

4-1-1995

The Auburn University Museum Fish Collection

Henry L. Bart Jr.

Michael S. Taylor

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

 Part of the [Marine Biology Commons](#)

Recommended Citation

Bart, Henry L. Jr. and Taylor, Michael S. (1995) "The Auburn University Museum Fish Collection," *Southeastern Fishes Council Proceedings*: No. 31.

<https://doi.org/10.7290/sfcp31e269>

Available at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss31/6>

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>.

The Auburn University Museum Fish Collection

We have identified an effect of fixing and preservation on the ratio of urogenital papilla length to branchial length. If this ratio is to be used effectively in comparisons among lamprey taxa or among populations from different geographic locations, then not only should all lampreys be at a comparable reproductive state (Kott et al., 1988), but all should be treated identically with respect to fixing and preservation. Differences among individuals or groups with respect to types or concentrations of preservatives, or with respect to schedules of fixing and preservation, might contribute to variability that obscures taxonomic differences, or worse, to biases that are confounded with taxonomic effects.

ACKNOWLEDGEMENTS

We thank John Lyons and Doug Basten for assistance in the field. John Lyons also provided curatorial support and reviewed an earlier draft of this manuscript. Our field work was funded in part by a travel stipend from the St. Norbert College Faculty Development Fund, and it was conducted under a permit granted to John Lyons by the Mississippi Department of Wildlife, Fisheries and Parks. Voucher specimens have been placed in the ichthyological collections at the University of Wisconsin-Madison and the University of Southern Mississippi.

LITERATURE CITED

- Beamish, F.W.H. 1982. Biology of the southern brook lamprey, *Ichthyomyzon gagei*. *Environmental Biology of Fishes* 7: 305-320.
- Cochran, P.A. 1987. The southern brook lamprey (*Ichthyomyzon gagei*) in the St. Croix River drainage of Wisconsin and Minnesota. *Copeia* 1987: 443-446.
- Cochran, P.A. and J.E. Marks. In press. Biology of the silver lamprey, *Ichthyomyzon unicuspis*, in Green Bay and the lower Fox River, with a comparison to the sea lamprey, *Petromyzon marinus*. *Copeia*.
- Cochran, P.A. and T.C. Pettinelli. 1988. Northern and southern brook lampreys (*Ichthyomyzon fossor* and *I. gagei*) in Minnesota. *Journal of the Minnesota Academy of Science* 54: 23-27.
- Docker, M.F., and F.W.H. Beamish. 1991. Growth, fecundity, and egg size of least brook lamprey, *Lampetra aepyptera*. *Environmental Biology of Fishes* 31: 219-227.
- Kott, E., C.B. Renaud and V.D. Vladykov. 1988. The urogenital papilla in the Holarctic lamprey (Petromyzontidae). *Environmental Biology of Fishes* 23: 37-43.
- Morkert, S.B. and R.A. Bergstedt. 1990. Shrinkage of sea lamprey larvae preserved in formalin. *North American Journal of Fisheries Management* 10: 484-486.
- Sneen, M.E. and P.A. Cochran. 1990. A comparison of urogenital papilla length in northern and southern populations of southern brook lampreys (*Ichthyomyzon gagei*). Abstract, 70th Annual Meeting, American Society of Ichthyologists and Herpetologists, Charleston, South Carolina.

MUSEUM NOTES

The Auburn University Museum Fish Collection

Henry L. Bart, Jr. and Michael S. Taylor
Tulane University Museum of Natural History
Belle Chasse LA 70037

HISTORY

The Auburn University Museum fish collection (standard symbolic code - AUM, Leviton et al., 1985; Leviton and Gibbs, 1988: 281 [address correction]) was established in 1930 by entomologist, Frank E. Guyton. Guyton collected fishes while sampling streams of east-central Alabama with students from the Alabama Polytechnic Institute (A.P.I.), the forerunner of Auburn University. Specimens from these early

collections formed the basis of descriptions and systematic treatments of taxa such as the redeye bass *Micropterus coosae* (holotype and paratypes; Hubbs and Bailey, 1940), Alabama spotted bass *M. punctulatus henshalli* (paratypes; Hubbs and Bailey, 1940), bronze darter *Percina palmaris* (paratypes; Bailey, 1940), and eastern redbfin darter *Etheostoma whipplii artesia* (specimens used in color description; Hubbs and Black, 1941). In fact, A.P.I. specimens and Guyton's contributions are acknowledged, in all of the above works. In most instances, A.P.I. specimens were donated to Michigan and are now cataloged in the Museum of Zoology. However, in a few cases (notably *Micropterus coosae* and *M. p. henshalli*) paratypes were retained at A.P.I., and are now part of the AUM fishes type collection.

The AUM fish collection built up gradually through the efforts of Guyton, and fisheries biologists such as H.S. Swingle, John D. Black, and Jack S. Dendy. William Smith-Vaniz, a student of Dendy's, contributed numerous collections and used the Auburn Fish Collection as the basis for a Master of Science thesis, which culminated with the publication of

Freshwater Fishes of Alabama, in 1968.

Growth and use of the Auburn fish collection was greatest during the period 1967-1983, when the collection was under the care of John S. Ramsey. Ramsey brought to Auburn University the experience in collection building and quality care he had gained as a student of Royal D. Suttkus at Tulane University. Under Ramsey's tenure as curator, regional holdings were substantially increased, and material from a number of foreign countries was added. Many of the foreign collections were obtained by students and faculty in Auburn's internationally renowned Fisheries and Allied Aquacultures Program. A backlog of international collections lacking proper collection data accumulated, and this, together with specimens Ramsey obtained through the local aquarium trade, formed the basis of a diverse teaching collection, which Ramsey used in courses such as general and systematic ichthyology. Ramsey and his students used the main research collection in studies of taxonomy, life history, conservation, and hybridization (e.g., Mathur, 1973; Mathur and Ramsey, 1974; Wallace and Ramsey, 1981; Timmons et al., 1983; Wieland, 1984; Johnson and Ramsey, 1990). In addition to curating the fish collection, and teaching and research responsibilities in both the Fisheries and Zoology departments, Ramsey's served as Leader of the Auburn University Cooperative Fish and Wildlife Research Unit.

Ramsey left Auburn University in 1983. The collection was idle for five years before the senior author was hired Curator in 1988. At the time of the senior author's hiring, the ichthyology position was converted to 100% Zoology with responsibilities divided equally among curating and basic science teaching and research.

The decision was made to move the collection from the Fisheries Building (Swingle Hall) to newly renovated Zoology Department space (the "Physiology Building") on the north end of the Auburn campus. The move was performed by professional movers under the constant supervision of the authors at a cost of \$14,000. In moving the collection, specimens had to be cleared from shelves, and the shelving dismantled and reassembled in the new space before the specimens could be reshelfed. The collection, which had been arranged alphabetically by family in Swingle Hall, was rearranged in phylogenetic family order (following Nelson, 1984) during the move. During the senior author's term as Curator, the emphasis was on curating and improving the collection facility. However, collections from across the southeastern United States (roughly 1,200 lots in all), made in connection with a study of regional influences of stream fish diversity, were added during this time.

The senior author left Auburn in December 1991. The junior author remained at Auburn and cared for the collection until April of 1992. Students of the senior author completing graduate studies at Auburn University provided intermittent care and access to outside researchers until December 1994.

HOLDINGS

The following account on holdings in the AUM fish collection is based primarily on computerized records which represent roughly 80% of all collection records. There are presently 27,695 cataloged lots in the collection as of the last electronically cataloged entry. The 21,677 computerized lots represent 241,043 specimens of 1,199 nominal species, in 510 genera, and 140 families. The Collection is roughly three-fourths freshwater and one-fourth marine. Cyprinids make up roughly 34% of the computerized records; centrarchids 19%; percids 14%; catostomids 6%; ictalurids 5%. Thirty-seven of the 48 contiguous United States plus Alaska, and the territories of Puerto Rico, Guam, and the U.S. Virgin Islands are represented in the collection (21,110 lots in all). The strongest representation is from the southeastern United States (88% of computerized lots), primarily the states of Alabama (10,269 lots), Georgia (4,700 lots), Tennessee (1,874 lots), Mississippi (917 lots), Florida (803) and South Carolina (257 lots). River systems most prominently represented are the Alabama River inclusive of the Tallapoosa, Coosa and Cahaba rivers (6,779 lots or 31%), and the Apalachicola River inclusive of the Chattahoochee, Flint and Chipola rivers (4,190 lots or 19%).

International representation in the collection is also very good. The following foreign countries are represented: Mexico, Guatemala, Belize, Honduras, Nicaragua, Colombia, Ecuador including the Galapagos Islands, Peru, Brazil, Bolivia, Argentina, Uruguay, Dominican Republic, Haiti, Jamaica, Norway, Liberia, Mali, Niger, Cameroon, Central African Republic, Indonesia, the Philippines, and Taiwan. In all, there are 1,248 cataloged lots of international fishes with at least this many more lots in unsorted and uncataloged backlog. Roughly 70% of the international material is from the fresh waters of South America, principally the Amazon Basin.

The total backlog of unsorted and uncataloged material is estimated at between 9,000 and 11,000 lots. Included in this material are collections from a number of regional faunal surveys such as the West Point Reservoir (Chattahoochee River) pre-impoundment survey. At the time of the fish collection's move to its present location, the backlog material was boxed and stored in the basement of the Forestry Building (Smith Hall) directly adjacent to the Fisheries Building. The material was inventoried in 1991 to assess curatorial needs and to establish accessioning priorities. None of the backlog was accessioned during the authors' tenure at Auburn. However, all international collections and the West Point Reservoir pre-impoundment survey collections were transferred to the main fish collection facility. The remainder of the backlog material is still in the basement of Smith Hall with no climate control. Most recently, the Forestry Department has been pressuring the Zoology Department to transfer the remaining backlog material to Zoology Department space.

The following nominal species/subspecies are represented by types (secondary only): *Scaphirhynchus suttkusi* Williams and Clemmer, *Camptostoma pauciradii* Burr and Cashner, *Notropis cahabae* Mayden and Kuhajda, *Fundulus julisia* Williams and Etnier, *Micropterus coosae* Hubbs and Bailey, *Micropterus punctulatus henshalli* Hubbs and Bailey, *Etheostoma brevirostrum* Suttkus and Etnier, *Etheostoma etnieri* Bouchard, *Etheostoma flavum* Etnier and Bailey, *Etheostoma lachneri* Suttkus and Bailey, *Etheostoma pyrrhogaster* Bailey and Etnier, *Etheostoma ramseyi* Suttkus and Bailey, *Etheostoma raneyi* Suttkus and Bart, *Etheostoma tallapoosae* Suttkus and Etnier, *Etheostoma zonistium* Bailey and Etnier, *Percina brevicauda* Suttkus and Bart, and *Percina palmaris* Bailey. Types and osteological specimens (cleared and stained and dry skeletons) are stored in a wall-mounted cabinet in a secured room housing lower fishes (see below).

CURATION

The fish collection is presently housed in two adjoining rooms in the Physiology Building on the north side of the Auburn University campus. The collection is arranged phylogenetically in Nelson (1984) family order. Agnathans through scorpaeniformes and all type specimens are housed in one of the rooms; perciformes through tetraodontiformes are housed in the other. The room housing higher fishes has a low ceiling that can only accommodate 7 ft-high shelves. The room has entryways on both ends connected by a corridor. Physiologists use the corridor to access labs in the rear (west) wing of the building, and as an emergency evacuation route. The front (north) entryway is a keyless, self-closing door with signs warning against unauthorized entry. The rear entry is an open archway connecting the collection room to a small work area for visitors. A double steel door at the rear of the visitor area has a panic bar for rapid escape from inside the building, and a coded key-pad lock to restrict access to the building from outside. The room housing lower fishes has a ceiling high enough to accommodate 10 ft-high shelves. It has a single, keyed entry and, thus, is more secure than the "low-ceiling room".

The vast majority of lots in the collection are fluid preserved; "cleared and stained" and dry skeleton lots number fewer than 200. The fluid collection is preserved in both ethanol (70%) and isopropanol (45-50%). The earliest collections, including all of the A.P.I. material, are preserved in ethanol. Until recently, all of the rest of the collection was preserved in isopropanol.

The early collections and some of the more valuable recent material are stored in high quality, bail-top jars. Jar labels in use throughout the collection are a heavy parchment type. Jars with baked resin lids were used extensively in the collection in the 1970's and early 1980's. Temperature control was a problem in the Fisheries Building (Swingle Hall). The temperature changes caused the resin lids to loosen and alcohol levels to back off. To control this, Ramsey started a practice of sealing the jars with vinyl tape.

In 1989, an ambitious realcoholing effort was started to

convert all of the collection to ethanol. By the end of 1991, half of the collection had been transferred to ethanol. During realcoholing, baked resin lids were replaced with soft-molded polyethylene lids with foam liners. Tank storage in the collection was also upgraded from styrofoam coolers and plastic tubs to museum-quality 36-in stainless-steel tanks.

In the early 1980's, in order to control a growing overflow problem, Ramsey established a policy of discarding or exchanging lots of common species that were already well represented in the collection. In verifying identifications, Ramsey noted which species or which portions of large lots were to be retained. Records for all verified species were entered into the electronic catalog, but only species or individuals that were retained were assigned catalog numbers.

Three different cataloging systems have been in use at different times during the history of the fish collection. Guyton established the first hand-written catalog in 1930 with sequential entries based on date and location of collection, and a listing of species collected. Dendy and Smith-Vaniz established a new cataloging system in 1964 based on accession date. To use an example included in volume one of the hand-written ledger, the number "483-2" would signify the year of accession (1948), the sequence of accession (3rd collection accessioned from that year), and the species entry from the list of captured species (2nd species cataloged from the list of collected species).

Ramsey established a sequential numbering system and recataloged early collections under this system. The sequentially numbered catalog fills seven cloth-bound ledgers. The hand-written catalog was discontinued in October 1983 in favor of an electronic cataloging system. The original electronic system, also established under Ramsey, was in Appleworks format and consisted of locality and species databases linked by a sequential accession number. Accession numbers assigned to collections in the electronic cataloging system are written in pencil to the left of the catalog number for the first lot of each collection. All entries after AUM 23970 are cataloged in the electronic cataloging system. Early collections were accessioned in the order in which they were electronically cataloged, but later collections were apparently accessioned according to Ramsey's research interests. For example, all Coosa River system and Chattahoochee collections were accessioned in sequence. The only interruptions to this sequence were new collections, which were accessioned as they were recataloged. About one-fifth of the collection was computerized during Ramsey's time at Auburn.

The authors modified Ramsey's electronic cataloging system and developed an electronic labeling system. Data from the previous electronic cataloging system were imported into the new system and an additional three-fifths of the collection data were computerized, bringing the total percentage of the collection computerized to the present 80 percent. The new system is based on a dBase IV platform. It consists of separate accession, species, locality and drainage databases linked by a sequential accession number. The accession database includes fields for accession number,

latitude/longitude, field number, date, method and time of collection, collectors, number of species and specimens taken, range of catalog numbers for species lots, and processor, verification and cataloger information (name and date). The species database includes fields for accession number, family number, family, catalog number, genus, subgenus, species, subspecies, authority and type status, and number of specimens seen and kept. The locality database comprises country, state/province, county/district, and locality description fields. The drainage database includes fields for drainage, subdrainage and the specific body of water sampled. A loan database was planned but not completed.

A unique system was developed for generating high-quality jar labels directly from the electronic cataloging system. The system employs a plotter with a rapidograph nib. A program, written in SASgraph, formats a page of 20, 3 x 2 in labels with standard label fields, accepts information from the electronic database, and fills in species, locality, collector, date, etc., in fonts of different types and sizes. The plotter accepts 11x14 sheets of heavy parchment paper, which is an ideal stock for wet labels. A temporary database accumulates "pages" of labels and gives the user the option of saving incomplete pages or printing labels with blank fields. The database is maintained on a 386 IBM compatible PC with two 80 megabyte hard drives.

All collection records and computing equipment are housed in a large room adjoining the "low-ceiling room". The seven-volume hand-written catalog, printouts of all computerized records in accession sheet format, and an assortment of identification manuals and other reference books, are stored on wall-mounted shelves. Loan records and correspondence are stored in a filing cabinet. The filing cabinet also contains a nearly complete file of original descriptions and subsequent systematic treatments of species represented in the collection, a file of reprints of studies that utilized material in the collection, and a listing of all international holdings. Archived with the records are Guyton's original A.P.I. series catalog, copies of Smith-Vaniz's field notes and the original artwork used in *Freshwater Fishes of Alabama*, and field notes for other donated collections.

PRESENT STATUS AND FUTURE PROSPECTS

Craig Guyer, a herpetologist and Curator of Amphibians and Reptiles at Auburn University, has been overseeing use of the collection since 1992. The authors are often consulted when special needs arise. In addition, Mary C. Freeman, who has been affiliated with the National Ecology Research Center's, Stream Ecology Field Station at Auburn University since 1992, is actively working in the collection and helping to facilitate use by outside researchers. Thus, although the collection has been without a curator for over three years, it continues to be used in research, and it is under the watchful eyes of qualified individuals. The most pressing need at the moment is finding new storage space for the backlog material

in the basement of the Forestry Building.

The recent completion of a new Life Sciences building has opened space in the building that presently houses most of the Zoology Department, (Funchess Hall). There are plans to relocate physiologists currently in the Physiology Building to Funchess Hall, and move the amphibian, reptile and vertebrate paleontology collections (and their curators) to the vacated Physiology Building space. Presumably, the move would create sufficient space to accommodate the remaining backlog fish material as well. The Physiology Building presently houses the bird and mammal collections in addition to fishes. Thus, all vertebrate collections should soon be consolidated into a single building.

What is uncertain is when a permanent curator for the fish collection will be hired. Faculty in the Department of Zoology and Wildlife Science (particularly the curators of other AUM collections) understand the importance of the fish collection, and view the hiring of a new curator of fishes as an important priority. Unfortunately, an ichthyologist is not the *top* priority for hire in the Zoology Department. However, expertise in basic ichthyology is also important to the program in Fisheries and Allied Aquacultures. It is conceivable that the two departments could once again share an ichthyology position, especially if the position did not have the added burden of administrative responsibility in the Cooperative Fish and Wildlife Research Unit, as was the case with Ramsey's position. It is hoped that Auburn University will pursue such a position in the very near future, in order to maintain its fish collection and its long tradition in basic ichthyology.

LITERATURE CITED

- Bailey, R.M. 1940. *Hadropterus palmaris*, a new darter from the Alabama River system. J. Washington Acad. Sci. 30: 524-530.
- Hubbs, C.L. and R.M. Bailey. 1940. A revision of the black basses, *Micropterus* and *Huro*, with descriptions of four new forms. Misc. Pap. Mus. Zool. Univ. Mich. 48: 7-49.
- Hubbs, C.L. and J.D. Black. 1941. The subspecies of the American percid fish *Poecilichthys whiplii*. Occ. Pap. Mus. Zool. Univ. Mich. 429, 29pp.
- Johnston, C.E. and J.S. Ramsey. 1990. Redescription of *Semotilus thoreauianus*, a cyprinid fish of the southeastern U.S. Copeia 1990: 119-130.
- Leviton, A.E., R.H. Gibbs, Jr., E. Heal and C.E. Dawson. 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985: 802-832.
- Leviton, A.E. and R.H. Gibbs, Jr. 1988. Standards in herpetology and ichthyology. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Supplement No. 1: Additions and corrections. Copeia 1988: 280-282.

- Mathur, D. 1973. Food habits and feeding chronology of the black-banded darter, *Percina nigrofasciata* (Agassiz), in Halawakee Creek, Alabama. Trans. Amer. Fish. Soc. 102: 48-55.
- Mathur, D. and J.S. Ramsey. 1974. Reproductive biology of the rough shiner, *Notropis baileyi*, in Halawakee Creek, Alabama. Trans. Amer. Fish. Soc. 103: 88-93.
- Nelson, J.S. 1984. Fishes of the World, 2nd Ed. Wiley Interscience, New York, 523pp.
- Timmons, T.J., J.S. Ramsey and B.A. Bauer. 1983. Life history and habitat of the blackfin sucker, *Moxostoma atripinne* (Osteichthyes: Catostomidae). Copeia 1983: 538-541.
- Wallace, R.K., Jr. and J.S. Ramsey. 1981. Reproductive behavior and biology of the bluestripe shiner (*Notropis callitaenia*) in Uchee Creek, Alabama. Amer. Midl. Nat. 106: 214-217.
- Wieland, W.A. 1984. Life history of the bronze darter *Percina palmaris* in the Tallapoosa River, Alabama, pp 83-94 In: L.M. Page (ed.), Environmental biology of darters, W. Junk, The Hague, Netherlands.

REGIONAL SFC REPORTS

REGION I - Northeast

Bob Jenkins at Roanoke College is still redhorsing around. He's trying to track down a complete specimen of the robust redhorse from the Pee Dee River; all he has now is a bag of bones. Chris Sample of SCDNR has been saving specimens for him. No luck so far. Work continues on the sicklefin redhorse. Bob also is attempting to sort out what, at first glance, appeared to be hybrid redhorses from the Pee Dee, but now might be the same as the oddball Mox from the Cape Fear River. His survey work on *Etheostoma osburni* in Virginia revealed no new populations. It is strong in Big Stony Creek and barely persisting in Laurel Fork. The introduced James River *Notropis telescopus* is sweeping through that drainage. It can now be found in the mid-Piedmont below Lynchburg. Bob has a student comparing food habits of it and *N. semperasper* which are now sympatric, a potential problem. Another student is comparing the food habits of young and small juveniles of *Moxostoma carinatum* and when they switch to mollusks.

Work at VPI under Paul Angermeier is winding down from last year. Kevin Leftwich finished his dissertation on habitat models of *Percina burtoni*. Bill Ensign and Kevin did some sampling in Russell Fork of the Ohio drainage and caught the first *Percina maculata* taken in the state since 1937. It was taken 1 km inside the border. Other species of note collected was *Etheostoma blennioides*.

Mike Pinder has taken over for Sue Bruenderman in the Virginia Department of Game and Inland Fisheries, Nongame Section. Mike and his coworkers collected 12 specimens of *Etheostoma acuticeps* at four sites in the South Fork Holston River between the confluence of Laurel Creek and the South Holston Reservoir. They snorkeled and electrofished. None were found above this point, apparently due to water temperature change. They also found a good population of *Etheostoma chlorobranchium* in Laurel Creek. They surveyed two sites (day and night) in Copper Creek, and found one *Etheostoma percnurum*, one *Noturus flavus*, and one

hellbender. There was a heavy load of sediment present. Mike has a meeting planned with local landowners to discuss what they have and the need to protect the fauna. The August issue of *Virginia Wildlife* will be dedicated to Copper Creek. A state fishery biologist located two new populations of *Phoxinus tennesseensis*; a state survey 20 years ago identified them as *oreas*. *Noturus gilberti* was collected in Cowpasture River in the northwest part of the James River drainage.

John Alderman of North Carolina Wildlife, Nongame Section, has been investigating aspects of the life history of *Notropis mekistocholas*. He has found it to have two spawning periods - a primary one in mid-May and a secondary one in August. He is not sure how long it lives, but hopes to determine that this year by examining museum specimens. John also hopes to sample the Cape Fear River below Buckhorn Dam during the primary spawning period to see if it exists in that portion of the river. One issue facing North Carolina is the number of reservoirs permitted and proposed for the piedmont region, particularly in the Neuse River basin. There is one planned near Wilson which will inundate about 1000 acres of wooded wetlands and one on the Little River in Wake County which will impact 700-800 more acres of wetlands. John has been working hard to identify and protect our aquatic resources, especially the mussels and reservoirs obviously have the potential to greatly reduce the aquatic diversity found in North Carolina.

The North Carolina State Museum of Natural Sciences hopes (plans?) on publishing the endangered report on freshwater fishes this year. Ed Menhinick is the editor.

Fritz Rohde (FCR) of the North Carolina Division of Marine Fisheries and Mary Moser of the University of North Carolina at Wilmington have been conducting status surveys on various NC state-listed fishes found in the mountains. The lower French Broad River from Redmon Dam at Marshall down to the North Carolina/Tennessee border was sampled as well as two major tributaries. Also, the Cane River was searched for *Luxilus chrysocephalus*. Two interesting finds were the first capture of *Noturus flavus* from the French Broad drainage and the first state record of *Ichthyomyzon bdellium*.

Rudy Arndt of Richard Stockton College of New Jersey made three trips to South Carolina collecting fishes for the