Cheniere, SW of Monroe, 13 March 1970, N. Douglas and T. Guidroz (RAK No. 128).
- RB *Etheostoma whipplei artesiaie* (young male, 36.0 mm SL). UF 43941. Alabama: Choctaw Co., small creek beside Bladon Springs, 17 March 1970, R.A. Kuehne and R.W. Barbour (RAK No. 133).

PLATE 22

- LT *Etheostoma barbouri* (breeding male, 46.0 mm SL). UF 44039. Kentucky: Casey Co., South Fork of Green River at U.S. hwy. 421 bridge, 18 April 1982, R.A. Kuehne et al.
- LC *Etheostoma flabellare* (breeding male, 46.0 mm SL). UF 43779. Kentucky: Clinton Co., Smith Creek at st. rte. 696 bridge, approx. 2 mi. SE of Albany, 2 April 1969, R.A. Kuehne and R.W. Barbour (RAK No. 77).
- LB *Etheostoma kennicotti* (adult male, 35.0 mm SL). UF 44021. Tennessee: Campbell Co., trib. of Elk River near Elk Valley, 18 March 1974, R.A. Kuehne et al. (RAK No. 180-74).
- RT *Etheostoma neopterum* (adult male, 43.5 mm SL). UF 43959. Tennessee: Benton Co., Sycamore Creek at st. rte. 69 bridge, 0.5 mi. E of Holladay, 19 April 1970, R.A. Kuehne and J.W. Small (RAK No. 139).
- RC *Etheostoma obeyense* (breeding male, 52.0 mm SL). USNM 204345. Kentucky: Clinton Co., Smith Creek at co. rte. 69, 2 mi. SE of Albany, 3 April 1969, R.A. Kuehne and R.W. Barbour. (Photograph also appeared in Fig. 1 in Kuehne and Small [1971]).
- RB *Etheostoma olivaceum* (breeding male, 49.0 mm SL). UF 43782. Tennessee: DeKalb Co., Dry Creek at st. rte. 70 bridge, 4 April 1969, R.A. Kuehne and R.W. Barbour (RAK No. 79).

PLATE 23

- LT *Etheostoma smithi* (breeding male, 50.5 mm SL). UF 44034. Kentucky: Livingston Co., Ferguson Creek at st. rte. 70 bridge, 5 mi. E of Smithland, 31 May 1982, R.A. Kuehne and P. Hudgins.
- LC *Etheostoma squamiceps* (breeding male, 62.0 mm SL). UF 43791. Kentucky: Edmonson Co., Bylew Creek at Bylew Cave, 5 April 1969, R.A. Kuehne and R.W. Barbour (RAK No. 83).
- LB *Etheostoma striatulum* (breeding male, 45.5 mm SL). UAIC 10022.01. Tennessee: Bedford Co., Hurricane Creek at un-numbered co. rd. crossing, 2.8 air mi. N of Elbethel, 21 March 1979, D. Nieland and B.A. Bauer (DN 79-23).
- RT *Etheostoma virgatum* (breeding male, 50.5 mm SL). USNM 204350. Kentucky: Rockcastle-Jackson Co., Horse Lick Creek, approx. 1 mi. above mouth, 6 October 1969, R.A. Kuehne and J.W. Small (RAK No. 110) (Photograph also appeared in Fig. 1 in Kuehne and Small [1971]).
- RC *Etheostoma collis* (breeding male, 39.5 mm SL). UF 43760. North Carolina: Stanley Co., small creek at st. rte. 24 bridge, near county line, date undetermined, R.A. Kuehne and R.W. Barbour et al. (RAK No. 72).
- RB *Etheostoma fusiforme barratti* (adult male, 42.5 mm SL). UF 43742. Georgia: Telfair Co., spillway of lake at Little Ocmulgee State Park, near McRae, 18 March 1969, R.A. Kuehne et al. (RAK No. 69).

PLATE 24

- LT *Etheostoma gracile* (breeding male). Provenance and disposition unknown.
- LC *Etheostoma saluda* (breeding male, 45.0 mm SL). UF 44033. South Carolina: Saluda Co., Persimmon Creek at st. rte. 121 bridge, approx. 5 mi. N of Saluda, 20 March 1974, R.A. Kuehne et al. (RAK No. 184).
- LB *Etheostoma serriferum* (young adult). Provenance and disposition unknown.
- RT *Etheostoma fonticola* (breeding male, 24.0 mm SL). UF 43395. Texas: Hays Co., San Marcos River at old cotton gin crossing, 16 March 1968, R.A. Kuehne et al. (RAK No. 7).
- RC *Etheostoma microperca* (breeding male, 27.5 mm SL). UF 43855. Missouri: Wright Co., Woods Fork of Gasconade River, 5.5 mi. W of Hartville, 30 May 1969, R.A. Kuehne and R.W. Barbour (RAK No. 98).
- RB *Etheostoma proeliare* (breeding male). Disposition unknown. Probably from Louisiana: Union Psh., Meridian Creek at st. rte. 348 bridge, 0.25 mi. E of Conway, 15 March 1970, R.A. Kuehne, R.W. Barbour, and N.H. Douglas (RAK No. 126) (J.W. Small, pers. comm.).

LITERATURE CITED

- Bailey, R.M. and D.A. Etnier. 1988. Comments on the subgenera of darters (Percidae) with descriptions of two new species of *Etheostoma* (*Ulocentra*) from southeastern United States. Univ. Michigan Museum of Zoology Misc. Publ. No. 175:48 pp.
- Barbour, R.W. 1985. Robert Andrew Kuehne 1927-1984. *Copeia* 1985(2):528-529.
- Burr, B.M. and M.L. Warren, Jr. 1986. A distributional atlas of Kentucky fishes. Kentucky Nature Preserves Commissions, Scientific and Technical Series No. 4, 398 pp.
- Etnier, D.A. and W.C. Starnes. 1986. *Etheostoma lynceum* removed from the synonymy of *E. zonale* (Pisces, Percidae). *Copeia* 1986 (3):832-836.
- Etnier, D.A. and J. D. Williams. 1989. *Etheostoma* (*Nothonotus*) *wapiti* (Osteichthyes:Percidae), a new darter from the southern bend of the Tennessee River system in Alabama and Tennessee. Proceedings of the Biological Society of Washington 102(4):987-1000.
- Howell, W. M. 1968. Taxonomy and distribution of the percoid fish, *Etheostoma stigmaeum* (Jordan), with the validation and redescription of *Etheostoma davisoni*. Ph.D. dissertation, University of Alabama.
- Knapp, L.W. 1976. Redescription, relationships and status of the Maryland darter, *Etheostoma sellare* (Radcliffe and Welsh), an endangered species. Proceedings of the Biological Society of Washington 89(6):99-118.
- Kuehne, R.A. and R.W. Barbour. 1983. The American Darters. University Press of Kentucky. 177 pp.
- Kuehne, R.A. and J.W. Small, Jr. 1971. *Etheostoma barbouri*, a new darter (Percidae, Etheostomatini) from the Green River with notes on the Subgenus *Catonotus*. *Copeia* 1971 (1):18-26.
- Page, L.M. 1985. Evolution of reproductive behaviors in percoid fishes. Illinois Natural History Survey Bulletin 33(3):275-295.
- Page, L.M. and B.M. Burr. 1991. A field guide to freshwater fishes (North America north of Mexico). The Peterson Field Guide Series. Houghton Mifflin Co., Boston. xiv + 432 pp.
- Page, L. M. and R.L. Mayden. 1981. The life history of the Tennessee snubnose darter, *Etheostoma simoterum* in Brush Creek, Tennessee. Illinois Natural History Survey Biological Notes No. 117:11pp.
- Pflieger, W.L. 1975. The fishes of Missouri. Missouri Department of Conservation, 343 pp.
- Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. Common and Scientific Names of Fishes from the United States and Canada. American Fisheries Society Special Publication 20:1-1983.
- Simons, A.M. In press (a). The phylogenetic relationships of the crystal darter, *Crystallaria asprella*. *Copeia*.
- Simons, A. M. In press (b). The phylogenetic relationships of the *Boleosoma* species group. In: R.L. Mayden (ed.), Systematics, Historical Ecology, and North American Freshwater Fishes. Stanford Univ. Press, Stanford, California.