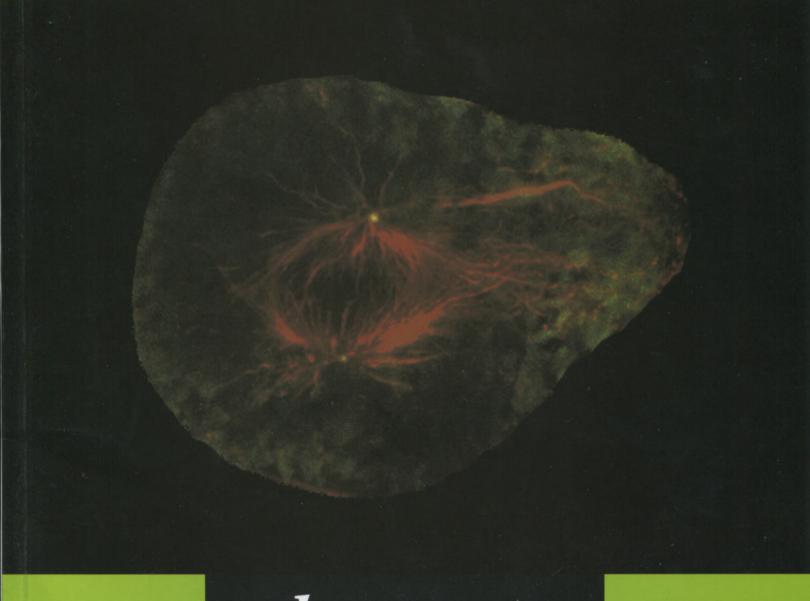
Phycological Research

Volume 49 • Issue 2 • June 2001

ISSN 1322-0829



Blackwell Science Asia

The Japanese Society of Phycology

Phycological Research

EDITOR-IN-CHIEF

Taizo Motomura

Institute of Algological Research, Hokkaido University, Muroran 051-0003, Japan

ASSOCIATE EDITORS

Put O. Ang Jr Department of Biology Chinese University of Hong Kong China

Christos Katsaros Faculty of Biology University of Athens Greece

Ki Wan Nam Department of Marine Biology Pukyong National University Korea Antonio Flores-Moya Faculty of Science University of Málaga Spain

Hiroshi Kawai Kobe University Research Center for Inland Seas Kobe University Japan

Hisayoshi Nozaki Graduate School of Science University of Tokyo Japan David J. Garbary Department of Biology Saint Francis Xavier University Canada

Gwang Hoon Kim Department of Biology Kongju National University Korea

Kazuo Okuda Faculty of Science Kochi University Japan Shuji Hino Faculty of Science Yamagata University Japan

John W. La Claire II School of Biological Sciences University of Texas at Austin USA

John A. West School of Botany University of Melbourne Australia Takeo Horiguchi Graduate School of Science Hokkaido University Japan

Akio Murakami Kobe University Research Center for Inland Seas Kobe University Japan

Giuseppe C. Zuccarello School of Biological Science University of New South Wales Australia

EDITORIAL ADVISORY BOARD

Yuji Fujita *Nagasaki, Japan* Terumitsu Hori *Tsukuba, Japan* Ichiro Imai *Kyoto, Japan* Hironao Kataoka *Sendai, Japan*

Dieter G. Müller Konstanz, Germany Masao Ohno Kochi, Japan Megumi Okazaki Tokyo, Japan Robert Sheath Guelph, Canada Makoto M. Watanabe *Tsukuba, Japan* Yasutsugu Yokohama *Shizugawa, Japan* Isao Inouye *Tsukuba, Japan*

AIMS AND SCOPE Phycological research is published by the Japanese Society of Phycology and complements the Japanese Journal of Phycology. The journal publishes international, peer-reviewed research dealing with all aspects of phycology to facilitate the international exchange of results. All articles are peer-reviewed by at least two researchers expert in the field of the submitted paper. Phycological Research has been credited by the International Association for Plant Taxonomy for the purpose of registration of new non-vascular plant names (including fossils). For further information see http://bgbm3.bgbm.fu-berlin.de/iapt/registration/journals/htm. Publication of Phycological Research has been supported by a Grant-in-Aid for Publication of Scientific Results from the Ministry of Education, Science and Culture, Japan

ABSTRACTING AND INDEXING SERVICES The journal is indexed by BIOSIS Database, Cambridge Scientific Abstracts, Chemical Abstracts Service, Ecological Abstracts, EMBASE/Excerpta Medica, GEOBASE, UnCover, University Microfilms and Zoological Record.

EDITORIAL CORRESPONDENCE All material for publication should be sent to the Editor-in-Chief, Taizo Motomura, Institute of Algological Research, Hokkaido University, Muroran 051-0003, Japan (fax: (+81) 143 22 4135; email: motomura@bio.sci.hokudai.ac.jp). For details instructions concerning the submission of manuscripts, please refer to the Instructions to Authors at the back of a recent issue of the journal or visit the journal web page.

THE JAPANESE SOCIETY OF PHYCOLOGY We invite anyone who is interested in any aspect of phycology to become a member of the Society. As a member you will receive *Phycological Research* and the *Japanese Journal of Phycology* free of charge. The annual membership fee for individuals ¥8000. (Members who reside Japan will receive only the English language journal *Phycological Research* and the annual membership fee is ¥7000 (standard), ¥5000 (student).)

Those who wish to join the Society should send the application form (at the back of each issue of the journal), together with payment, to the Membership Secretary: Dr Koji Iwamoto, at the address given on the form. Members who wish to claim for missing or damaged issues should contact the Membership Secretary.

BUSINESS CORRESPONDENCE AND ADVERTISEMENT BOOKING

All matters relating to orders, subscriptions, back issues, offprints, advertisement bookings and general enquiries should be addressed to: Blackwell Science Asia Pty Ltd, PO Box 378, Carlton South, Victoria 3053, Australia (tel: (+61) 3 9349 0300; fax: (+61) 3 9347 5001; email: info@blacksci-asia.com.au; URL: www.blackwell-science.com/pre).

Blackwell Science Asia's Tokyo Office has Japanese speakers available to answer queries on tel: 03 5802 6781; fax: 03 5802 6782. (For international calls, the country code for Japan is 81.)

SUBSCRIPTION RATES The journal is published four times per year and the prices for 2001 are as follows: Institution: Aus\$604 (Australia); Aus\$549 (New Zealand); ¥40 900 (Japan); US\$335 (rest of world). Personal: Aus\$243 (Australia); Aus\$221 (New Zealand); US\$135 (rest of world). For online subscription prices please contact subs@blacksci-asia.com.au. The journal is despatched to subscribers by surface air-lifted delivery.

COPYRIGHT AND PHOTOCOPYING © 2001 Japanese Society of Phycology. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Blackwell Science Asia Pty Ltd for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided that the base fee of US\$15 per copy is paid directly to: CCC, 222 Rosewood Drive, Danvers, MA 01923, USA. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Special requests should be addressed to the publisher. ISSN: 1322-0829/2001. US\$15.

DISCLAIMER The Publisher, the Society and the Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, the Society or the Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, the Society or the Editors of the products advertised.

This journal is printed on acid-free paper.

Cover Microtubules (red) radiating from two centrosomes (yellow) in Pelvetia zygote. Photographed by Dr Sherryl Bisgrove.

The Japanese Society of Phycology

Officers for 2001-2002

President: Yoshiaki Hara, Faculty of Science, Yamagata University, Yamagata 990-8560, Japan Secretary: Tasuku Hishinuma, Faculty of Science, Yamagata University, Yamagata 990-8560, Japan

Membership secretary: Ichiro Mine, Faculty of Science, Kochi University, Kochi 780-8520, Japan Treasurer: Naoto Hanzawa, Faculty of Science, Yamagata University, Yamagata 990-8560, Japan

Members of Executive Council 2001-2002

Tetsuro Ajisaka Kyoto University
Hideomi Amano Mie University
Terumitsu Hori University of Tsukuba
Takeo Horiguchi Hokkaido University
Daisuke Fujita Toyama Prefectural Fisheries
Research Institute
Hiroshi Kawai Kobe University
Masahiko Idei Bunkyo University Women's College
Masafumi Iima Nagasaki University
Taku Misonou Yamanashi University
Taizo Motomura Hokkaido University

Tamotsu Nagumo The Nippon Dental University
Tadahide Noro Kagoshima University
Masao Ohno Kochi University
Munekatsu Saitoh Morioka Junior College
Jiro Tanaka Tokyo University of Fisheries
Toshinobu Terawaki National Research Institute of
Fisheries and Environment of Inland Sea
Yasutsugu Yokohama Shizugawa Nature Center
Makoto M. Watanabe National Institute for
Environmental Studies

JOIN THE JAPANESE SOCIETY OF PHYCOLOGY AND RECEIVE FOUR ISSUES OF PHYCOLOGICAL RESEARCH PER YEAR FREE OF CHARGE

The Japanese Society of Phycology, founded in 1952, currently has 760 members (including 105 overseas members). The Society is open to anyone who is interested in pure or applied aspects of phycology.

Application for membership (Please type or write in block letters) Membership starts from 2001 Name in full: (Family name) Mailing address: __ (Postal code) (Country) Telephone: _____ E-mail: Date:____ Signature: __ The annual fee for individual members is ¥8000 (¥7000 for members who reside outside Japan, ¥5000 for students who submit a verifying statement signed by their Chairperson or Head of Department) ☐ MasterCard ☐ American Express ☐ Visa Payment by: Card number: ______ Expiry date: ____ ☐ International giro postal transfer (Postal Account No.: 01320-4-48748) ☐ International postal money order Send application form to: Dr Ichiro Mine

Fax: +81 88 844 8356; email:jsphycol@anet.ne.jp

Faculty of Science Kochi University 2-5-1 Akebono-cho, Kochi 780-8520, Japan

Phycological Research

Volume 49 • Issue 2 • June 2001

Dun-Hai Li, Yong-Ding Liu and Li-Rong Song	
Hormogonia mass differentiation from Nostoc sphaeroides Kütz. (cyanobacterium) and the	
comparison of structural characteristics between hormogonia and vegetative filaments	81
Luciano F. Fernandes, Leticia Zehnder-Alves and Jackson C. Bassfeld	
The recently established diatom Coscinodiscus wailesii (Coscinodiscales, Bacillariophyta)	
in Brazilian waters. I: Remarks on morphology and distribution	89
Naomi Phillips, Celia M. Smith and Clifford W. Morden	
An effective DNA extraction protocol for brown algae	97
Marcelo Ribeiro Zucchi and Orlando Necchi Jr	
Effects of temperature, irradiance and photoperiod on growth and pigment content in some	
freshwater red algae in culture	103
Shogo Nakamura, Haruo Ogihara, Kinue Jinbo, Midori Tateishi, Tetsuo Takahashi, Kenjiro Yoshimura, Mamoru Kubota, Masakatsu Watanabe and Soichi Nakamura	
Chlamydomonas reinhardtii Dangeard (Chlamydomonadales, Chlorophyceae) mutant with	
multiple eyespots	115
Kazuhiro Kogame	
Life history of Chnoospora implexa (Chnoosporaceae, Phaeophyceae) in culture	123
Hidekazu Suzuki, Tamotsu Nagumo and Jiro Tanaka	
Morphology of the marine epiphytic diatom Cocconeis heteroidea (Bacillariophyceae)	129
Hidekazu Suzuki, Tamotsu Nagumo and Jiro Tanaka	
A new marine diatom, Cocconeis shikinensis sp. nov. (Bacillariophyceae) from Japan	137
Whitney E. Hable, Peter EerNisse, Michael Hoggan and Darryl L. Kropf	
Effect of calcium ionophores on early development in fucoid algae	145



