



İSTANBUL
UNIVERSITY
PRESS

AQUATIC SCIENCES and ENGINEERING

VOLUME: 37 ISSUE: 3 2022 E-ISSN 2602-473X

Indexing and Abstracting

Web of Science - Emerging Sources Citation Index (ESCI)

SCOPUS

TÜBİTAK-ULAKBİM TR Dizin

Zoological Record

Biological Abstracts

BIOSIS Previews

CAB Abstract

SciLit

DOAJ

EBSCO Academic Source Ultimate

SOBIAD



Scopus®

Clarivate
Analytics

ZOOLOGICAL RECORD



Clarivate
Analytics

BIOSIS PREVIEWS

Clarivate
Analytics

BIOLOGICAL ABSTRACTS



DOAJ
DIRECTORY OF
OPEN ACCESS
JOURNALS

SOBIAD

EBSCO

Owner

Prof. Dr. Melek İşinibilir Okyar
Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye

Responsible Manager

Prof. Dr. Devrim Memiş
Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye

Correspondence Address

Istanbul University Faculty of Aquatic Sciences,
Ordu Caddesi No: 8 34134 Laleli-Fatih / İstanbul, Türkiye
E-mail: ase@istanbul.edu.tr
<https://iupress.istanbul.edu.tr/tr/journal/ase/home>

Publisher

Istanbul University Press
Istanbul University Central Campus, 34452 Beyazıt,
Fatih / İstanbul, Türkiye
Phone: +90 (212) 440 00 00

Cover Photo

Özkan Özden
E-mail: ozden@istanbul.edu.tr

Authors bear responsibility for the content of their published articles.

The publication language of the journal is English.

This is a scholarly, international, peer-reviewed and open-access journal published quarterly in January, April, July, and October.

Publication Type: Periodical

EDITORIAL MANAGEMENT BOARD

Editor-in-Chief

Prof. Dr. Devrim Memiş

Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye - mdevrim@istanbul.edu.tr

Co-Editor-in-Chief

Prof. Dr. Özkan Özden

Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye - ozden@istanbul.edu.tr

Language Editors

Alan James Newson

Istanbul University, Department of Foreign Languages, İstanbul, Türkiye - alan.newson@istanbul.edu.tr

Elizabeth Mary Earl

Istanbul University, Department of Foreign Languages, İstanbul, Türkiye - elizabeth.earl@istanbul.edu.tr

EDITORIAL BOARD

Prof. Dr. Genario Belmonte - University of Salento, Italy - genuario.belmonte@unisalento.it

Prof. Luis M. Botana - Santiago de Compostela University, Santiago-de-Compostela, Spain - luis.botana@usc.es

Prof. Dr. Carsten Harms - Applied University Bremerhaven, Germany - charms@hs-bremerhaven.de

Prof. Dr. Konstantinos Kormas - University of Thessaly, Greece - kkormas@uth.gr

Prof. Dr. Sergi Sabater - Institute of Aquatic Ecology, Spain - sergi.sabater@udg.edu

Prof. Dr. Maya Petrova Stoyneva-Gaertner - Sofia University "St Kliment Ohridski", Bulgaria - mstoyneva@abv.bg

Prof. Dr. Nuray Erkan - Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye - nurerkan@istanbul.edu.tr

Prof. Dr. Reyhan Akçaalan - Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye - akcaalan@istanbul.edu.tr

Prof. Dr. Firdes Saadet Karakulak - Istanbul University, Faculty of Aquatic Sciences, İstanbul, Türkiye - karakul@istanbul.edu.tr

Prof. Dr. Lukas Kalous Czech - University of Life Sciences, Czech - kalous@af.czu.cz

Dr. Pierantonio Addis - University of Cagliari, Italy - addisp@unica.it

Dr. Nico Salmaso - Research and Innovation Centre, Italy - nico.salmaso@fmach.it

Dr. Petra Visser - University of Amsterdam, Netherlands - P.M.Visser@uva.nl

Aims and Scope

Aquatic Sciences and Engineering is an international, scientific, open access periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official publication of İstanbul University Faculty of Aquatic Sciences and it is published quarterly on January, April, July, and October. The publication language of the journal is English and continues publication since 1987.

Aquatic Sciences and Engineering aims to contribute to the literature by publishing manuscripts at the highest scientific level on all fields of aquatic sciences. The journal publishes original research and review articles that are prepared in accordance with the ethical guidelines.

The scope of the journal includes but not limited to; aquaculture science, aquaculture diseases, feeds, and genetics, ecological interactions, sustainable systems, fisheries development, fisheries science, fishery hydrography, aquatic ecosystem, fisheries management, fishery biology, wild fisheries, ocean fisheries, biology, taxonomy, stock identification, functional morphology freshwater, brackish and marine environment, marine biology, water conservation and sustainability, inland waters protection and management, seafood technology and safety.

The target audience of the journal includes specialists and professionals working and interested in all disciplines of aquatic sciences.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

Aquatic Sciences and Engineering is covered in Clarivate Analytics Web of Science Emerging Sources Citation Index

(ESCI), Clarivate Analytics Zoological Record, Biological Abstracts, BIOSIS Previews, Scopus, DOAJ, Scilit, TUBITAK ULAKBIM TR Index and CAB Abstracts.

Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at <https://iupress.istanbul.edu.tr/en/journal/ase/home>. The journal guidelines, technical information, and the required forms are available on the journal's web page.

All expenses of the journal are covered by the İstanbul University Faculty of Aquatic Sciences. Potential advertisers should contact the Editorial Office. Advertisement images are published only upon the Editor-in-Chief's approval.

Statements or opinions expressed in the manuscripts published in the journal reflect the views of the author(s) and not the opinions of the İstanbul University Faculty of Aquatic Sciences, editors, editorial board, and/or publisher; the editors, editorial board, and publisher disclaim any responsibility or liability for such materials.

All published content is available online, free of charge at <https://iupress.istanbul.edu.tr/en/journal/ase/home>. Printed copies of the journal are distributed to the members of the İstanbul University Faculty of Aquatic Sciences, free of charge.

İstanbul University Faculty of Aquatic Sciences holds the international copyright of all the content published in the journal.

OPEN  ACCESS

Editor in Chief: Prof. Devrim MEMİŞ

Address: İstanbul Üniversitesi Su Bilimleri Fakültesi Yetiştiricilik Anabilim Dalı Kalenderhane Mah. 16 Mart Şehitleri caddesi No: 2 Vezneciler / İstanbul, Türkiye

Phone: +90 212 4555700/16448

Fax: +90 212 5140379

E-mail: mdevrim@istanbul.edu.tr

Contents/İçindekiler

Review

The Effects of Climate Change on Aquatic Ecosystems in Relation to Human Health

E. Gozde Ozbayram, Derya Çamur, Latife Köker, Ayça Oğuz Çam, Reyhan Akçaalan, Meriç Albay.....123

Research Articles

Cyanobacterial Diversity and the Presence of Microcystins in the Küçük Menderes River Basin, Türkiye

Latife Köker, Ayça Oğuz, Reyhan Akçaalan, Meriç Albay.....129

Evaluation of different scale-up strategies for *Haematococcus pluvialis* cultivation in airlift photobioreactors

Bahar Aslanbay Guler, Irem Deniz, Zeliha Demirel, Esra Imamoglu.....137

Population Dynamics, Current Trends and Future Prospects of the Black Goby (*Gobius niger*) in the Eastern Part of the Black Sea (Türkiye)

Mehmet Aydın, Murat Karadurmuş.....142

Fish Biodiversity at Kawadighi Haor of Northeastern Bangladesh: Addressing Fish Diversity, Production and Conservation Status

Md. Abu Hena Mostofa Kamal, Md. Abu Kawsar, Debasish Pandit, Mrityunjy Kunda, Khushnud Tabassum, Md. Tariqul Alam.....151

Improving the Reproductive Yield of Black Sea Salmon (*Salmo labrax* PALLAS, 1814) with a Selective Breeding Program

Eyüp Çakmak, Şirin Firidin, Nilgün Aksungur, Yahya Çavdar, İlker Zeki Kurtoğlu, Muharrem Aksungur, Osman Tolga Özel, Ekrem Cem Çankırlıgil, Zehra Duygu Düzgüneş, Esin Batır161

Seasonal Differences in Lipid and Fatty Acid Composition of European Eels (*Anguilla anguilla*, Linnaeus 1758) from Orontes River, Türkiye

İdil Can Tunçelli, Özkan Özden, Nuray Erkan.....169

Benthic Macroinvertebrate Fauna of Some High-Altitude Lakes in the Aladağlar Mountains (Niğde)

Selda Öztürk, Sevil Sungur, Erdoğan Çiçek175