

CAMBRIDGE

JOURNALS

Environmental Conservation

International Journal of Interdisciplinary Environmental Science

Published for the Foundation for Environmental Conservation

Editor

Nicholas V. C. Polunin, University of Newcastle, UK

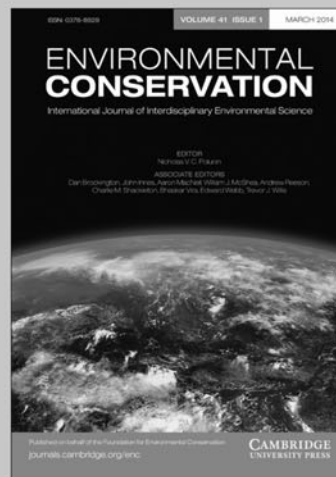
Environmental Conservation is one of the longest-standing, most highly-cited of the interdisciplinary environmental science journals. It includes research papers, reports, comments, subject reviews, and book reviews addressing environmental policy, practice, and natural and social science of environmental concern at the global level, informed by rigorous local level case studies. The journal's scope is very broad, including issues in human institutions, ecosystem change, resource utilisation, terrestrial biomes, aquatic systems, and coastal and land use management. *Environmental Conservation* is essential reading for all environmentalists, managers, consultants, agency workers and scientists wishing to keep abreast of current developments in environmental science. Selected papers are made freely available online as part of **EC Perspectives**.

Price information

is available at: <http://journals.cambridge.org/enc>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/enc-alerts>



Environmental Conservation is available online at:
<http://journals.cambridge.org/enc>

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070

Fax +44 (0)1223 325150

Email journals@cambridge.org

in New York:

Phone +1 (845) 353 7500

Fax +1 (845) 353 4141

Email

subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/enc>



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE

JOURNALS

Antarctic Science

Published on behalf of Antarctic Science Ltd, Cambridge

Editors

Laurie Padman, Earth & Space Research, Corvallis, USA
Walker O. Smith, Virginia Institute of Marine Sciences, USA
Alan P. M. Vaughan, British Antarctic Survey, Cambridge, UK
David W. H. Walton, British Antarctic Survey, Cambridge, UK

Antarctic Science provides a truly international forum for the broad spread of studies that increasingly characterize scientific research in the Antarctic. The journal attracts papers from all countries currently undertaking Antarctic research. Whilst emphasising interdisciplinary work, the journal publishes papers from environmental management to biodiversity, from volcanoes to icebergs, and from oceanography to the upper atmosphere. No other journal covers such a wide range of Antarctic scientific studies.

Price information

is available at: <http://journals.cambridge.org/ans>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/ans-alerts>



Antarctic Science
is available online at:
<http://journals.cambridge.org/ans>

To subscribe contact Customer Services

in Cambridge:
Phone +44 (0)1223 326070
Fax +44 (0)1223 325150
Email journals@cambridge.org

in New York:
Phone +1 (845) 353 7500
Fax +1 (845) 353 4141
Email
subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/ans>



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE

JOURNALS

The Lichenologist

Published on behalf of The British Lichen Society

Senior Editor

Peter D. Crittenden, University of Nottingham, UK

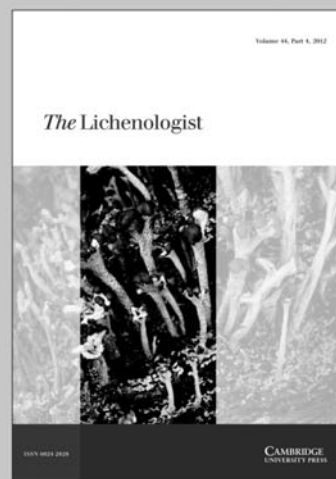
The Lichenologist is the premier scientific journal devoted exclusively to the study of lichens worldwide. As the leading forum for the dissemination of new concepts and topical reviews, *The Lichenologist* reaches more scientists concerned with the study of lichens and lichen symbionts than any other single journal. All aspects of lichenology are considered including systematics and phylogenetics; molecular biology; ultrastructure, anatomy and morphology; secondary chemistry, effects of pollutants and use as bioindicators; biogeography.

Price information

is available at: <http://journals.cambridge.org/lic>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/lic-alerts>



The Lichenologist
is available online at:
<http://journals.cambridge.org/lic>

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070

Fax +44 (0)1223 325150

Email journals@cambridge.org

in New York:

Phone +1 (845) 353 7500

Fax +1 (845) 353 4141

Email

subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/lic>



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE

JOURNALS

Oryx

The International Journal of Conservation
Published for Fauna & Flora International

Editor

Martin Fisher, Fauna & Flora International, UK

Oryx -- *The International Journal of Conservation* is a quarterly peer-reviewed journal of biodiversity conservation, conservation policy and sustainable use, and the interaction of these subjects with social, economic and political issues. The journal has a particular interest in material that has the potential to improve conservation management and practice, supports the publishing and communication aspirations of conservation researchers and practitioners worldwide and helps build capacity for conservation. Besides articles and short communications, *Oryx* regularly publishes reviews, forum sections and letters, and every issue includes comprehensive reporting of international conservation news.

Price information

is available at: <http://journals.cambridge.org/orx>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/orx-alerts>



Oryx

is available online at:
<http://journals.cambridge.org/orx>

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070
Fax +44 (0)1223 325150
Email journals@cambridge.org

in New York:

Phone +1 (845) 353 7500
Fax +1 (845) 353 4141
Email
subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/orx>



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE

JOURNALS

Bird Conservation International

Published on behalf of BirdLife International

Editor-in-Chief

Phil Atkinson, British Trust for Ornithology, UK

Bird Conservation International is a quarterly peer-reviewed journal focusing on the conservation of birds and their habitats. The official journal of BirdLife International, it provides stimulating, international and up-to-date coverage of a broad range of conservation topics, using birds to illuminate wider issues of biodiversity, conservation and sustainable resource use. *Bird Conservation International* publishes original papers and reviews, including specifically targeted articles and recommendations by leading experts.

Price information

is available at: <http://journals.cambridge.org/bci>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/bci-alerts>



Bird Conservation International is available online at:
<http://journals.cambridge.org/bci>

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070

Fax +44 (0)1223 325150

Email journals@cambridge.org

in New York:

Phone +1 (845) 353 7500

Fax +1 (845) 353 4141

Email

subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/bci>



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE

JOURNALS

The Journal of Navigation

Published on behalf of
The Royal Institute of Navigation

Editors

Nick Randall, MSc FRIN, The Royal Institute of Navigation, UK
Tony Fyler, The Royal Institute of Navigation, UK

The Journal of Navigation contains original papers on the science of navigation by man and animals over land and sea and through air and space, including a selection of papers presented at meetings of the Institute and other organisations associated with navigation. Papers cover every aspect of navigation, from the highly technical to the descriptive and historical. Subjects include electronics, astronomy, mathematics, cartography, command and control, psychology and zoology, operational research, risk analysis, theoretical physics, operation in hostile environments, instrumentation, ergonomics, financial planning and law. The journal also publishes selected papers and reports from the Institute's special interest groups. Contributions come from all parts of the world.

Price information

is available at: <http://journals.cambridge.org/nav>

Free email alerts

Keep up-to-date with new material – sign up at
<http://journals.cambridge.org/nav-alerts>



The Journal of Navigation
is available online at:
<http://journals.cambridge.org/nav>

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070
Fax +44 (0)1223 325150
Email journals@cambridge.org

in New York:

Phone +1 (845) 353 7500
Fax +1 (845) 353 4141
Email
subscriptions_newyork@cambridge.org

For free online content visit:
<http://journals.cambridge.org/nav>



CAMBRIDGE
UNIVERSITY PRESS

THE MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM

TERMS OF MEMBERSHIP FOR 2016

MBA MEMBERSHIP (prices per annum)	Price from 1st March 2016
Young Marine Biologist (YMB)	£12.50
Student Member	£25.00
Associate Member	£40.00 (direct debit discount £5)
Professional Member, Mem.MBA	£45.00 (direct debit discount £5)
MBA Fellow, FMBA	£120.00 (direct debit discount £5)
Institutional Member	£340.00

JOURNAL SUBSCRIPTION (MBA price added to the above membership fees, with the exception of YMB as no Journal option for this category)	
Online Journal	£20.00
Print Journal	£60.00
Print & Online Journal	£80.00

The Association is a learned society founded in 1884 and incorporated by Royal Charter in 2013. The Marine Biological Association (MBA) provides a unified, clear, independent voice on behalf of the marine biological community. In 1888, the MBA opened the Plymouth laboratory at Citadel Hill.

The MBA is also a registered charity with its key aims being to promote scientific research into all aspects of life in the sea, including the environment on which it depends, and to disseminate to the public the knowledge gained. The Patron of the Association is His Royal Highness the Duke of Edinburgh, who is also an Honorary Fellow. The other Honorary Fellows are His Serene Highness Prince Albert of Monaco, Dr Sylvia Earle, Sir Tim Hunt and Professor James Lovelock.

The work of the Association is controlled by the Council elected annually by its subscribing members.

The Marine Biological Association, under the direction of its Council, has undertaken research in all branches of marine science and many of the results have been published in this Journal. An account of the history of the first hundred years of the Association and Journal may be found in Volume 67 (pp. 463 and 465).

Since its foundation the Association has been supported by grants from Research Councils and by subscriptions and donations from private members, universities, learned societies, the Fishmongers' Company and other public bodies.

The Plymouth Laboratory was opened in June 1888 and, since that date, considerable additions have been made to the buildings,

including a library, resource centre, extensive laboratory accommodation and seawater facilities.

The Association and the research programme are based entirely at the Citadel Hill Laboratory. The building is shared with SAHFOS (Sir Alister Hardy Foundation for Ocean Science).

The Marine Biological Association retains the lease of the building on Citadel Hill and continues as a very active scientific learned society with a large international membership. The MBA manages a research programme carried out by research fellows together with scientific visitors, publishes an International Journal, Annual Report, Newsletters and organizes scientific meetings.

Subscriptions can be paid by cash/cheque, direct debit from a UK bank account or credit card. *Subscriptions are reduced by £5 per annum if paying by direct debit.

Members of the Association have a wide range of rights and privileges including the use of post-nominals (FMBA for MBA Fellows, Mem.MBA for Professional Members) and being entitled to receive the Marine Biologist Magazine. The Commissioners of Inland Revenue have approved the Association for the purposes of Section 16, Finance Act, 1958, and that the whole of the annual subscriptions paid by a member who qualifies for relief under the section will be allowable as a deduction from his emoluments assessable to income tax.

All correspondence should be addressed to: The Membership Secretary, Marine Biological Association, The Laboratory, Citadel Hill, Plymouth, PL1 2PB, UK (Tel. +44 (0) 1752 633207; Fax. +44 (0) 1752 633102; e-mail: membership@mba.ac.uk).

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
The Pitt Building, Trumpington Street, Cambridge, CB2 1RP, United Kingdom

This journal issue has been printed on FSC-certified paper and cover board. FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. Please see www.fsc.org for information.

Printed by Bell and Bain Limited, Glasgow

CAMBRIDGE UNIVERSITY PRESS
Journals Fulfillment Department, UPH, Shaftesbury Road, Cambridge CB2 8BS, United Kingdom
1 Liberty Plaza, Floor 20, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
C/ Orense, 4, planta 13, 28020, Madrid, Spain
Dock House, The Waterfront, Cape Town 8001, South Africa

CONTENTS

ARTICLES

- Brodie, J., Wilbraham, J., Pottas, J. & Guiry, M.D. A revised check-list of the seaweeds of Britain 1005
- Mirzajani, A., Hamidian, A.M., Bagheri, S. & Karami, M. Possible effect of *Balanus improvisus* on *Cerastoderma glaucum* distribution in the south-western Caspian Sea 1031
- Jin, Q., Wu, H.-G., Zhang, X.-X. & Ke, Z.-L. Influence of non-nutrient environmental factors on *Ulva pertusa*'s inhibitory effects on *Heterosigma akashiwo* growth 1041
- Villegas-Hernández, H., Muñoz, M. & Lloret, J. Reproductive traits of the pompano, *Trachinotus ovatus* (Linnaeus, 1758), in the north-western Mediterranean 1053
- Tavares, M., Santana, W. & Pettan, R. *Rochinia confusa*, a junior synonym of *R. umbonata* (Crustacea: Brachyura: Epialtidae) as revealed by ontogenetic changes 1065
- Huang, D., Ou, H., Wang, D., Chen, J. & Ding, S. Sexual reproduction of the potentially cultivable sponge *Mycale phyllophila* (Porifera, Demospongiae) 1073
- Han, Q., Jiang, X. & Wang, X. The polychaete feeding guild composition in the Sishili Bay, the northern Yellow Sea, China 1083
- Spath, M.C., Delpiani, G. & Figueroa, D.E. Feeding ecology of the apron ray *Discopyge tschudii* (Elasmobranchii, Narcinidae) in San Jorge Gulf, Patagonia, Argentina 1093
- Zamora-Silva, A. & Malaquias, M.A.E. Diet preferences of the Aglajidae: a family of cephalaspidean gastropod predators on tropical and temperate shores 1101
- Wang, Z., Xu, G. & Xu, H. Temporal variation in body-size spectrum of biofilm-dwelling protozoa during the colonization process in coastal waters of the Yellow Sea, northern China 1113
- Yang, Z., Xu, Y., Xu, G. & Xu, H. Temporal variation in taxonomic distinctness of biofilm-associated diatoms within the colonization process in coastal ecosystems 1119
- Powell, E.N., Mann, R., Ashton-Alcox, K.A., Kim, Y. & Bushek, D. The allometry of oysters: spatial and temporal variation in the length – biomass relationships for *Crassostrea virginica* 1127
- Noori Koupaei, A., Mostafavi, P.G., Fallah Mehrabadi, J., Fatemi, S.M.R. & Dehghani, H. Diversity of shallow water zoantharians in Hengam and Larak Islands, in the Persian Gulf 1145
- Lessa, R., Da Silva, C.R., Dias, J.F. & Santana, F.M. Demography of the Agassiz's parrotfish *Sparisoma frondosum* (Agassiz, 1831) in north-eastern Brazil 1157
- Avigliano, E., Jawad, L.A. & Volpedo, A.V. Assessment of the morphometry of saccular otoliths as a tool to identify triplefin species (Tripterygiidae) 1167
- Terrón-Sigler, A., León-Muez, D., Peñalver-Duque, P., Gálvez-César, R. & Espinosa Torre, F. Geographic distribution of *Astroides calycularis* (Scleractinia: Dendrophylliidae) as a baseline to assess future human impacts on the Southern Iberian Peninsula 1181