NACA Newsletter

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NACA and Thailand's Department of Fisheries Strengthen Collaboration

On June 28, NACA's newly appointed Director General, Dr. Eduardo Leano, along with staff, paid a courtesy call to Mr. Bancha Sukkaew, the Director General of the Department of Fisheries (DOF), Thailand, and directors of DOF's divisions.

Dr. Leano expressed his gratitude for Thailand's ongoing support to the organisation. For more than 30 years, Thailand has hosted the NACA Secretariat and provided both office facilities and supported the administrative staff.

Mr. Sukkaew congratulated Dr. Leano on his new role as NACA Director General. Discussions centered on ongoing projects between NACA and DOF and explored opportunities for collaboration both in Thailand and the wider region.

Mr. Sukkaew emphasised the need to improve food security in the Asia-Pacific region and the importance of cooperation in information sharing and R&D to enhance productivity and reduce costs. He noted that feed costs, which can represent over 70% of total production costs, are a particular concern. Additionally, he highlighted the need to address climate change issues and promote gender equality in the aquaculture industry.

Mr. Bancha Sukkaew, Director General DOF (centre), Dr Eduardo Leano, Director General NACA, next left.

Dr. Leano thanked Mr. Sukkaew for his cooperation and looked forward to further strengthening NACA's partnership with Thailand. He welcomed Thailand's participation in the current project on knowledge brokering for nature-based solutions in aquaculture transformation in Asia-Pacific. The Thai team was working to identify and document innovations and nature-based solutions in the aquaculture industry as a contribution to the Aquaculture Innovation and Investment Hub, presently in development.

Full-degree scholarships and research internship grants from Prince of Songkla University, Thailand

The Faculty of Science at Prince of Songkla University is offering two opportunities:

- Ten full-degree scholarships (PhD, Masters) provided by the Faculty of Science, including full tuition and on-campus dormitory cost: https://sites.google.com/psu.ac.th/sci-ir/collaborations/scholarship
- Research Internship Grant for collaborative graduate research work, available for 4-6 months until September 2025, available to graduate students worldwide: https://sites.google.com/psu.ac.th/sci-ir/collaborations/research-internship

Applications for both programmes close **31 July 2024**, don't miss out!

Manual on *Artemia* production and use

Van Stappen, G., Sorgeloos, P. & Rombaut, G. (eds.)

This FAO publication on brine shrimp is a manual for all those who are using *Artemia* or have an interest in this organism, whether as a source of live food in the hatchery, as a model organism in research, or for other purpose. It is intended for those who wish to update their knowledge on *Artemia* biology, production or its use, but also for those who want to learn about *Artemia* for the first time.

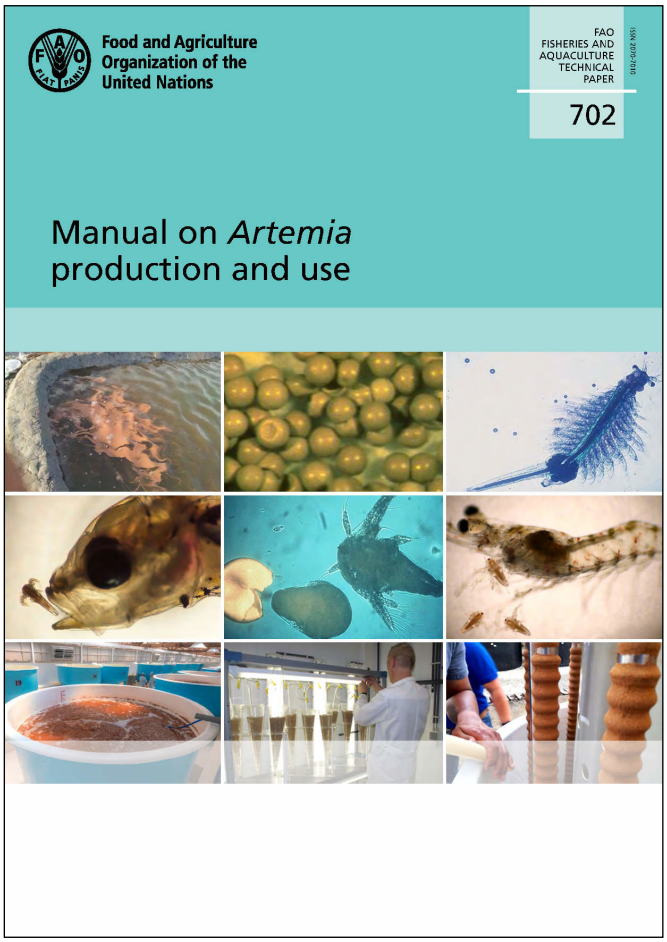
A team of leading *Artemia* experts from around the globe with diverse backgrounds, expertise and working in research, education and/or the industry have jointly contributed to its writing. This manual presents in a concise form essential information on *Artemia* biology and the most important natural cyst resources that find their way to the aquaculture market. It also provides detailed information on general principles and practical procedures to produce *Artemia* in ponds and in tank systems.

Finally, the manual offers a compilation of state-of-the-art guidelines and methodologies related to the use of this crucial live food organism in aquaculture. The illustrations, tables and practical worksheets will help the reader to implement the correct procedures in the production and use of *Artemia*. This publication is a must for anyone working with this unique organism.

Supplementary material (in excel format) that accompanies this publication is available for download separately.

Download the manual from:

- https://enaca.org/?id=1335



The Grass Carp Aquaculture Manual

Ana Silvia Pedrazzani, Nathieli Cozer and Antonio Ostrensky

This manual provides valuable information on grass carp production. It covers everything from grass carp's natural distribution and reproductive behaviours to its biology and anatomy. This manual also explores diseases that can affect grass carp and emphasises the crucial connection between animal welfare and stress in fish.

With a detailed discussion on cultivation systems, this manual includes pond structures and fish farming techniques in both polyculture and monoculture. It provides practical insights into important aspects such as water quality monitoring, feeding, nutrition, health checks and behaviour assessments at every stage of grass carp farming from broodstock management to pre-slaughter and slaughter processes. The emphasis is on responsible harvesting techniques, transportation considerations and humane slaughter methods.

With its extensive range of topics, from the intricacies of grass carp biology to the practical aspects of pond management and sustainable farming practices, this manual offers a comprehensive guide for both novice and experienced fish farmers, and enthusiasts interested in cultivating grass carp sustainably and ensuring optimal animal welfare.

Download the manual courtesy of FAI Farms from:

- https://enaca.org/?id=1338

Pacific oyster farming: A practical manual

Mark Mercer, Leorenzo Gennari, and Alessandro Lovatelli

The purpose of this manual from FAO is to give the reader a foundation of practical knowledge regarding all aspects of Pacific oyster cultivation. It is targeted at new entrants to the market wishing to establish a farm, and existing operators who wish to develop their farms and explore new cultivation techniques. The methodologies described can be applied to both low-tech, low budget, small-scale farming operations and to high-tech, big budget, industrial-scale aquaculture production enterprises.This guide focuses on the functional expertise and technical equipment required to construct and manage an operational farm in the diverse environmental and physical locations in which they can be situated, from the initial stages of finding and selecting a suitable site, to the conclusion of the first production cycle and harvesting the crop.

The manual contains a brief introduction which describes the relevance of the species with regards to global aquaculture production figures and how it can form an important part of future food production strategies.

Chapter 2 describes the anatomy and biology of *Crassostrea gigas* and gives an indication as to the environmental conditions in which the species thrives as well as the pathologies and predators that can result in poor health leading to potential mortalities. Quality assessment parameters are also discussed with regards to desirable attributes when selling final product into the market and what is necessary to be aware of when considering consumer safety.

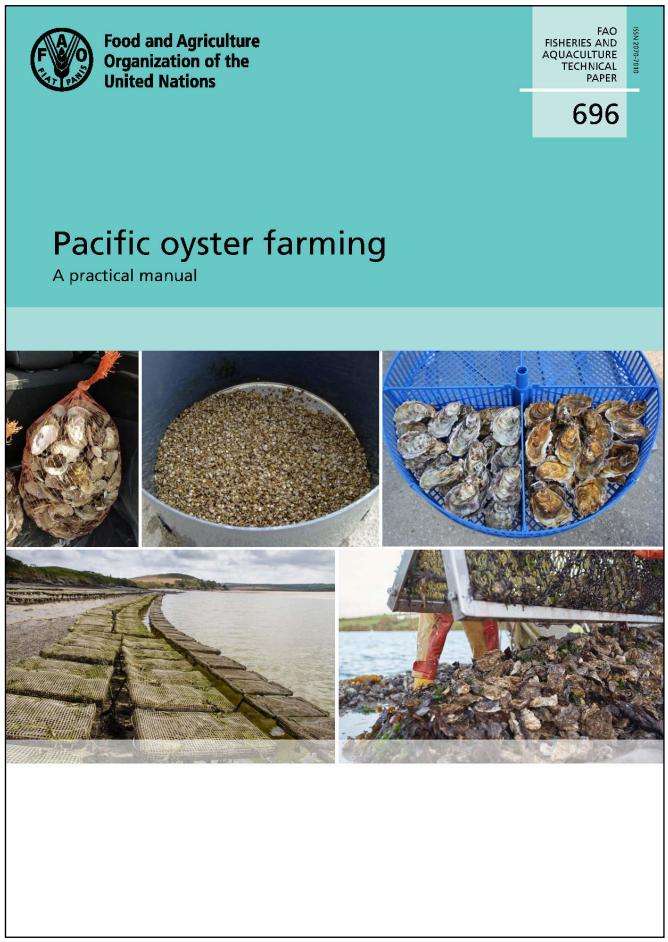
Chapter 3 deals with all aspects of undertaking a survey of potential oyster farming sites and what data should be collected and examined in order to both assess a site's suitability, but also which areas are best suited to different cultivation techniques.

Chapter 4 introduces the main farming techniques that will be described in detail in the following chapters, which includes off-bottom cultivation, on-bottom cultivation, and suspended cultivation, and also gives details of some of the most common cultivation equipment necessary to undertake these operations. The techniques and strategies necessary to procure seed oysters and how to develop them through the nursery stage are also introduced. This includes the basic principles of upwelling.

Chapter 5 provides a detailed description of how to build and operate one particular example of a Floating Upwelling System (Flupsy) which is suitable for use in remote but sheltered conditions. A section on the best practices to be adopted when handling and transporting oysters is also included in this chapter.

Chapters 6, 7 and 8, constitute the main body of the manual and provide an in depth look into the three major cultivation techniques that this guide concentrates on:

- Farming with trestles and bags in the intertidal zone.
- On-bottom cultivation in the intertidal or subtidal zone.
- Offshore long-line cultivation.



These represent three of the most common farming techniques adopted in a multitude of locations and, although other techniques are utilised, are responsible for the majority of oyster production around the globe. In each chapter, all aspects of the farming process are explored including site selection, farm design, farming practices and main constraints.

Finally, the manual finishes with some suggestions for further reading, a glossary and appendixes which includes information on food safety in regard to bivalve molluscs and some further details about cupped oyster production figures.

The manual is available for free download from:

- https://enaca.org/?id=1336

The State of World Fisheries and Aquaculture 2024: Blue Transformation in action

The 2024 edition of The State of World Fisheries and Aquaculture, published by FAO, features the Blue Transformation in action, illustrated by activities and initiatives, led by FAO in collaboration with Members, partners and key stakeholders, to integrate aquatic foods into global food security and sustainability, enhance policy advocacy, scientific research and capacity building, disseminate sustainable practices and technological innovations, and support community involvement.

Part 1 of this edition of The State of World Fisheries and Aquaculture benefits from significant improvements in data collection, analytical and assessment tools and methodologies to present the most up-to-date review of world fisheries and aquaculture production and utilisation.

Part 2 highlights the role of FAO and its partners to catalyse the transformational changes required to support aquaculture expansion and intensification, effective management of global fisheries and upgrading of aquatic value chains.

Part 3 covers the high-impact challenges and opportunities of the untapped potential of utilising whole fish and by-products to improve food security and nutrition, expounds on the role of aquatic food systems in providing critical climate, biodiversity and environmentally sound solutions, and highlights the importance of their integration into national and multilateral processes. It also presents an outlook on future trends up to 2032 based on projections.

The State of World Fisheries and Aquaculture 2024 provides the most up-to-date and evidence-based information, supporting policy, scientific and technical insights on challenges, opportunities and innovations shaping the present and future of the sector, for the benefit of a wide and expanding audience of policymakers, managers, scientists, fishers, farmers, traders, civil society activists and consumers.

Download the report from:

- https://enaca.org/?id=1337

Safeguarding salt lake brine shrimp (*Artemia*) resources for aquaculture: A training project

A training project addressing *Artemia* management and conservation from hydrological, biological, ecological, aquaculture, wildlife and legislative perspectives will be held in Rome, Italy, from 2-6 September 2024. The training is being organised by the Food and Agriculture Organization of the United Nations (FAO) and the Network of Aquaculture Centres in Asia-Pacific (NACA), with the financial support of the Alliance of National and International Science Organizations for the Belt and Road Regions (ANSO) and the Royal Academy for Overseas Sciences (RAOS), in cooperation with the International Artemia Aquaculture Consortium (IAAC). The project will address hydrological, biological, ecological, aquaculture, wildlife and legislative aspects of *Artemia* management and conservation.

Many salt lakes on different continents are under threat of drying up because of human interventions and/or climate change events. Different species of brine shrimp are the sole zooplankton developing in dense monocultures in these inland salt lakes and play crucial roles in wildlife survival and are an important resource to the global fish/shellfish farming (aquaculture) industry:

- *Artemia* biomass is a crucial source of high-protein food for millions of migrating birds foraging in transit during certain periods of the year.

- Thousands of tonnes of *Artemia* cysts (0.5-mm inactive embryos) are harvested from salt lakes in North America and Asia annually for use as a vital zooplankton substitute in the larval rearing of over 900 billion larvae and fry of

different aquatic species that eventually yield more than 10 million tonnes of seafood produced in the aquaculture industry.

In recent decades, a few terminal salt lakes have already dried up (e.g. Aral Sea in Uzbekistan, Urmia Lake in Iran, Owens Lake in the United States of America) with very significant impacts on wildlife and human health, as well as important economic losses (in the billions of USD). On the other hand, new salt lakes may emerge or be restored in new or dried-up locations due to climate change.

Multidisciplinary efforts to better understand hydrological, biological, and ecological events - with the Great Salt Lake in Utah as a unique test case - can deliver insights and allow the formulation of specific legislative measures to safeguard the fate of terminal salt lakes and at least delay their terminal status.

The gene pool of *Artemia* species and strains occurring in salt lakes worldwide need to be safeguarded and better characterised for use in aquaculture. The ecological hetero-geneity and dynamics of salty lakes, influenced by climate change and human intervention, have left genetic signatures in the *Artemia* genome that require an integrated/coordinated approach.

Through this training session, the International Artemia Aquaculture Consortium (IAAC), a subject-oriented network of NACA, is following up on recommendation 16 of the 11th Session of the Sub-Committee on Aquaculture of the Committee on Fisheries (COFI:AQ) (Rome, May 2022) "...The Sub-Committee appreciated the work on *Artemia* and supported FAO efforts to explore development of technologies and sustainable management of *Artemia* resources" and paragraph 69 of the 12th Session of COFI:AQ (Hermosillo, May 2023) "...recommended the preparation of protocols on sustainable harvesting practices of wild resources, ...and certification of cyst products...furthermore, new initiatives are vital to conserve *Artemia* biodiversity...".

Objectives of the training

- Identify inland salt lakes with *Artemia* populations that either have disappeared in recent years, or that are under (short/long-term) threat, and in both cases try to identify the causes for their disappearance or threat with focus on hydrological, biological ecological and climate changing aspects.
- Evaluate methodologies that have been developed to safeguard lost habitats.
- Review the long-term approach taken by different organi-sations in the State of Utah (United States of America) to protect the Great Salt Lake habitat and its resources (for wildlife and for the aquaculture industry).
- Review similar approaches undertaken for the protection of other salt lakes in Asia.

- Review the characterisation, monitoring and safeguarding of the gene pool of native and non-native *Artemia* species and stocks occurring in salt lakes, including guidelines for characterisation of genetic resources and the establish-ment of an *Artemia* cyst bank.
- Brainstorm development of knowledge products that can enhance future management of inland salt lakes including protocols, suitable legislation and training programs, leading to improved water and nutrient management to protect the endemic *Artemia* gene pool and manage the resource effectively.

The detailed programme is available for download from the link below.

- https://enaca.org/?id=1334

Reported Aquatic Animal Diseases in the Asia-Pacific Region during the Fourth Quarter of 2023

Listed below are the reported aquatic animal diseases submitted by countries in the Asia-Pacific region, which covers the fourth quarter of 2023. The original and updated reports can be accessed from the QAAD page at: https://enaca.org/?id=8

Finfish Diseases

- Infection with epizootic haematopoietic necrosis virus (EHN): Australia in wild adults and juveniles redfin perch (*Perca fluviatilis*).
- Infection with *Aphanomyces invadans* (EUS): Bangladesh in mrigal (*Cirrhinus mrigala*) and rohu (*Labeo rohita*); and India in snakehead (*Channa marulius*).
- Infection with red seabream iridovirus (RSIV): Chinese Taipei in hybrid grouper (*Epinephelus fuscoguttatus* x *E. lanceolatus*), seabass (*Lates calcarifer*) and silver seabream (*Rhabdosagrus sarb*a); and, India (reported as ISKNV) in seabass (*Lates calcarifer*).
- Infection with tilapia lake virus (TiLV): India in tilapia (*Oreochromis niloticus*), and Philippines in fingerlings, grow-out and adult tilapia (*Oreochromis* sp.).
- Viral encephalopathy and retinopathy (VER): Chinese Taipei in hybrid grouper and giant grouper (*E. lanceolatus*).
- Grouper iridoviral disease (GIV): Chinese Taipei in hybrid grouper and giant grouper (*E. lanceolatus*).

Molluscan Diseases

- Infection with *Perkinsus olseni*: India in mussel (*Perna viridis*) and clam (*Arca* sp.).

Crustacean Diseases

- Infection with white spot syndrome virus (WSSV): Chinese Taipei in whiteleg shrimp (*P. vannamei*); India in *P. vannamei*; and, the Philippines in *P. vannamei* (fry, PL, grow-out culture, and adult) and wild crabs.
- Infection with infectious hypodermal and haematopoietic necrosis virus (IHHNV): Philippines in *P. vannamei* (PL).
- Acute hepatopancreatic necrosis disease (AHPND): The Philippines in *P. vannamei* (PL).
- Infection with Infectious myonecrosis virus (IMNV): India in *P. vannamei*.
- Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (EHP): Chinese Taipei in *P. vannamei*; India in *P. vannamei*; and, the Philippines in *P. vannamei* (PL and grow out culture) and *P. monodon* (PL).

Amphibian Diseases

- Infection with *Batrachochytrium dendrobatidis*: Australia in *Myxophyes australis*, *Lymnodynastes peronii* and an unknown frog species in Victoria.

Other Diseases

- Bangladesh reported Infection with *Aeromonas* spp. in stinging catfish (*Heteropneustes fossili*s), gulsha (*Mystus cavasius*), pangas catfish (*Pangasianodon hypophthalmus*), pabda (Ompok bimaculatus).
  India reported Infection with tilapia parvovirus in *O. niloticus*.

E.M. Leaño
Director General and Senior Programme Officer, Health and Biosecurity

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First International Artemia Aquaculture Consortium Conference, 9 September (hybrid event)

The first conference of the International Artemia Aquaculture Consortium (IAAC) will be organised on 9 September as part of the same premises as the Larvi '24 Conference, in Ostend, Belgium. This is a hybrid event, with participation possible both in person and online via Zoom.

In the morning session (open to all larvi participants), the following IAAC members will give presentations: Yeong Yik Sung (Malaysia), Patrick Sorgeloos (Belgium), Simon Wilkinson (Thailand), Sui Liying (China), Stephanie De Vos (Belgium), Brad Marden (USA), Phil Brown (USA), Yathish Ramena (USA) and David Johanson (Belgium). A detailed programme will be available shortly.

Participation in the IAAC conference is free, but people attending in person are requested to indicate your interest to attend it on the Larvi registration form linked below. Details of the Zoom meeting will be posted on the NACA / IAAC websites shortly.

https://aquaculture.ugent.be/larvi/registration.htm

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NACA is a network composed of 20 member governments in the Asia-Pacific Region.