NEWSLETTER
OF THE EXOTIC FISH SECTION
AMERICAN FISHERIES SOCIETY

May, 1982 William L. Shelton, Editor Volume 2, Number 2

## From the President

We have grown! As of the end of March, we were 9 members short of having voting priveleges in the AFS Executive Committee (EXCOM). While voting priveleges in EXCOM are important, that has never been our major objective. We do want to build a section of members interested in exotic fishes and their many uses. We want members who are cognizant that exotic fishes can cause problems when accidentally released, or that intentionally released exotics may have the potential to create problems from the special traits that resulted in their importation. We need additional members who are interested in diseases and parasites of exotic fishes. We also need more members from the Aquarium Trade, Fish Culture, and supporting industries. Our objectives are simple and clear: to act as a community of scientists and other parties interested in the wise use of importations and introductions of exotic fishes for a variety of purposes, while minimizing adverse impact on native biota and habitat. We are dedicated to open dialogue on the many aspects of introduced fishes, including transplants of native species beyond their historical ranges of distribution.

In the next issue of our Section Newsletter, you will find a ballot for the election of our President-Elect and Secretary-Treasurer for the coming year. Also to be included is our agenda for the Section Meeting to be held at the AFS meeting at Hilton Head, South Carolina in September.

Walt Courtenay

## Where is our Symposium book?

The chapters by Symposium participants (1981 AFS meeting, Albuquerque) were edited by Courtenay and Stauffer in March, 1982. Most chapters have been revised, are stored in the word processor at Frostburg, and are being returned to the authors for final input and corrections. We now have Jim McCann's Preface and the editors' Introduction completed. We anticipate being in press by mid to late July, 1982.

Editors

## From the Editor

Now I can identify with the rationale behind radio call-in contests which permit the DJ access to the audience and the self assurance that someone is listening. We received no response to our requests in the last newsletter for news, meeting announcements, etc. I will repeat, that if your interests are not being reflected in this blurb sheet it is partly because you have not responded. We will have another newsletter before the Annual meeting, so send those cards and letters -- Fisheries Department, Auburn University, Alabama 36849.

## EFS Membership

As reported in the 2 April AFS Diary, our section membership was 191.

## Session Cancelled

The session on, Aspects of Aquarium Fish Farming in Florida, that was planned for the 1982 AFS meeting has been cancelled.

## Book Progress

During the week of 8-12 March, W.R. Courtenay and J.R. Stauffer reviewed and edited chapters for the book, Distribution, Biology and Management of Exotic Fishes. Chapters are being reworked by the authors for return to the editors in May.

## Grass Carp Hybrid Studies

With reference to the hybrid grass carp session that was conducted at the AFS Meeting in Albuquerque, several of the papers are being reviewed for publication in a future issue of TAFS. I am not certain which papers or when they will appear but the availability of this information will be welcome.

## Amended Legislation

An important piece of legislation was passed 16 November 1981, the "Lacey Act Amendments of 1981." The essence of the amended legislation is to designate as unlawful---"for any person---to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce - any fish---possessed, transported or sold in violation of any state law or regulation of any state---. The following succinctly explains some of the ramifications; it was prepared by Dr. John Jensen, Fisheries Specialist, Alabama Cooperative Extension Service, Auburn University, Alabama:

A recent amendment to the Lacey Act (Public Law 97-79) may be particular interest to Alabama producers of grass carp (white amur) and other Chinese carps. The Lacey Act as amended makes violation of any state law regarding possession or transportation of fish or wildlife a federal offense. The penalty is severe, with a maximum fine of $20,000 or 5 years imprisonment or both for each convicted offense.

We contacted several states to determine their laws and regulations related to grass carp. We spoke informally with officials from the following state conservation departments: California, Georgia, Mississippi, New York, Pennsylvania and Florida. Mississippi does not prohibit the grass carp at all and Tennessee allows stocking in certain counties with a permit. The other states expressly prohibit grass carp.

Most states that prohibit grass carp prohibit possessing any form dead or alive. Therefore, an individual transporting grass carp from Alabama to New York, for example, even though the intent is to sell them as food fish and not for stocking purposes, is violating New York State law. The individual is also in violation of the Federal Lacey Act. Many state laws that prohibit possession do not distinguish the form. Therefore, even dressed grass carp may be technically prohibited in many states.

Shipping grass carp in interstate commerce, even through states that otherwise prohibit the fish, is generally not considered illegal. A waybill specifying destination must accompany the shipment and the carrier should be a licensed common carrier.

The various state laws combined with the Lacey Act amendment have serious repercussions for Alabama grass carp producers looking for out-of-state markets. Producers should contact the state of destination for clarification of its laws before arranging for any grass carp shipments to that state. States along the shipping route should also be contacted to determine their policies.

Another important point of the Lacey Act is that the originator of the illegal species is also considered guilty of the violation as well as the transporter and receiver. A letter from the buyer should accompany the shipment stating that the fish are not considered illegal in the state of destination or that the buyer has a permit from the state to receive the fish.

Contact your congressmen for a copy of the act.

## Program Highlights

We appreciate the following information provided by Dick Luebke which describes exotic fish research conducted by the Texas Parks and Wildlife Department at the research center--Heart of the Hills Fisheries Research Station, Ingram, Texas.

### Texas Parks and Wildlife Department
### Heart of the Hills Fisheries Research Station

### Description of Facilities

In 1969 the Heart of the Hills Fisheries Research Station was established at Mountain Home, Texas on the site of one of the oldest State fish hatcheries, originally constructed in 1925. The transition from a production hatchery to a research station began with the construction of an office/laboratory building and

the alteration of existing ponds with the financial assistance of a federal aid development program. Work has continued since then on the expansion of research capabilities through modification and acquisition of existing and new facilities and equipment. The current staff of 12 represents a wide variety of backgrounds and expertise.

Station facilities include 25 ponds, 0.2-2.5 acres each, an office/laboratory, wet laboratory building, shop, three residences and several storage buildings. The office building contains an extensive fisheries-related library, a small chemical laboratory and a small wet laboratory used primarily for temperature tolerance testing. The main wet laboratory building is approximately 6,500 $ft^2$ and is equipped with a wide variety of fish holding devices ranging from raceways and aquaria to 500-gallon and 8,000-gallon fiberglass tanks. The building has been modified to provide complete photoperiod and water temperature control.

## Exotic Fish Research

Nile perch were obtained from Africa in 1975, after a Department biologist had spent a year on Lake Tanganyika studying the fish in their native environment and determining the lower lethal temprature of approximately 52°F. Originally four species were involved (Lates niloticus, L. augustifrons, L. microlepis and L. mariae). In 1977 all L. microlepis and most L. augustifrons were lost to an equipment malfunction. At present 12 L. mariae, six L. niloticus and two L. augustifrons are being maintained as broodfish. This past summer (1981) was the first time the fish were fully mature. Through photoperiod and temperature manipulation numerous spawns were obtained. However, inability to raise fry beyond approximately 12 days of age has precluded initiation of field evaluations of Nile perch stockings in heated reservoirs. Every effort will continue in that direction.

Peacock bass fingerlings were obtained from South America in 1974. These fish were use primarily for lower lethal temperature determination (62°F). In 1977, five additional fish (Cichla temensis and C. ocellaris) were obtained from Florida and maintained as broodfish. Fingerlings produced in 1981 were stocked in a private heated reservoir in northeast Texas and have survived one of the coldest winters in recent history. Plans call for complete evaluation of their impact on existing fish populations and the sport fishery.

## Transotics and Other Research

Work with various transotics continues to account for much of the research efforts at the Station. Two warmwater strains of rainbow trout are being cultured for potential enhancement of the Texas trout fisheries.

## Taxonomic Changes

The following items will be of interest of EFS members. I am reminded of the old Chinese Proverb that states "Common names change from place to place but scientific names change from time to time." Those of us troubled with the uncertainty of whether to call our tilapias by Saratherodon or Tilapia will be either relieved or futher agitated by the proposal to enter the generic designation of Oreochromis into the picture. For more information, see the new literature

listing (Trewavas 1982). But there is more -- If you have seen literature reference to the bighead carp as Hypophthalmichthys nobilis instead of the more familiar Aristichthys, a change has been proposed for that "lumping." See the literature listing (Howes 1981).

## Recent Literature

*Goulding, M. 1980. The fishes and the forest; explorations in Amazonian natural history. Univ. Calif. Press, Berkeley. 280 p.

Howes, G. 1981. Anatomy and phylogeny of the Chinese major carps, Ctenopharyngodon Stein., 1866 and Hypophthalmichthys Blkr., 1860. Bull. Brit. Mus. (Nat. Hist.), Zool. 41(1):1-52.

Leslie, A.J., Jr., J.M. Van Dyle, and L.E. Nall. 1982. Current velocity for transport of grass carp eggs. Trans. Amer. Fish. Soc. 111:99-101.

Li, H.W., and P.B. Moyle. 1981. Ecological analysis of species introductions into aquatic systems. Trans. Amer. Fish. Soc. 110-772-782.

Pullin, R.S.V. and R.H. Lowe-McConnell, editors. 1982. The biology and culture of Tilapia. ICLARM Conference Proceedings 7, Manila, Philippines. Price still not availabe--next time.

*Smith, N.J.H. 1981. Man, fishes and the Amazon. Columbia University Press, New York. 180 p.

Smith, C.R., and J.V. Shireman. 1981. Grass carp bibliography. Job completion report, Corps of Engineers, A contribution of the Center for Aquactic Weeds, Univ. Florida, Gainesville.

Trewavas, E. 1982. Generic groupings of Tilapiini used in aquaculture. Aquaculture 27:79-81.

*These two books were published earlier (1979) in Portugese; the coverage is somewhat different in the originals. Both books discuss biology of some of the fishes of interest to EFS members. Thanks to John Ramsey for this info.

## Meeting Information

No new announcements are available, but the following meetings were previously listed and abstracts were examined recently.

World Conference on Aquaculture (EMS/WMS), Venice, Italy, 21-25 September 1981. A wide array of papers were presented by leading scientists. Invited papers will be published in a book; poster papers will be included in the Annual Proceedings of the World Mariculture Society.

Annual Meeting of the World Mariculture Society, Charleston, SC., 1-4 March 1982. Fifteen papers (13 from the U.S.) were presented on Macrobrachium rosenbergii, and 5 papers on tilapia. The proceedings will be available later in the year.

International Symposium on Genetics in Aquaculture, Galway, Ireland, 29 March-2 April. Papers were presented by several world renown fish geneticists; 3 reports were on tilapia. The proceedings of the symposium will be published in a special issue of Aquaculture.

## FCS News Items

The following items were extracted from the FCS newsletter and may be of interest to our section membership. Thanks to Jay Huner for the legwork. We can consider this as a function of the Liaison Committee.

Aquaculture in Texas: A Status Report and Development Plan--This publication is the Texas Aquaculture Plan. It was compiled by Robert R. Stickney and James T. Davis and was released in Aug. 81. Species plans are developed for freshwater finfish (channel catfish, Tilapia, and largemouth bass), baitfish, marine finfish, marine shellfish (bivavle mollusks and penaeid shrimp), and freshwater shellfish (freshwater shrimp and crayfish). The compilers have done an excellent job of examining the resource potential of Texas and provide readers with detailed maps of soil types, water resources, climatic conditions, and aquaculture potential of various areas in Texas. They note "...Texas possesses one of the largest coastlines of any state in the nation, has regions with adequate supplies of both fresh and salt water for aquaculture, enjoys a mild temperate to subropical climate and presently contains a small but well-developed community of aquaculturists in both the private and public sectors. The potential for expansion of aquaculture in Texas appears to be excellent..." Further information about this report may be obtained by contacting Dr. Stickney, c/o Dept. of Wildl. and Fish. Sci., Texas A&M Univ., College Station, TX 77843.

Preferred Temperatures and Optimum Finfish Growth--The relationship between the final preferendum of a fish and optimum temperature for growth was examined by Drs. Robert McCauley and John Casselman for 12 common freshwater species for which this information was available. The correlation between these two variables was high, and the final preferendum was, on the average, several degrees higher than the temperature that was optimum for maximum growth. Determinations for preferred temperature, unlike long term growth experiments can be obtained quickly and easily in the laboratory. This permits the fish culturist to follow changes in preferred temperature with age and, where an inexpensive supply of warm water is available, to adjust the rearing temperature to favor maximum growth. McCauley and Casselman are seeking additional data to test this model. Species studies to date include brown, brook and rainbow trout, Atlantic and sockeye salmon, large and smallmouth bass, northern pike, yellow perch, guppy, goldfish, and bluegill. Please contact R.W. McCauley, Wilfrid Laurier, Univ., Waterloo, Ontario, Canada N2L 3C5.

Solar Aquaculture: Perspectives in Renewable, Resource-Based Fish Production--This was the title of a workshop held on 26 Sept. 81 at the New Alchemy Institute, Falmouth, MA. The thrust of the workshop was to disseminate information about solar-algae pond aquatic ecosystems developed at the New Alchemy Institute. "Ponds" are fiberglass cylinders that serve as solar heat collectors for heating greenhouses and homes. Fish, principally blue tilapia, Sarotherodon aureus, are

cultured in these containers to serve as a protein source. Green algae suspended in the water column, serve as "green water" purifying systems to remove metabolic wastes from the fish. A 5' tall x 5' diameter solar-algae pond can produce 35-50 pounds of fish per year in Massachusetts at costs competitive with retail fish prices. Incorporation of hydroponic units with the solar-algae ponds in greenhouses can result in the production of vegetables, primarily tomatoes and cucumbers, at rates that are competitive with area hydroponic greenhouses. The New Alchemy Insititute welcomes visitors and publishes a useful and informative quarterly journal entitled New Alchemy. A new book entitled Solar Aquaculture is in press and should be available soon. Further information about the New Alchemy Institute can be obtained from: The New Alchemy Institute, 237 Hatchville Rd., East Falmouth, MA 02536.

Rodale Aquaculture Project--Rodale Press Inc.'s Resources Division has had a small-scale aquaculture program for some years now. There has been a very significant increase in interest in small-scale aquaculture with special workshops being held by Rodale, the New Alchemy Institute, FCS, etc. As a result, Rodale has initiated an Associate Membership to this Aquaculture Project. Through this organization, Rodale will be able to pull together devotees of self-reliant (small-scale) aquaculture, make available results of its research and keep members up-to-date on research by others in the field. The quarterly newsletter, Network, is well done and very informative. The Fall 81 issue includes the following articles: Ecological Aquaculture: An Alternative; The Energy Perspective (deals with energy costs of aquaculture); Notes from Kinmundy (deals with manure-based "Chinese" polyculture in Illinois); Aquaculture Development Bill Becomes Law, and The Tail End, Small-Scale Culture Tips. Editors are Steve Van Gorder and Douglas Strange. For further information, write to: Rodale Press, Inc., 33 East Minor St., Emmaus, PA 18049.

Aquaculture Energetics--How many calories does it take to produce a pound of fish, crustacean, or mollusks? This is a question that all aquaculturists must consider. An article on this subject appeared in Rodale's Network (Fall 81, see above). It is written by Greg Welsh (The Energy Perspective). In his discussion, Welsh quotes data from W. Edwardson, "Energy Demands of Aquaculture," Fishing News Int., Dec. 76. Energy Input versus Output are referenced for 9 systems. The most efficient system studies was Thailand-subsistence carp/tilapia culture where 1 calorie of input gave 52 calories of output (net = +51). Taiwan-milkfish culture almost "broke even" with 1.3 calories of input giving -0.3 calories of output (net = -0.3). The worst systems were U.S. earthen catfish ponds where 18.5 calories of input returned only 1 calorie of output (net = -17.5). While catfish are now quite profitable in this country, they are, relatively speaking, very wasteful of energy. Most thoughtful aquaculturists felt that there will be a shift to energy efficient polyculture in the U.S. Edwardson's data show why rising energy costs may make it unprofitable to maintain current catfish systems.

## Non-Established Exotic Fishes in Waters of the United States

The following table is taken from "The exotic ichthyofauna of the contiguous United States with preliminary observations of intranational transplants," by W.R. Courtenay and J.N. Taylor, and to be presented at the EIFAC Symposium on Stock Enhancement in the Management of Freshwater Fisheries, 31 May-5 June, 1982, Budapest, Hungary.

A list of non-established exotic fishes known from waters of the United States. (W.R. Courtenay and J.N. Taylor, in press).

Formerly established species

| | | |
|---|---|---|
| Serrasalmus humeralis Valenciennes | | Florida |
| Hoplias malabaricus (Bloch) | trahira | Florida |
| Oryzias latipes (Temminck and Schlegel) | medaka | California, New York |
| Cynalebios bellottii Steindachner | Argentine pearlfish | California |
| Cynolebias nigripinnis Regan | | California |
| Cynolebias whitei Myers | | California |
| Rivulus harti (Boulenger) | Trinidad rivulus | California |
| Aequidens pulcher (Gill) | blue acara | Florida |
| Cichlasoma beani (Jordan) | green guapote | California |
| Cichlasoma salvini (Günther) | yellowbelly cichlid | Florida |
| Cichlasoma severum (Heckel) | banded cichlid | Nevada |
| Cichlasoma trimaculatum (Günther) | threespot cichlid | Florida |
| Anabas testudineus (Bloch) | climbing perch | Florida |
| Betta splendens Regan | Siamese fightingfish | Florida |
| Ctenopoma nigropannosum (Reichenow) | twospot ctenopoma | Florida |
| Macropodus opercularis (Linnaeus) | paradisefish | Florida |

Intentionally released with no evidence of establishment

| | | |
|---|---|---|
| Coregonus maraena Bloch | German whitefish | Michigan |
| Salmo letnica (Karaman) | Ohrid trout | Colorado, Montana, Tennessee, Wyoming |
| Esox reicherti Dybowski | Amur pike | Pennsylvania |
| Chanos chanos (Forskål) | milkfish | California |
| Chirostoma jordani Woolman | | Texas |
| Lates nilotica (Linnaeus) | Nile perch | Texas |
| Cichla ocellaris Schneider | Iucanari | Florida |

Collected but not known to be established

| | | |
|---|---|---|
| Anguilla anguilla (Linnaeus) | European eel | California |
| Osteoglossum bicirrhosum Vandelli | Aruana | California, Nevada |
| Plecoglossus altivelis Temminck and Schlegel | ayu | California |
| Colossoma spp. | pacu | California, Florida, Ohio |
| Clossoma brachypomum (Cuvier | | Florida |
| Colossoma nigripinnis (Cope) | blackfin pacu | Florida |
| Gymnocorymbus ternetzi (Boulenger) | black tetra | Florida |
| Metynnis sp. | | Florida |
| Metynnis roosevelti Eigenmann | | Kentucky |

| | | |
|---|---|---|
| Serrasalmus sp. | piranha | Illinois, Kentucky, Pennsylvania |
| Serrasalmus nattereri (Kner) | red piranha | Florida, Massachusetts, Michigan, Pennsylvania |
| Barbus sp. | tinfoil barb | Florida |
| Barbus conchonius (Hamilton-Buchanan) | rosy barb | Florida |
| Barbus gelius (Hamilton-Buchanan) | golden barb | Florida |
| Barbus tetrazona (Bleeker) | tiger barb | California, Florida |
| Brachydanio rerio (Hamilton-Buchanan) | zebra danio | California, Florida |
| Danio malabaricus (Jerdon) | giant danio | Florida |
| Hypophthalmichthys molitrix Valenciennes | silver cup | Arkansas |
| Pterodoras granulosus (Valenciennes) | | Florida |
| Callichthys sp. | callichthys | Florida |
| Corydoras sp. | corydoras | Florida |
| Pterygoplichthys sp. | | Florida |
| Poecilia hybrids | | Florida, Nevada |
| Channa micropeltes Kuhl and van Hasselt | giant snakehead | Maine, Rhode Island |
| Stizostedion lucioperca (Linnaeus)[1] | European pike-perch | New York |
| Ameca splendens Miller and Fitzsimmons | butterfly goodeid | Nevada |
| Cichlasoma labiatum (Günther) | red devil | Florida |
| Geophagus brasiliensis (Quoy and Gaimard) | pearl eartheater | Florida |
| Geophagus surinamensis (Bloch) | redstriped eartheater | Florida |
| Pterophyllum sp. | | Florida |
| Tilapia sparmanni Smith | banded tilapia | Florida |
| Colisa fasciata (Bloch) | giant gourami | Pennsylvania |
| Colisa labiosa (Day) | thicklipped gourami | Florida |
| Colisa lalia (Hamilton-Buchanan) | dwarf gourami | Florida |
| Helostoma temmincki Cuvier | kissing gourami | Florida |
| Trichogaster leeri (Bleeker) | pearl gourami | Florida |
| Trichogaster trichopterus (Pallas) | blue gourami | Florida |
| Pseudotropheus zebra (Boulenger) | zebra mbuna | Florida |

[1] Unconfirmed report.

# Application for Membership

Print or type applicant's name in full

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19 Membership year*

**American Fisheries Society**
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If applicant is a student as defined below, the teacher endorsing him signs here.

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Date

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|---|---|---|---|---|---|---|---|
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☐ **Official** ($250) ☐ **Sustaining** ($100) ☐ **Library Subscription** ($125)† ☐ **Associate** ($1,000)

* New members accepted Jan. 1–Aug. 31 are credited to full membership for that year. (Back issues of periodicals as appropriate are sent.) Members accepted Sept. 1–Dec. 31 credited to full membership as of next Jan. 1, unless requested otherwise.

** Bona fide students of fisheries subjects are eligible for Student membership (limited to 6 years). Persons employed full-time not eligible. Teacher endorsement required (see above).

**NOTE:** **Official** membership open to any governmental body. **Retired** membership for Active members upon retiring at age 65. **Sustaining** membership for commercial firms, conservation clubs, or others desiring to support the Society. **Library Subscriptions** include bimonthly TRANSACTIONS, quarterly NORTH AMERICAN JOURNAL OF FISHERIES MANAGEMENT, bimonthly FISHERIES, Membership Directory, Special Publications, and Monographs.

**†Other than U.S. & Canada, $129.00.**

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