

Channel Catfish Life History And Biology

A Nation-wide Cooperative Program of Training, Investigation and Application by the Bureau of Sport Fisheries and Wildlife, State Game and Fish Departments, and Colleges and Universities

Revised and Expanded

Ecohydrology & Hydrobiology

Life History and Biology

Fish

Life History Studies of Two Digenetic Trematodes, *Bolbophorus damnificus* and an Unknown Clinostomoid Species, that Infect Channel Catfish *Ictalurus punctatus*

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Fish Diseases and Medicine

Cachuma Project Contract Renewal, Water Supply Project, Santa Ynez Valley, Bradbury Dam, Santa Barbara

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Channel Catfish

Early Life History of Channel Catfish (*Ictalurus punctatus*) in Navigation Pool 7 of the Upper Mississippi River

Ictaluridae - Catfish and Madtoms, Volume 3

Effects of Phytoestrogens on Sensitive Life History Stages in Channel Catfish

Biology and Culture of Channel Catfish

Channel Catfish Life History And Biology

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KALEIGH SANTOS

A Nation-wide Cooperative Program of Training, Investigation and Application by the Bureau of Sport Fisheries and Wildlife, State Game and Fish Departments, and Colleges and Universities Univ. of Manitoba Press

Soybean meal has been proposed as an alternative protein source in aquaculture feeds. Soybean meal partially or completely replaces fishmeal as the major protein component in commercial catfish diets. Although soybean substitution has shown promising results when replacing fishmeal in feeds for numerous herbivorous and carnivorous aquaculture species, there are a number of potential drawbacks that need to be considered. One component in need of investigation is the presence of phytoestrogens in plant protein components. Phytoestrogens are plant-based estrogen mimics that serve in the plants as phytoalexins, compounds that provide plants with protection from viruses, fungi, bacteria, and insects. Genistein represents the largest proportion of phytoestrogens in soybeans and have the potential to alter cellular functions associated with spermatozoa production and energy utilization. Genistein was found to bind with steroid-binding-proteins within channel catfish *Ictalurus punctatus* to produce estrogen receptor mediated effects in the form of vitellogenin production from the liver. Genistein competed with radiolabeled estradiol for hepatic estrogen receptors (ERs) in both the male and female channel catfish. Relative binding affinities in male ERs were higher (2.72) than those in females ERs (1.17) for genistein. Channel catfish fed increasing concentrations of genistein (0, 2, 4, 8 mg/g) between 5 - 140 and 60 - 150 days post hatch

displayed significant deviations from expected phenotypic sex in a dose dependant manner. Additionally, intersex individuals were identified at all treatment concentrations for catfish fed between 5 and 140 days post hatch. When walleye *Sander vitreus* and channel catfish spermatozoa were incubated in vitro with graded concentrations of genistein, ATP content was significantly lower compared to control treatments at several incubation concentrations and was significantly related to fertilization rate. Fertilization rate was significantly dependant on genistein incubation concentrations (P [less than or equal to] 0.01). Logistic regression showed a significant relationship between genistein concentration and fertilization in channel catfish (P [less than or equal to] 0.01). Although in vitro examinations revealed alterations in several spermatozoa quality parameters and fertilization capacity, in vivo work showed no significant declines in the same parameters. Overall this work revealed that the impacts of phytoestrogens, particularly genistein, can alter the normal physiological functions of sex determination and reproduction at both early and late life history stages.

Revised and Expanded Storey Publishing

The history of channel catfish farming in the United States serves as a model for the development of pond-based aquaculture industries worldwide. Channel catfish farming is the largest and economically most important aquaculture industry in the United States. In 2003, over 300,000 metric tons (662 million pounds) of channel catfish were processed, representing about half the total United States aquaculture production. Demand for farm-raised catfish is strong, with record processing years in 2002 and 2003. In 22 chapters written by active scientists in the field, *Biology and Culture of Channel Catfish* comprehensively synthesizes over 30 years of research on this American icon. Throughout the book, fundamental biological aspects of channel catfish are linked to practical culture techniques. Topics include: • Latest information on reproductive physiology, genetics, and breeding •

Comprehensive treatment of catfish nutrition, feeds, and feeding practices • Water quality management and pond dynamics • In-depth review of immunology in channel catfish • Practical information on diseases and health management • Techniques for commercial culture, including innovative techniques such as raceways, recirculating systems, and partitioned aquaculture systems • Catfish economics and marketing • Exploration of environmental concerns, including recommended Best Management Practices

[Ecohydrology & Hydrobiology](#) CRC Press

HOW TO PLAY BASKETBALL This book is for anyone that wants to Coach or play Basketball. It's for College Coaches, High School Coaches, Middle School Coaches, Elementary Coaches, and Recruitment Coaches. With this book you will win at least 75% of your games if you have a supportive team to Coach.

Life History and Biology Univ of California Press

In this entertaining guide, Louise Riotte tells you everything you need to know to create a productive pond on your own land, from siting the pond to maintaining water quality and stocking the pond with fish. She also includes plenty of old-time fishing lore and scrumptious recipes for freshly caught fish.

Fish NewSouth Books

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[Ictalurus Punctatus](#) Channel CatfishLife History and BiologyChannel CatfishLife History and BiologyObservations on the Life History of Channel Catfish, *Ictalurus Punctatus* (Rafinesque) in Utah Lake, UtahThe channel catfish, *Ictalurus punctatus* (Rafinesque), was first introduced into Utah Lake in the summer of 1911, and has since been stocked in the lake on numerous occasions. It has only been in the last few years that the channel catfish has become an important game fish in Utah. As the value of the channel catfish, as a game fish, increased, it has become increasingly important to the state to maintain this species for present and future generations. This study was initiated in 1958 and completed in 1960, and was financed by the Utah State Department of Fish and Game. Data on certain phases of the channel catfish life history were investigated to provide information to aid in management of this species. The following phases were studied: age and rate of growth; age composition of the population; reproduction success; food habits; movements; and extent of the fishing pressure.Observation on the Life History of Channel Catfish, *Ictalurus Punctatus* (Rafinesque), in Utah Lake, UtahPreliminary Observations on the Spawning and Early Life History of Channel Catfish from the Lower Wisconsin River with Recommendations for Further StudyEarly Life History of Channel Catfish (*Ictalurus Punctatus*) in Navigation Pool 7 of the Upper Mississippi RiverYoung-of-the-year (YOY) channel catfish (*Ictalurus punctatus*) were collected from Navigation Pool 7 of the upper Mississippi River near La Crosse, Wisconsin, USA. The objectives of this study were to describe distribution and abundance patterns, identify variations in growth, and determine food habits of YOY over the entire pool. Otolith aging technique was validated in the laboratory and used to evaluate growth of wild fish. YOY were captured by otter trawl at night in the navigable main channel during summer 1984 and 1985. A total of 296 YOY (15-83 mm SL) were collected in 1984 and 183 YOY (15-68 mm SL) in 1985. No significant differences in catch were detected throughout the pool. YOY appeared in the drift in mid-July, reached peak abundance in August, then declined sharply. In general, length did not differ significantly throughout the pool, although stations associated with a large backwater tributary produced significantly smaller fish early in both collecting seasons. No differences in growth between stations were detected. Smaller YOY appeared to feed in the water column on invertebrate drift, then switched to benthic invertebrates at about 50-mm SL. All reaches of the main channel appear to be of equal nursery value for channel catfish. A large backwater area in the pool may represent critical spawning habitat. Changes in feeding behavior dramatically affect catchability of YOY. Discharge is the major factor influencing adult spawning and YOY distribution patterns. Drifting YOY could be significantly impacted by hydropower development and commercial navigation. Otter trawling represents a means of evaluating channel catfish year-class strength. Current research gaps are presented.Reproductive Biology and Early Life History of Fishes in the Ohio River DrainageIctaluridae - Catfish and Madtoms, Volume 3

Young-of-the-year (YOY) channel catfish (*Ictalurus punctatus*) were collected from Navigation Pool 7 of the upper Mississippi River near La Crosse, Wisconsin, USA. The objectives of this study were to describe distribution and abundance patterns, identify variations in growth, and determine food habits of YOY over the entire pool. Otolith aging technique was validated in the laboratory and used to evaluate growth of wild fish. YOY were captured by otter trawl at night in the navigable main channel during summer 1984 and 1985. A total of 296 YOY (15-83 mm SL) were collected in 1984 and 183 YOY (15-68 mm SL) in 1985. No significant differences in catch were detected throughout the pool. YOY appeared in the drift in mid-July, reached peak abundance in August, then declined sharply. In general, length did not differ significantly throughout the pool, although stations associated with a large backwater tributary produced significantly smaller fish early in both collecting seasons. No differences in growth between stations were detected. Smaller YOY appeared to feed in the water column on invertebrate drift, then switched to benthic invertebrates at about 50-mm SL. All reaches of the main channel appear to be of equal nursery value for channel catfish. A large backwater area in the pool may represent critical spawning habitat. Changes in feeding behavior dramatically affect catchability of YOY. Discharge is the major factor influencing adult spawning and YOY distribution patterns. Drifting YOY could be significantly impacted by hydropower development and commercial navigation. Otter trawling represents a means of evaluating channel catfish year-class strength. Current research gaps are presented.

[Observations on the Life History of Channel Catfish, Ictalurus Punctatus \(Rafinesque\) in Utah Lake, Utah](#) Elsevier

Evolution of the Alabama Agroecosystem describes aspects of food and fiber production from prehistoric to modern times. Using information and perspectives from both the "hard" sciences (geology, biology) and the "soft" science (sociology, history, economics, politics), it traces agriculture's evolution from its appearance in the Old World to its establishment in the New World. It discusses how agricultural practices originating in Europe, Asia and Africa determined the path agriculture followed as it developed in the Americas. The book focuses on changes in US and Alabama agriculture since the early nineteenth century and the effects that increased government involvement have had on the country's agricultural development. Material presented explains why agriculture in Alabama and much of the South remains only marginally competitive compared to many other states, the role that limited agricultural competitiveness played in the slower rate of economic development in the South in general, and how those limiting

factors ensure that agricultural development in Alabama and the South will continue to keep up but never catch up.

Culture of Nonsalmonid Freshwater Fishes, Second Edition CRC Press

Fish are critically important to the welfare of this planet and its occupants, the health of both wild and captive fish populations paramount to our survival. This book presents the gross pathology of the most commonly encountered diseases and syndromes of fish in an organ system-based approach. It provides an overview of the di

Finfish Aquaculture Diversification Springer Science & Business Media

Although catfish have been farmed for about 30 years and catfish farming is the most successful aquacultural enterprise in the United States, there are those who contend that catfish farming is still as much of an "art" as it is a science. This position is difficult to refute completely, particularly considering that some practices used in catfish farming appear to have little scientific basis. Skill coupled with a small dose of mysticism certainly plays a role in the culture of catfish, and the catfish producer is faced with the unenviable task of rearing an animal in an environment that requires considerable management. Certain aspects may still be an "art" because research and technical information needed to support the industry have lagged behind industry growth; however, the basic principles underlying catfish farming are based on sound scientific evidence whose foundation was laid in the 1950s by work conducted at state and federal fish hatcheries in the southeastern and midwestern United States. Since that time, several university and government laboratories have expanded the scientific base for catfish farming. As a result, considerable information is available, but it is generally fragmented and exists in a multitude of diverse scientific and trade journals. The material is often too technical or abstract to be comprehensible to fish culturists and personnel in allied industries. This book fits the definition of the term handbook in the sense that it is intended as a book of instruction or guidance as well as a reference.

The Status of Warmwater Fish Farming and Progress in Fish Farming Research AuthorHouse

Comprehensive handbook of seafood information! This definitive reference is the most comprehensive handbook of information ever assembled on foods and other products from fresh and marine waters. Marine and Freshwater Products Handbook covers the acquisition, handling, biology, and the science and technology of the preservation and processing of

Resource Publication CABI

Culture of Nonsalmonid Freshwater Fishes, 2nd Edition presents an expanded, updated description of important techniques and practices for the culture of some of the most widely cultured nonsalmonid species used for human consumption (channel catfish, tilapia, carp) for stocking freshwater bodies for recreational fishing (bass, walleye, striped bass), and for bait (minnows). This new edition features the latest information on spawning, nutritional requirements, special culture requirements, tolerance to various water quality parameters, and types of diseases that can occur. It is an essential book for all aquaculturalists, agency fishery biologists, and students interested in freshwater aquaculture.

[Current Federal Aid Research Report](#) CRC Press

The international journal *Ecohydrology & Hydrobiology* (E&H) has been created to promote the concept of Ecohydrology, which is defined as the study of the functional interrelations between hydrology and biota at the catchment scale. Ecohydrology extends from the molecular level to catchment-scale processes and is based on three principles: • framework (hydrological principle) - quantification and integration of hydrological and ecological processes at a basin scale; • target (ecological principle) - necessity of enhancing ecosystem absorbing capacity and ecosystem services; and • management tool (ecological engineering) - the use of ecosystem properties for regulation the interplay between hydrology and biota. The journal encourages the submission of manuscripts which adopt an integrative approach to aquatic sciences, explaining ecological and hydrological processes at a river-basin scale or propose practical applications of this knowledge. It will also consider papers in other hydrobiological fields. Especially welcome are papers on regulatory mechanism within biocenosis and the resistance and resilience of freshwater and coastal zones ecosystems. There is no page charge for published papers. All submitted papers, written exclusively in English, should be original works, unpublished and not under consideration for publication elsewhere. All papers are peer-reviewed. The following types of papers are considered for publication in E&H: • original research papers • invited or submitted review papers, • short communications

CRC Press

The document contains brief reports on the activities of the units.

Progress in Sport Fishery Research

In 2015, Illinois changed size and harvest limits for catfishes (blue catfish *Ictalurus furcatus*, flathead catfish *Pylodictis olivaris*, and channel catfish *Ictalurus punctatus*) in the Ohio River to match those of neighboring states in order to provide continuity of the regulations and promote a trophy catfish fishery. Regulations imposed a daily limit of one blue catfish or flathead catfish ≥ 35 inches (88.9 cm) and one channel catfish ≥ 28 inches (71.1 cm) per fisher and a 13 inch (33.0 cm) minimum length limit for all species with no bag limit. Although management regulations were implemented, potential efficacy of the implemented regulations and appropriate (i.e. most precise or accurate with fewest samples) monitoring protocols were unknown. Furthermore, there was general lack of understanding of early life movements, natal dispersal timing and principal recruitment sources that aid in determining appropriate spatial scale for monitoring and managing lower Ohio River catfish stocks. To fill these knowledge gaps the following methods were employed: 1) simulation modeling was used to evaluate precision in estimating catch and size distribution metrics for monitoring population trends with increasing sample size (i.e., sampling events), 2) N-mixture modeling was used to estimate size selectivity of multiple gears using detection probability as a robust alternative to size-specific catchability coefficients, 3) otolith microchemistry (Sr:Ca and Ba:Ca) was employed to determine principal recruitment sources, early life movement patterns, and provide fisheries managers with a better understanding of the spatial extent to which management actions should be implemented, 4) Bayesian modeling was used to estimate growth and mortality, 5) Yield-per-recruit modeling was used to estimate and evaluate fishing mortality rates that would result in growth overfishing (FMAX) and yield at FMAX (YPRMAX) for three management scenarios (no regulation, minimum length limit [33.0 cm or greater] and a permissive slot limit [33.0 cm-88.9 cm; blue catfish and flathead catfish]). The simulation models presented account for the uncertainty associated with heterogeneous selectivity of a gear, and minimize the impact of rare or extreme catch values. Trotlines and low pulse (15-pps) electrofishing generally required the

fewer samples to achieve stable values of catch per unit of effort (CPUE), proportional size distribution (quality; PSDQ), and coefficient of variation (CV) than other gears based on simulation modeling. Abundance and detection probabilities were estimated separately for each species of catfish by length category within and across gears, producing a species-gear-size correction for catch bias used in estimating Proportional Size Distribution-Quality (PSDQ). Corrected (i.e., accounting for detection) PSDQ values were lower than uncorrected estimates suggesting a positive bias for larger fish across the entire sampling regime. Managers should use a combination of low pulse electrofishing, trotlines, and high pulse (60-pps) electrofishing in their monitoring efforts for all three species. Based on microchemistry, ictalurid catfishes in the lower Ohio River appear to recruit from multiple sources and make movements across a broad geographic scale. Additionally, some catfish may be originating from outside the portion of the Ohio River that is managed by Illinois (lower 214 km). Fisheries managers should take this into account when implementing management actions. However, most ictalurid catfishes originated from riverine (e.g., Ohio and Mississippi River) natal environments and not from smaller tributaries, and managers should not expect tributaries to compensate for weak year-classes within the river. Based on yield per recruit modeling, catfish stocks are unlikely to benefit from current regulations or a theoretical minimum size limit given the near complete overlap of YPRMAX confidence intervals for all estimable scenarios and the small statistical difference (1-3%) based on FMAX between the most permissive and most restrictive scenarios. While statistical differences in FMAX exist, they are likely biologically irrelevant, exceeding the precision of estimation methods for F. While there is some indication that alignment and continuity of management regulations is warranted based on microchemistry, the efficacy of the current permissive slot regulations is questionable based on the models presented and the life history of these fishes. There is no advantage to implementing any of the modeled regulations in terms of increasing FMAX or YPRMAX.

Catfish Ponds & Lily Pads

Manitoba's ninety-three species of fish give the province the third most diverse fish population in Canada. The province's variety of geological features, with its major lakes, rivers, tributaries, and watersheds, is due in large part to its history as the basin for Glacial Lake Agassiz. This, combined with its access to the waters of Hudson Bay and large American river systems, has provided habitat for a wide diversity of freshwater fish. Species from lampreys to goldeye, catfish to perch, bigmouth bass to slimy sculpin swim in waters from arctic rivers in the north to Red River tributaries and down to the Mississippi in the south. Freshwater Fishes of Manitoba is a comprehensive, user-friendly guide. Each species is accurately depicted in detailed colour photographs and accompanying map, with descriptions of physical characteristics, spawning and feeding habits, distribution, habitat, ecological role, and economic importance. The guide also includes an extensive glossary, keys to identifying the families, species, and subspecies, and information on documentation and preservation of specimens. Freshwater Fishes of Manitoba is not only the definitive guide to these fishes of Manitoba, it is also accessible and reliable for a range of users from general fishers to professional fish biologists.

Preliminary Observations on the Spawning and Early Life History of Channel Catfish from the Lower Wisconsin River with Recommendations for Further Study

The commercial production of channel catfish (*Ictalurus punctatus*) is major industry in Mississippi. Infections of channel catfish with the digenetic trematode *Bolbophorus damnificus* have often been associated with heavy economic losses in the industry. To efficiently control transmission of this trematode, the avian hosts need to be identified. In the first study, two American white pelicans, two double-crested cormorants, two great blue herons, and two great egrets were fed channel catfish infected with *B. damnificus* metacercariae. The presence of *Bolbophorus damnificus* ova in pelican feces at three days post infection (dpi) indicated the pelicans had patent infections. Mature *B. damnificus* were recovered from the intestines

of both pelicans at 21 dpi. No *B. damnificus* infections were observed in the other bird species. In a second study, 33 American white pelicans, 34 double-crested cormorants, 35 great blue herons, and 32 great egrets were collected in the Mississippi Delta. The prevalence of *B. damnificus* in the American white pelican was 93.9%, with an average of 158 *B. damnificus* found per bird (range 0-681). *Bolbophorus damnificus* was not found in any of the other bird species. The results of these two studies confirm that the AWPE is the only proven natural host for *B. damnificus*. In a third study, two previously undescribed cercariae were found infecting rams-horn snails in commercial catfish ponds. In challenge studies, channel catfish were exposed to both cercariae types. Only one type of cercariae (type I) was infective to channel catfish. The first evidence of type I metacercariae was seen histologically at 14 dpi and grossly at 21 dpi. Development continued until 120 dpi, when both gross examination and histology suggested that the metacercariae were mature. The type I metacercariae appeared to cause little host damage. Molecular analysis of the 18S rRNA gene region indicated that the type I cercariae and metacercariae may be a species of *Clinostomum*. The data generated in these three studies provides additional information that can be used in the development of efficacious management schemes to control digenetic trematodes infecting commercial catfish.

Life History and Biology

There is considerable global interest in the culture of finfish species both for cold and warm water aquaculture development and growth. Essential information on the biology, domestication and aquacultural characteristics of a wide selection of novel and established species is provided in the form of technical sheets, species descriptions and information on current rearing practices, making this a must-have reference in the field of aquacultural science. The book also offers a basic framework in order to support investment strategies for research and development efforts aimed at the emergence of a profitable finfish aquaculture industry and presents a rationale for species diversification, different approaches to species selection and basic economical and market considerations governing the launch of strategic development and commercialization efforts.

Learn to Become a Smarter Lake Fisherman

This series fills immense gaps in knowledge of issues related to early life development of fishes in the Ohio basin. Volume I includes families Acipenseridae to Esocidae, Volume II includes the Catostomidae, while Volume III addresses the developmental and morphological issues of catfish and madtoms. This volume describes the characteristics of the

An Evaluation of the Status, Life History, and Habitat Requirements of Endangered and Threatened Fishes of the Upper Colorado River System

The channel catfish, *Ictalurus punctatus* (Rafinesque), was first introduced into Utah Lake in the summer of 1911, and has since been stocked in the lake on numerous occasions. It has only been in the last few years that the channel catfish has become an important game fish in Utah. As the value of the channel catfish, as a game fish, increased, it has become increasingly important to the state to maintain this species for present and future generations. This study was initiated in 1958 and completed in 1960, and was financed by the Utah State Department of Fish and Game. Data on certain phases of the channel catfish life history were investigated to provide information to aid in management of this species. The following phases were studied: age and rate of growth; age composition of the population; reproduction success; food habits; movements; and extent of the fishing pressure.

Creating and Enjoying a Family Pond

Channel Catfish Life History and Biology Observations on the Life History of Channel Catfish, *Ictalurus Punctatus* (Rafinesque) in Utah Lake, Utah

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