

Announcing . . .

. . . A lecture and laboratory course that offers a comprehensive view of the biology and taxonomy of early life stages of fishes. These stages (eggs, larvae and juveniles) are abundant and diverse components of aquatic ecosystems. Their small size, dynamic vital rates, and dependence on ambient environmental factors, make them vulnerable to variability in climate and to stresses of anthropogenic origin. Knowledge of their morphological development serves to clarify the complex systematics of teleost fishes, the most diverse and largest class of vertebrates. Early life stages often have specialized adaptations to insure survival in stressful habitats.

The objectives of this graduate-level course are to provide participants with the technical background, training and skills necessary to better understand the early life history and population dynamics of marine fishes and to confidently identify their larval stages.

The Larval Fish Collection and Laboratory Sessions

We present a unique teaching collection of larval fishes with over 500 lots and 1,500 specimens. The collection contains larval representatives of 26 orders and 169 families of teleost fishes. In each laboratory, a 1-h lecture on morphology, systematics and larval identification of lab material is followed by a 3-h study period.

Lecture Topics

- An Overview of Teleost Systematics
- What is a Fish Larva?
- Ontogeny and Development
- Embryology and Hatching
- Maternal Effects
- Metamorphosis
- Foods and Feeding
- Physical Processes
- Larval Assemblages
- Age and Growth
- Nutritional Condition Mortality and Cohort Dynamics
- Recruitment Theory
- Applications in Fisheries Science and Management
- Culture, Stocking and Restoration
- Mesocosm Experiments

Registration

Please use the online application form at www.vims.edu/adv/657/registration.htm



Prerequisites, Venue and Costs

It is presumed that students will have some experience and academic background in fish ecology, fisheries science, ichthyology and biological oceanography. Prerequisites include an undergraduate degree in a biological discipline and permission of the instructors.

Lectures and laboratories will be held in the new Marine Science Center of the University of New England in Biddeford, Maine. The Center is situated on the Saco River. It offers ample laboratory space with high quality stereomicroscopes for our use. All lecture and laboratory materials are provided. If you have unknown, unsorted or interesting larval fish material in your collections, bring them with you!

- **Date: 2-19 August 2009**
- **3 graduate credits**
- **Application deadline: 1 May 2009**
- **Tuition: approx. US \$1,500**
- **Room and board: approx. US \$1,008**
- **UNE BIO 580, MSCI 657, MEES 698**

Professors

John E. Olney (Olney@vims.edu)
College of William and Mary

Edward D. Houde (Ehoude@cbl.umces.edu)
University of Maryland

Lab Assistant

Pat Crewe
College of William and Mary

WWW.VIMS.EDU/ADV/657

The Teaching Collection

Elopiiformes

Megalopidae
Elopiidae

Anguilliformes

Albulidae
notocanthoid family
Ophichthidae
Xenocrigidae
Anguillidae
Dysommidae
Cyematidae
Muraenidae
Congridae
Nemichthyidae
Synphobranchidae

Clupeiformes

Clupeidae
Engraulidae
Pristigasteridae

Ostariophysi

Gonorhynchiformes
Chanidae
Gonorhynchidae

Protacanthopterygii

Salmoniformes
Salmonidae
Osmeridae

Argentiniiformes

Bathylagidae
Argentinidae

Neoteleostei

Stomiiformes
Gonostomatidae
Sternoptychidae
Phosichthyidae
Stomiidae

Euryptergii

Aulopiformes
Giganturidae
Chlorophthalmidae
Ipnopidae
Synodontidae

Evermannellidae
Paralepididae
Scopelarchidae
Notosudidae

Ctenosquamata

Myctophiformes
Myctophidae

Lampridiformes

Veliferidae
Lamprididae
Stylephoridae
Radiicephalidae
Lophotidae
Regalecidae
Trachipteridae

Polymixiiformes

Polymixiidae

Ophidiiformes

Carapidae
Ophidiidae
Bythitidae

Gadiformes

Bregmacerotidae
Merlucciidae
Gadidae
Phycidae

Lophiiformes

Antennariidae
Lophiidae
Ogocephalidae
Caulophrynidae
Oneirodidae
Neoceratidae
Gigantactinidae
Ceratiidae
Centrophrynidae
Batrachoididae

Stephanoberyciformes

Melamphidae
Mirapinnidae

Zeiformes

Caproidae

Beryciformes

Diretmidae
Holocentridae
Trachichthyidae
Berycidae

Scorpaeniformes

Scorpaenidae
Hemirhamphidae
Liparidae
Triglidae
Platycephalidae
Cyclopteridae

Dactylopteriformes

Dactylopteridae

Mugilomorpha

Mugilidae
Elassomatidae

Gasterosteiformes

Syngnathidae
Gasterosteidae
Fistulariidae
Macrorhamphosidae
Pegasidae

Atherinomorpha

Atherinidae
Antherinopsidae
Scomberosocidae
Belonidae
Hemiramphidae
Exocoetidae
Fundulidae
Poeclidae

Perciformes

Moronidae
Percidae
Polynemidae
Sciaenidae
Coryphaenidae
Rachycentridae
Echeneidae

Carangidae
Opistognathidae
Priacanthidae
Malacanthidae
Bramidae
Mullidae
Uranoscopidae
Gerreidae
Menidae

Lobotidae
Lethrinidae
Howellidae
Caristiidae
Ammodytidae
Symphysanodontidae
Labridae
Scaridae
Sparidae
Cyptacanthodidae
Anarhichadidae
Apogonidae
Callionymidae
Gobiesocidae
Lutjanidae
Pomacentridae
Serranidae
Kyphosidae
Percophidae
Cirrhitidae
Chiasmodontidae
Scorpididae
Microcanthidae
Champsodontidae
Callanhiidae

Blennioidei

Blenniidae
Dactyloscopidae
Chaenopsidae

Acanthuroidei

Acanthuridae
Ephippidae
Siganidae
Chaetodontidae
Pomacanthidae
Zanclidae
Luaridae

Gobioidei

Gobiidae
Microdesmidae
Xenisthmidae

Stromateioidei

Stromateidae
Ariomatidae
Nomeidae
Tetragonuridae
Amarsipidae

Scombroidei

Scombrolabricidae
Pomatomidae
Sphyraenidae
Gempylidae
Trichiuridae
Scombridae
Xiphiidae
Istiophoridae

Pleuronectiformes

Bothidae
Paralichthyidae
Pleuronectidae
Cynoglossidae
Archiridae
Scopthalmidae

Tetraodontiformes

Tetraodontidae
Monacanthidae
Balistidae
Molidae
Ostraciidae
Diodontidae

EARLY LIFE HISTORY of MARINE FISHES

*A Graduate Course
in Larval Fish
Identification and
Ecology*



Photo: G. D. Johnson