

Volume 8(4) 405–536

December 1998

ISSN 0960–2585

# SEED SCIENCE RESEARCH



CAB INTERNATIONAL

# SEED SCIENCE RESEARCH

## Aims and Scope

*Seed Science Research* provides an international vehicle for the publication of original papers and review articles on the fundamental aspects of seed research. The emphasis is on the physiology, biochemistry, molecular biology and ecology of seeds, covering the following key topics:

- germination
- dormancy
- ecophysiology
- reserve mobilization
- viability
- longevity
- vigour
- establishment
- seed and embryo development
- maturation
- seed-soil and seed-animal interactions
- computer modelling
- chemical and structural defences
- biotechnology
- physiology of seed pathology

## Editor

Professor M. Black

*Division of Life Sciences, King's College London, Campden Hill Road, London, W8 7AH, UK*  
Tel: +44 (0)171 333 4212 Fax: +44 (0)171 333 4500 Email: michael.black@kcl.ac.uk

## Associate Editors

M.A. Cohn, *Louisiana State University Agricultural Center, Baton Rouge, USA*

K. Thompson, *University of Sheffield, UK*

## Editorial Board

J.M. Baskin, *University of Kentucky, Lexington, USA*

J.D. Bewley, *University of Guelph, Ontario, Canada*

K.J. Bradford, *University of California, Davis, USA*

C.M. Bray, *University of Manchester, UK*

D. Côme, *Université Pierre et Marie Curie, Paris, France*

F. Corbineau, *Université Pierre et Marie Curie, Paris, France*

A. Cuming, *University of Leeds, UK*

M. Delseny, *Université de Perpignan, France*

R. Ellis, *University of Reading, UK*

M. Fenner, *University of Southampton, UK*

G.B. Fincher, *University of Adelaide, Commonwealth Research Centre, Victoria, Australia*

J. Greenwood, *University of Guelph, Ontario, Canada*

G. Hendry, *University of Dundee, UK*

H.W.M. Hilhorst, *Wageningen Agricultural University, The Netherlands*

R. Hill, *University of Manitoba, Winnipeg, Canada*

A.C. Leopold, *Cornell University, Ithaca, New York, USA*

A. Mayer, *Hebrew University of Jerusalem, Israel*

B. McKersie, *University of Guelph, Ontario, Canada*

T. Minamikawa, *Tokyo Metropolitan University, Japan*

D. Osborne, *Oxford Research Unit, Open University, UK*

R.J. Probert, *Royal Botanic Gardens, West Sussex, UK*

P. Schopfer, *Biologisches Institut II der Universität, Freiburg, Germany*

M.K. Walker-Simmons, *Washington State University, Pullman, USA*

C.W. Walters, *National Seed Science Laboratory, Fort Collins, USA*

T. Wang, *John Innes Institute, Norwich, UK*

## Seed Science Research

Editorial .....	405
Personal View	
<b>Simpson, G.</b> Seminal thoughts .....	407
Invited Review	
<b>Shirley, B. W.</b> Flavonoids in seeds and grains: physiological function, agronomic importance and the genetics of biosynthesis .....	415
Physiology & Biochemistry	
<b>Botto, J. F., Sánchez, R. A. &amp; Casal, J. J.</b> Burial conditions affect light responses of <i>Datura ferox</i> seeds .....	423
<b>Duff, S. M. G., Guy, P. A., Nie, X., Durnin, D. C. &amp; Hill, R. D.</b> Haemoglobin expression in germinating barley .....	431
<b>Jalink, H., van der Schoor, R., Frandas, A., van Pijlen, J. G. &amp; Bino, R. J.</b> Chlorophyll fluorescence of <i>Brassica oleracea</i> seeds as a non-destructive marker for seed maturity and seed performance .....	437
<b>Malan, H. L. &amp; Farrant, J. M.</b> Effects of the metal pollutants cadmium and nickel on soybean seed development .....	445
<b>Markovič, O. &amp; Obendorf, R. L.</b> Soybean seed pectinesterase .....	455
<b>Pammenter, N. W., Greggains, V., Kioko, J. I., Wesley-Smith, J., Berjak, P. &amp; Finch-Savage, W. E.</b> Effects of differential drying rates on viability retention of recalcitrant seeds of <i>Ekebergia capensis</i> .....	463
<b>Sacadé, M., Hoekstra, F. A., van Pijlen, J. G. &amp; Groot, S. P. C.</b> A multifactorial study of conditions influencing longevity of neem ( <i>Azadirachta indica</i> ) seeds .....	473
<b>Toorop, P. E., van Aelst, A. C. &amp; Hilhorst, H. W. M.</b> Endosperm cap weakening and endo- $\beta$ -mannanase activity during priming of tomato ( <i>Lycopersicon esculentum</i> cv. Moneymaker) seeds are initiated upon crossing a threshold water potential .....	483
Ecology	
<b>Akinola, M. O., Thompson, K. &amp; Hillier, S. H.</b> Development of soil seed banks beneath synthesized meadow communities after seven years of climate manipulations .....	493
<b>Baskin, J. M., Nan, X. &amp; Baskin, C. C.</b> A comparative study of seed dormancy and germination in an annual and a perennial species of <i>Senna</i> (Fabaceae) .....	501
<b>Hulme, P. E.</b> Post-dispersal seed predation and seed bank persistence .....	513
<b>Rodriguez, A. M., Jacobo, E. J. &amp; Deregibus, V. A.</b> Germination behaviour of Italian ryegrass in flooding pampa rangelands .....	521
Index of Authors (Volume 8) .....	529
Index of Contents (Volume 8) .....	533

*Seed Science Research* is covered in the *Science Citation Index*<sup>®</sup>, *Current Contents*<sup>®</sup>/*Agriculture, Biology & Environmental Sciences*, *SciSearch*<sup>®</sup>, *Research Alert*<sup>®</sup>, *BIOSIS*<sup>®</sup> Database, CAB ABSTRACTS, and Elsevier BIOBASE/*Current Awareness in Biological Sciences*

The contents page of this journal is available on the internet before publication at  
<http://www.cabi.org/>

# Seed Science Research

Volume 8 1998

ISSN: 0960-2585

## **Publishing, Production, Marketing, and Subscription**

### **Sales Office:**

CABI Publishing  
Wallingford  
Oxon OX10 8DE  
UK  
Tel +44(0)1491 832111  
Fax: +44 (0)1491 829292  
Email: [publishing@cabi.org](mailto:publishing@cabi.org)  
Telex 847964 (COMAGG G)

### **For Customers in North America:**

CABI Publishing  
10 E 40th Street  
Suite 3203  
New York NY 10016  
USA  
Tel: +1 (212) 481 7018  
Toll-free: 800 528 4841  
Fax: +1(212) 686 7993  
Email: [cabi-nao@cabi.org](mailto:cabi-nao@cabi.org)

**Publisher:** Philip Edge

**Publishing Editor:** Jenny Howatson

**Product Manager (Marketing):** Sue Hill

*Seed Science Research* is an international journal published quarterly by CABI Publishing (a division of CAB INTERNATIONAL) in March, June, September and December

### **Special sales and supplements:**

This journal accepts advertising and inserts. We also provide bulk reprints of suitable papers to meet teaching or promotional requirements. The journal also publishes abstracts and proceedings on behalf of academic and corporate sponsors. Please contact David Nicholson at the Wallingford address for further details.

### **Subscription information:**

The subscription rates for Volume 8, 1998 (4 issues) are:

Non-member country:	£170.00
Member Country*:	£136.00
US Dollars (Americas only):	\$295.00

(\* Member Countries include UK, Canada, India, China, Australia, New Zealand. For a full list please apply to CAB INTERNATIONAL.)

Japanese Agent Maruzen Company Ltd, PO Box 5050, Tokyo International, 100-31, Japan

Personal subscription discounts are available on request: please contact the Product Manager (Marketing) at the Wallingford address.

Any **supplements** to this journal published in the course of the annual volume are normally supplied to subscribers at no extra charge

**Back volumes** are available. Please contact CABI Publishing for further information.

**Claims** for non-receipt of journal issues will be considered on their merit and only if the claim is received within six months of publication. Replacement copies supplied after this date will be chargeable.

**Despatch:** deliveries outside the UK are by ASP Printflow Airsaver unless other arrangements are made. Customers requiring airmail delivery should indicate clearly their requirements and add an additional 10% to the relevant subscription price.

**US POSTMASTERS:** please send address corrections to CABI Publishing at the Wallingford address.

### **Information for Authors**

Three copies of the manuscript and artwork should be sent to:

Professor Michael Black  
Division of Life Sciences  
King's College London  
Campden Hill Road  
London  
W8 7AH  
UK

**Notes for Authors** are available from this address if not printed in this issue of the journal.

**Offprints:** The author (or main author) of an accepted paper will receive 50 free offprints and a copy of the journal issue in which their paper is published. Additional offprints are available for a fee and should be ordered at proof stage. **No page charges are levied by this journal.**

**Copyright: CAB INTERNATIONAL, 1998.** All rights reserved: permission for reproduction of any part of the journal (text, figures, tables or other matter) in any form (on paper, microfiche or electronically) should be sought directly from the Publisher, or a licence permitting restricted copying obtained from the Copyright Licensing Agency, Tottenham Court Road, London W1P 9HE, UK, or in the USA by the Central Clearance Center, 27 Congress Street, Salem MA01970

**Disclaimer:** The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from or is based upon sources believed by us to be reliable, but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

CAB INTERNATIONAL does not accept responsibility for any trade advertisement included in this publication

This journal is printed on acid-free paper from renewable sources  
Printed by Information Press, Eynsham, UK