

# Advances in Plant Cytogenetics

---

Editors

*James A. Birchler*, Columbia, Mo.

*J. Chris Pires*, Columbia, Mo.

96 figures, 80 in color, and 38 tables, 2010

S. Karger  
Medical and Scientific Publishers  
Basel • Freiburg • Paris • London  
New York • Bangalore • Bangkok  
Shanghai • Singapore • Tokyo • Sydney

#### Disclaimer

The statements, opinions and data contained in this publication are solely those of the individual authors and contributors and not of the publisher and the editor(s). The appearance of advertisements in the journal is not a warranty, endorsement, or approval of the products or services advertised or of their effectiveness, quality or safety. The publisher and the editor(s) disclaim responsibility for any injury to persons or property resulting from any ideas, methods, instructions or products referred to in the content or advertisements.

#### Drug Dosage

The authors and the publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new and/or infrequently employed drug.

#### All rights reserved.

No part of this publication may be translated into other languages, reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, microcopying, or by any information storage and retrieval system, without permission in writing from the publisher or, in the case of photocopying, direct payment of a specified fee to the Copyright Clearance Center (see 'General Information').

© Copyright 2010 by S. Karger AG,  
P.O. Box, CH-4009 Basel (Switzerland)  
Printed in Switzerland  
on acid-free and non-aging paper (ISO 9706) by  
Reinhardt Druck, Basel

---

**KARGER**

Fax +41 61 306 12 34  
E-Mail [karger@karger.ch](mailto:karger@karger.ch)  
[www.karger.com](http://www.karger.com)

## Contents

## 5 Preface

Birchler, J.A.; Pires, J.C. (Columbia, Mo.)

## Chromosomal Diversity

## 6 Diversity of Chromosomal Karyotypes in Maize and Its Relatives

Albert, P.S.; Gao, Z.; Danilova, T.V.; Birchler, J.A. (Columbia, Mo.)

## 17 Recent and Frequent Insertions of Chloroplast DNA into Maize Nuclear Chromosomes

Roark, L.M.; Hui, A.Y.; Donnelly, L.; Birchler, J.A.; Newton, K.J. (Columbia, Mo.)

## 24 Structural Differences in Chromosomes Distinguish Species in the Tomato Clade

Anderson, L.K.; Covey, P.A.; Larsen, L.R.; Bedinger, P.; Stack, S.M. (Fort Collins, Colo.)

## Genome and Chromatin Dynamics

35 Single Integration and Spread of a *Copia*-Like Sequence Nested in rDNA Intergenic Spacers of *Allium cernuum* (Alliaceae)

Chester, M. (London); Sykorova, E.; Fajkus, J. (Brno); Leitch, A.R. (London)

47 Fate of *Aegilops speltoides*-Derived, Repetitive DNA Sequences in Diploid *Aegilops* Species, Wheat-*Aegilops* Amphiploids and Derived Chromosome Addition Lines

Kumar, S. (Uttarakhand); Friebe, B.; Gill, B.S. (Manhattan, Kans.)

## 55 Higher Organization and Histone Modification of the Plant Nucleus and Chromosome

Wako, T. (Tsukuba); Fukui, K. (Osaka)

## 64 Dynamics of Functional Heterochromatic Domains in the Plant Interphase Nucleus

Delgado, M.; Frescatada, M.; Ribeiro-Varandas, E.; Viegas, W. (Lisbon); Jones, R.N. (Aberystwyth)

## 72 Constructing Defined Chromosome Segmental Duplications in Maize

Yu, C. (Ames, Iowa); Danilova, T. (Columbia, Mo.); Zhang, J. (Ames, Iowa); Birchler, J. (Columbia, Mo.); Peterson, T. (Ames, Iowa)

## Centromeres

## 82 Neocentrics and Holokinetics (Holocentrics): Chromosomes out of the Centromeric Rules

Guerra, M.; Cabral, G. (Recife); Cuacos, M.; González-García, M.; González-Sánchez, M.; Vega, J.; Puertas, M.J. (Madrid)

## 97 Behavior of Centromeres in Univalents and Centric Misdivision in Wheat

Lukaszewski, A.J. (Riverside, Calif.)

110 Interspecific Hybrids of *Hordeum marinum* ssp. *marinum* × *H. bulbosum* Are Mitotically Stable and Reveal No Gross Alterations in Chromatin Properties

Sanei, M. (Gatersleben); Pickering, R. (Gatersleben/Christchurch); Fuchs, J.; Banaei Moghaddam, A.M. (Gatersleben); Dziurlikowska, A. (Katowice); Houben, A. (Gatersleben)

## Pairing and Recombination

117 The *Ph1* Locus from Wheat Controls Meiotic Chromosome Pairing in Autotetraploid Rye (*Secale cereale* L.)

Lukaszewski, A.J. (Riverside, Calif.); Kopecký, D. (Olomouc)

124 A Comparative Analysis of Chromosome Pairing at Metaphase I in Interspecific Hybrids between Durum Wheat (*Triticum turgidum* L.) and the Most Widespread *Aegilops* Species

Cifuentes, M. (Versailles); Garcia-Agüero, V.; Benavente, E. (Madrid)

## 133 Chiasma Frequency Is Region Specific and Chromosome Conformation Dependent in a Rye Chromosome Added to Wheat

Naranjo, T.; Valenzuela, N.T.; Perera, E. (Madrid)

143 An Easy Protocol for Studying Chromatin and Recombination Protein Dynamics during *Arabidopsis thaliana* Meiosis: Immunodetection of Cohesins, Histones and MLH1

Chelysheva, L.; Grandont, L.; Vrielynck, N.; le Guin, S.; Mercier, R.; Grelon, M. (Versailles)

## 154 Development of a Molecular Cytogenetic Recombination Assay for Barley

Phillips, D.; Nibau, C. (Aberystwyth); Ramsay, L.; Waugh, R. (Invergowrie); Jenkins, G. (Aberystwyth)

**162 Physical Distribution of Homoeologous Recombination in Individual Chromosomes of *Festuca pratensis* in *Lolium multiflorum***

Kopecký, D.; Havráňková, M. (Olomouc); Loureiro, J.; Castro, S. (Coimbra); Lukaszewski, A.J. (Riverside, Calif.); Bartoš, J.; Kopecká, J.; Doležel, J. (Olomouc)

**173 Chromosome Dynamics in Meiotic Prophase I in Plants**

Ronceret, A. (Versailles); Pawlowski, W.P. (Ithac, N.Y.)

Physical and Cytogenetic Mapping

**184 Reciprocal and Multi-Species Chromosome BAC Painting in Crucifers (Brassicaceae)**

Lysak, M.A.; Mandáková, T. (Brno); Lacombe, E. (Montpellier)

**190 Integration of Genetic, Physical, and Cytogenetic Maps for *Brassica rapa* Chromosome A7**

Xiong, Z. (Columbia, Mo.); Kim, J.S. (Columbia, Mo./Suwon); Pires, J.C. (Columbia, Mo.)

**199 FISH Applications for Genomics and Plant Breeding Strategies in Tomato and Other Solanaceous Crops**

Szinay, D.; Bai, Y.; Visser, R.; de Jong, H. (Wageningen)

**211 Development of Chromosome-Specific BAC Resources for Genomics of Bread Wheat**

Šafář, J.; Šimková, H.; Kubaláková, M.; Číhalíková, J.; Suchánková, P.; Bartoš, J.; Doležel, J. (Olomouc)

**224 A Cytological Map of the Short Arm of Rye Chromosome 1R Constructed with 1R Dissection Stocks of Common Wheat and PCR-Based Markers**

Gyawali, Y.P.; Nasuda, S.; Endo, T.R. (Kyoto)

**234 A Method to Produce Radiation Hybrids for the D-Genome Chromosomes of Wheat (*Triticum aestivum* L.)**

Riera-Lizarazu, O.; Leonard, J.M.; Tiwari, V.K. (Corvallis, Oreg.); Kianian, S.F. (Fargo, N.Dak.)

Sex Chromosomes

**241 Karyotyping in Melon (*Cucumis melo* L.) by Cross-Species Fosmid Fluorescence in situ Hybridization**

Liu, C.; Liu, J.; Li, H.; Zhang, Z.; Han, Y.; Huang, S.; Jin, W. (Beijing)

**250 *Silene latifolia*: The Classical Model to Study Heteromorphic Sex Chromosomes**

Kejnovsky, E.; Vyskot, B. (Brno)

**263 Author Index Vol. 129, No. 1–3, 2010**