

Zooplankton is drifting organism living in the oceans, particularly the pelagic and majority of them are microscopic, unicellular or multicellular forms with size ranging from a few microns to a millimeter or more. Zooplankton are the heterotrophic group of plankton as they feed on phytoplankton and can be subdivided into two groups; holoplankton (spend entire lifecycle as plankton) and meroplankton (spend part of lifecycle as plankton). The meroplankton groups consist of larval and young stages of animals that will adopt a different lifestyle once they mature (e.g. larvae of fish, shrimp, and crab).

Zooplankton is an important food source for many species of fish. They can provide an inexpensive alternative to other commercial feeds. Zooplankton has several advantages, among them a faster growth and greater feed efficiency for some species. The flavour and texture of fish are also improved with zooplankton as feed. Further research is needed on the chemical composition of zooplankton, the development of zooplankton-based dry diets and the effects of the replacement of fish meal with zooplankton meal for commercial, aquaculture species.

Success of aquaculture depends on healthy cultured stock. A disease free healthy stock can be maintained by feeding live food to the cultured stock along with supplemented artificial feed. Supplemented artificial feed cannot meet all the elements required for the growth of fish. So, fish and shellfish must be fed with live food. Importance of micro algae in aqua hatcheries not only owes its nutritional attributes but more so for its small size ranging from 5 to 25 microns meeting the feed size requirements ideally well for early stages of various aquatic animals. Today, micro algae is used as an essential food source for rearing all stages of marine bivalve molluscs (clams, oysters, scallops), gastropods (abalone, conch), larvae of fishes (cod, halibut, tilapia) and shrimps (*Penaeus* sp). Micro algae also constitute an important source of food for live food organisms (rotifers, copepods, cladocerans, brine shrimp etc.). Zooplankton is a very important source of natural food for larvae of many aquaculture species. In semi-intensive systems, which are the dominant type of carp production, many fish species feed on both zooplankton and zoobenthos as adults, while larvae and fry rely mostly on zooplankton. It provides them with high quality nutrients and other molecules such as proteolytic enzymes, hormones and growth factors, which support digestive processes in immature larval gut. This workshop will focus on the following objectives:

- This programme identifies the basic types and characteristics of common marine Phytoplankton and Zooplankton.
- This programme exposes the young and fertile minds to the current developments and thrust areas of Marine Plankton for the Sustainable Fishery Resources.
- This programme focus on the available methods of collection, preservation & identification of Marine Plankton.

Mode of Selection

Only 50 participants will be selected based on the experience and first come first basis. Duly filled registration form should reach on or **before 30th November, 2018.**

Organizing Committee

Patron

Prof. V. MURUGESAN

Vice-Chancellor
Annamalai University

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Registrar (i/c)
Annamalai University

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Dr. M. SRINIVASAN

Director and Dean
CAS in Marine Biology,
Faculty of Marine Sciences

Organizing Secretary

Dr. P. SAMPATHKUMAR

Associate Professor
CAS in Marine Biology

Co-organizing Secretary

Dr. G . ANANTHAN

Assistant Professor
CAS in Marine Biology

No registration fee & working lunch to be provided to the participants

ADDRESS FOR COMMUNICATION

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(Accredited with "A" Grade by NAAC)

National Workshop on "MARINE PLANKTON FOR THE SUSTAINABLE FISHERY RESOURCES"

Sponsored by

**Department of Science and Technology
(DST-PURSE)**

Government of India, New Delhi

Date: 7th December, 2018

Venue

Centre of Advanced Study in Marine Biology
Faculty of Marine Sciences



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Tamil Nadu, India

ABOUT ANNAMALAI UNIVERSITY

In the early 1920s, to serve the downtrodden and to promote Tamil Literature, Rajah Sir S. R. M. Annamalai Chettiar founded Sri Minakshi College, Sri Minakshi Tamil College and Sri Minakshi Sanskrit College in a rural setup at Chidambaram. In 1928, Rajah Sir S. R. M. Annamalai Chettiar agreed with the local Government to handover the above said institution for establishing a University. Thus, on 01.01.1929 Annamalai University was established as per Annamalai University Act 1928 (Tamil Nadu Act 1 of 1929).

Annamalai University Act 2013

The most significant development is the enactment of the Annamalai University Act, 2013 (Tamil Nadu Act 20 of 2013), which has come into force from September 25, 2013, after obtaining the assent of His Excellency, the President of India.

Accolades

Annamalai University, accredited with 'A' Grade by NAAC in 2014, is one of India's largest public residential universities with 10 Faculties and 49 departments of study. Sprawling over 950 Acres of land, the University does yeoman service in taking education to the doorsteps of the people who are otherwise far from access to centres of higher learning. The University has initiated several innovative teaching programmes over the years and has been a pioneer in distance education.

"The NIRF-2018" by the Ministry of Human Resource Development (MHRD) has ranked the University in the band 101 - 150 in the overall category as well as the University Category. In the Pharmacy Category the ranking is 20th in India. In the Medical Category the ranking is 24th

"The Times Higher Education World University Ranking - 2019" has ranked Annamalai University in 1000+ for Overall category. In the Subject category Ranking, 2019, the University is ranked in the band of 501-600 for Life Sciences and Pre-clinical, clinical & Health Subjects. 800+ in the Physical Sciences subject.

"The QS World University Ranking - 2019" has ranked Annamalai University in the band of 291 - 300 in Asia Ranking, 174 in the BRICS Ranking and 43 in India Ranking.

"The CWTS Leiden Ranking 2018", on scientific impact of universities and on universities' involvement in scientific collaboration & scientific performance, has ranked the University at 20th based on the number of publications and 4th based on the proportion of publications that, compared with other publications in the same field and in the same year, belong to the top 10% most frequently cited.

"The MDRA - India Today Ranking" (2018) has ranked Annamalai University 13th among the best Government Universities in India.

"The SCImago Institutional Ranking" (2018) has ranked 7th in Tamil Nadu and 32nd among the top 197 ranked institutions for Higher Education in India.

International Comparative Performance of India's Research Base (2009-14), a report published by Elsevier in April, 2016, prepared in collaboration with the Department of Science and Technology, Ministry of Science, Government of India has rated the University as the top Indian Institute in

Pharmacology, 17th among the top 30 Indian Universities in Publications with highest subject area Publication Count in Pharmacology.

As far as the Global Exposure, Indian Science Ascending, a Springer Nature report, done in conjunction with Confederation of Indian Industries, has ranked the University as 11th among the top 20 Indian Institutions in International Collaborations.

The University has participated in the Southern (Antarctic) Ocean Expeditions (SOE) organized by National Centre for Antarctic Ocean Research 2011 - 12 onwards.

Research & Partnership

Annamalai University has a commendable track record in projects and publications and has been awarded the PURSE Programme by the Department of Science and Technology. Nineteen departments are supported by UGC-SAP, Sixteen by DST-FIST and two departments have attained the status of Centre of Advanced Study. Annamalai University has joint research and innovation partnerships with 24 institutions across the USA, Europe, Australia, Japan, and the UK. The list of partners includes prestigious institutes like Karolinska Institute, John Hopkins University, and University of Michigan amongst others.

Two of the most notable international collaborations in which Annamalai University is the Co-ordinating Institute include the Indo- EU FUNCFOOD Project and the 21st Century Indo-US Knowledge Initiative. There are several ongoing research projects with international foundations and industrial players like Bayer, CavinKare, Dow Agrosiences, Bill & Melinda Gates Foundation, HCL, L&T, Accenture, and Huawei.

MoUs & Patents

To its credit, The University has obtained 15 Patents and has 40 MoUs with research partners like FAO, IRRI & USDA.

Institutional Social Responsibility Activities

The ISR activities of the University include, Hospital on Wheels, Free Medical and Dental Camps in Villages, Lifestyle & Hygiene Awareness, Rural & Urban Health Centres through the Faculty of Medicine and Dentistry which is attached with a 1400 bedded hospital. The Faculty of Agriculture carries out extension activities like Agripreneurship Development Programme, Sustainable Livelihood Projects for Tsunami affected people and Training Farmers in Integrated Farming.

ABOUT OUR CENTRE

The Centre of Advanced Study (CAS) in Marine Biology, a reputed Marine Institute in India is actively engaged in research and teaching in Marine Sciences. It's ideal location and easy accessibility to different biotopes such as estuary, mangrove, backwaters and coastal waters has helped in progress of various facets of Marine Science, Marine Technology and Oceanography. Though the centre was established as a field laboratory for the Department of Zoology in the year 1957 by the eminent scientist (Late) Prof. R.V. Seshaiya, it attained the status of a separate department in 1961. In 1963, UGC recognized this department as the Centre of Advanced Study in Marine Biology for its excellent research contributions. In recognition of the academic accomplishments achieved, the University elevated this Centre as a separate Faculty from the academic year 2010-

2011. The centre offers 7 post graduate courses and 5 research degrees apart from 3 Post-Graduate Diploma courses through Distance Education.

Till date, the Centre had produced 1,725 Postgraduates and 432 students have been awarded with M.Phil. Degree, 650 with Doctoral degree and 3 D.Sc., degree. The centre has successfully completed 200 research projects with potent outputs and has 77 ongoing research projects funded by various national and international agencies. The Centre's faculty members and students have visited various international and national institutions for training and research rather than merely participating in seminars and symposia. The centre has also organized a number of seminars, symposia and workshops at both national and international levels that enlightens the knowledge of students in various aspects.

An excellent display and reference collections of authentically identified specimens of the flora and fauna components of this area are maintained in the museum and there is also a classified catalogue consisting the species of marine invertebrates and vertebrates.

About the workshop

Live food organisms include all plants (phytoplankton) and animal (zooplankton) lives grazed upon by economically important fishes. Phytoplankton is generally eaten by zooplankton. Thus, phytoplankton forms the basis of the food chain. Live foods are able to swim in water column and are constantly available to fish and shellfish larvae are likely to stimulate larval feeding response. In an aquatic ecosystem, these live food organisms constitute the most valuable resource for aquaculture. Most of the fish and shellfish larvae in nature feed on small phytoplanktonic and zooplanktonic organisms. However, natural fish food organisms are usually not abundant in clear pond water, but are abundant in ponds having greenish water. The green colour indicates the presence of phytoplankton and other natural food organisms. In the natural food web, zooplankton constitutes a major part of the diet for marine fish larvae and it is generally believed that copepods can meet the nutritional requirements of fish larvae.

Marine microalgae are extremely important for primary production within intertidal habitats and constitute a major food source for higher trophic levels. A number of activities such as dredging and extractive industries may impact on fish habitats and microalgae, the impacts could lead to reduced local and regional fisheries production. One fundamental consideration is that algae are the base of the aquatic food chains that produce the food resources that fish are adapted to consume. But often it is not appreciated that the biochemical diversity among different algae can be vastly greater than among land plants, even when 'Blue-Green Algae' (e.g. *Spirulina*), more properly called Cyanobacteria, are excluded from consideration. This reflects the very early evolutionary divergence of different algal groups in the history of life on earth. Only one of the many algal groups, the Green Algae, produced a line of descent that eventually gave rise to all the land plants. Therefore it can be difficult to make meaningful generalisations about the nutritional value of this extremely diverse group of organisms; rather it is necessary to consider the particular qualities of specific algae.