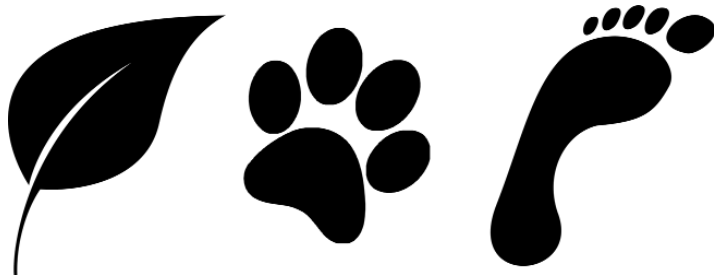


# ACTA BIOLOGICA CRACOVIENSIS

SERIES BOTANICA

Vol. 58 suppl. 1

2016



**XXXII Conference on Embryology**  
**Plants • Animals • Humans**

**ABSTRACTS**

**May 18–21, 2016**  
**Wojślawice, Poland**

Polish Academy of Sciences – Krakow Branch  
Polish Academy of Arts and Sciences

# ACTA BIOLOGICA CRACOVIENSIA

## Series Botanica

The Official Publication of the Biological Commission of the Polish Academy of Sciences – Cracow Branch and the Jagiellonian University

DEVOTED TO PLANT ANATOMY, MORPHOLOGY, CYTOLOGY, GENETICS, KARYOLOGY, EMBRYOLOGY, TISSUE CULTURE, PHYSIOLOGY, BIOSYSTEMATICS, PHYTOCHEMISTRY, SECONDARY METABOLISM, PHARMACOLOGY, BIOACTIVITY OF PLANT NATURAL PRODUCTS, BIOTECHNOLOGY, MOLECULAR PHYLOGENETICS AND PHYLOGEOGRAPHY  
ESTABLISHED 1958

© Polish Academy of Sciences and the Jagiellonian University, Cracow 2016

The edition of this supplement is financed by the Polish Academy of Arts and Sciences.

### EDITORIAL NOTE

The abstract texts have been printed as received, and no proofreading or corrections have been made. Thus, the contents of the abstracts are entirely the responsibility of the contributors. In the Index, the names of authors (in alphabetical order) are accompanied by the respective page numbers.

**ACTA BIOLOGICA CRACOVIENSIA Series Botanica is published twice a year by the Polish Academy of Sciences – Cracow Branch, ul. św. Jana 28, 31-018 Cracow, Poland**

Publisher: De Gruyter Open Sp. z o.o. <http://www.degruyteropen.com>

Set and printed by KON  Tekst Publishing House, Bobrzeckiej 9, 31-216 Cracow, Poland

Technical editor: Wojciech Marcinek

Author of graphic: Dominika Hull

ACTA BIOLOGICA CRACOVIENSIA Series Botanica on the Internet

The home page of *Acta Biologica Cracoviensia Series Botanica* can be found at <http://www2.ib.uj.edu.pl/abc/>

Webmaster: Piotr Osyczka

Electronic version publisher: De Gruyter Open [www.degruyter.com/view/j/abcsb](http://www.degruyter.com/view/j/abcsb)

The *Acta Biologica Cracoviensia Series Botanica* is participating in CrossCheck System's users in order to ensure that the content published is original and trustworthy.

**Primary version of the journal is printed version.**

Indexed in AGRICOLA (*National Agricultural Library*) AGRIS, AGRO, CABI databases (*Agroforestry Abstracts, Botanical Pesticides, CAB Abstracts, Crop Physiology Abstracts, Crop Science Database, Dairy Science Abstracts, Field Crop Abstracts, Forest Products Abstracts, Forestry Abstracts, Grasslands and Forage Abstracts, Horticultural Science Abstracts, Maize Abstracts, Ornamental Horticulture, Plant Breeding Abstracts, Plant Genetic Resources Abstracts, Plant Growth Regulator Abstracts, Potato Abstracts, Rice Abstracts, Seed Abstracts, Soils and Fertilizers Abstracts, Soybean Abstracts, Sugar Industry Abstracts, Wheat, Barley and Triticale Abstracts*), CNPIEC, EBSCO Discovery Service, Elsevier – SCOPUS, Foodline Science, FSTA – *Food Science & Technology Abstracts*, Google Scholar, Index Copernicus, J-Gate, Microsoft Academic Search, Naviga (*Softweco*), Polish Scientific Journals Contents, Primo Central (*ExLibris*), Summon (*Serials Solutions/ProQuest*), TDOne (*TDNet*), Thomson Reuters – *Biological Abstracts, Thomson Reuters – BIOSIS Previews, Thomson Reuters – Current Contents/Agriculture, Biology, and Environmental Sciences, Thomson Reuters – Journal Citation Reports/Science Edition, Thomson Reuters – Science Citation Index Expanded, WorldCat (OCLC)*.

# ACTA BIOLOGICA CRACOVIENSIA

## Series Botanica

### Editor

ANDRZEJ JOACHIMIAK

*Department of Plant Cytology and Embryology, Jagiellonian University,  
Gronostajowa 9, 30-387 Cracow, Poland  
Tel.: 48 12 664 6035; Fax: 48 12 664 51 04; e-mail: a.joachimia@uj.edu.pl*

### Managing Editor

MONIKA TULEJA

*Department of Plant Cytology and Embryology, Jagiellonian University,  
Gronostajowa 9, 30-387 Cracow, Poland  
Tel.: 48 12 664 6038; Fax: 48 12 664 51 04; e-mail: abc@iphils.uj.edu.pl*

### Section Editors

Section name:

Plant embryology, plant cell ultrastructure

JERZY BOHDANOWICZ

*Department of Plant Cytology and Embryology, University of Gdańsk, Wita Stwosza 59, 80-308 Gdańsk,  
Poland, e-mail: jurboh@biotech.univ.gda.pl*

Section name:

Plant genetics and cytogenetics, molecular cytogenetics

ROBERT HASTEROK

*Department of Plant Anatomy and Cytology, University of Silesia in Katowice, Jagiellońska 28,  
40-032 Katowice, Poland, e-mail: robert.hasterok@us.edu.pl*

Section name:

Plant cell tissue and organ culture, developmental biology

ROBERT KONIECZNY

*Department of Plant Cytology and Embryology, Jagiellonian University, Gronostajowa 9, 30-387 Cracow,  
Poland, e-mail: robert.konieczny@uj.edu.pl*

Section name:

Phytochemistry, secondary metabolism, pharmacology, bioactivity of plant natural products,  
biotechnology

ADAM MATKOWSKI

*Chair and Department of Pharmaceutical Biology and Botany, Silesian Piasts University  
of Medicine in Wrocław, Al. Jana Kochanowskiego 10, 51-601 Wrocław, Poland,  
e-mail: pharmaceutical.biology@wp.eu*

Section name:

Molecular phylogenetics and phylogeography

MICHAŁ RONIPIER

*W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, 31-512, Cracow, Poland  
e-mail: m.ronikier@botany.pl*

Section name:

Plant physiology – photosynthesis and respiration, biotic and abiotic stresses, inter- and intracellular  
signalling, plant movements, phytohormones in plant growth and development

IRENEUSZ ŚLESIAK

*Franciszek Górski Institute of Plant Physiology, Polish Academy of Sciences  
Niezapominajek 21, 30-239 Cracow, Poland  
e-mail: i.slesak@ifr-pan.krakow.pl*

## Advisory Editorial Board

HARVEY E BALLARD, JR. *Department of Environmental and Plant Biology, Ohio University, Porter Hall, Athens, Ohio 45701, USA,*  
e-mail: ballardh@ohio.edu

Molecular approaches in plant systematics, ecology and evolution

TATYANA B. BATYGINA. *Komarov Botanical Institute, Department of Embryology and Reproductive Biology, Prof. Popov St. 2, 197376 St. Petersburg, Russia,*  
e-mail: tb\_batygina@mail.ru

Plant embryology

JÓZEF BEDNARA. *Department of Plant Anatomy and Cytology, Maria Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland,*  
e-mail: ancyt@biotop.umcs.lublin.pl

Plant embryology

BORUT BOHANEC. *Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, 1000 Ljubljana, Slovenia,*  
e-mail: borut.bohanec@bf.uni-lj.si

Plant biotechnology

MARIA CHARZYŃSKA. *Department of Plant Anatomy and Cytology, Warsaw University, Miecznikowa 1, 02-096 Warsaw, Poland,*  
e-mail: marlitg@biol.uw.edu.pl

Cytoembryology of flowering plants; anther and pollen development (structural and molecular aspects)

MAURO CRESTI. *Dipartimento di Biologia Ambientale, Sezione Botanica, Università di Siena, Via P. A. Mattioli 4, I-53100 Siena, Italy,*  
e-mail: cresti@unisi.it

Sexual plant reproduction; pollen biology; pollen tube; pollen-stigma-style-ovule interaction; cytoskeleton

MARTA DOLEŻAL. *Academy of Physical Education, Chair of Hygiene and Health Protection, Al. Jana Pawła II 78, 81-571 Cracow, Poland*

General and medical mycology; health promotion; medical microbiology

FRANCISZEK DUBERT. *Department of Plant Physiology, Polish Academy of Sciences, Podlužna 3, 30-239 Cracow, Poland,*  
e-mail: dubert@ifr-pan.krakow.pl

Physiology of plant growth and development

OL'GA ERDELSKÁ. *Institute of Botany, Slovak Academy of Sciences, Dúbravská 14, 84223 Bratislava, Slovak Republic*

Plant embryology; developmental biology

JOHANN GREILHUBER. *University of Vienna, Institute of Botany, Rennweg 14, 1030 Vienna, Austria,*  
e-mail: johann.greilhuber@univie.ac.at

Plant karyology

JOHN M. HERR, Jr. *University of South Carolina, Department of Biological Sciences, Columbia, South Carolina 29208, U.S.A.,*  
e-mail: herrjr@mailbox.sc.edu

Plant morphology; anatomy; embryology

ANNA KOLTUNOW. *CSIRO Plant Industry, PO Box 350, Glen Osmond, SA 5064, Australia,*  
e-mail: anna.koltunow@csiro.au

Plant reproduction, developmental biology – particularly seed and fruit (cellular and molecular aspects)

JOLANTA MAŁUSZYŃSKA. *Department of Plant Anatomy and Cytology, Silesian University, Jagiellońska 28, 40-032 Katowice, Poland,*  
e-mail: maluszyn@us.edu.pl

Plant cytology; cytogenetics

KAROL MARHOLD. *Department of Botany, Faculty of Science, Charles University, Benátská 2, CZ-128 01 Praha 2, Czech Republic,*  
e-mail: karol.marhold@savba.sk

Genome evolution; phylogeny; phylogeography

ELISABETH MATTHYS-ROCHON. *ENS Lyon, 46 Allée d'Italie, 69364 Lyon Cedex 07, France,*  
e-mail: ematthysr69@gmail.com

Plant gametes; pollination; cellular and molecular aspects of fertilization; in vitro development

MARIA PAJĄK. *Department of Plant Cytology and Embryology, Jagiellonian University, Gronostajowa 9, 30-387 Cracow, Poland,*  
e-mail: maria.pajak@uj.edu.pl

Plant embryology; apomixis

JAN J. RYBCZYŃSKI. *Botanical Garden – Center for Biological Diversity Conservation of the Polish Academy of Sciences, Prawdziwka 2, 02-973 Warsaw, Poland,*  
e-mail: jjryb@obpan.pl

Plant tissue and organ culture; biotechnology; cryopreservation

BARBARA SKUCIŃSKA. *Department of Plant Breeding and Seed Science, The Agricultural University of Cracow, ul. Łobzowska 24, 31-140 Cracow, Poland,*  
e-mail: rrwazec@cyf-kr.edu.pl

Plant tissue and organ culture

ALEV TOSUN. *Department of Pharmacognosy, Ankara University, 06100 Tandogan-Ankara, Turkey,*  
e-mail: pharmacogalev@gmail.com

Natural products; phytochemistry; essential oils; biological activity of plant extracts and isolated compounds

DAVID TWELL. *Department of Biology, University of Leicester, Leicester LE1 7RH, United Kingdom,*  
e-mail: twe@leicester.ac.uk

Plant Reproductive biology; pollen development, germline and gamete development; gene regulation including post-transcriptional and small RNA pathways

HANNA WEISS-SCHNEEWEISS. *Plant Evolutionary Cytogenetics Group, Department of Systematic and Evolutionary Botany, University of Vienna, Rennweg 14, A-1030 Vienna, Austria,*  
e-mail: hanna.schneeweiss@univie.ac.at

Evolutionary plant cytogenetics

MICHIEL T. M. WILLEMSE. *Laboratory of Plant Cell Biology, Wageningen Agricultural University, Arboretumlaan 4, 6703 BD Wageningen, The Netherlands,*

Sexual plant reproduction; biology of lower plants

MACIEJ ZENKTELER. *Laboratory of General Botany, Institute of Experimental Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland,*  
e-mail: maczen@amu.edu.pl

Experimental embryology; plant tissue and organ culture



**XXXII Conference on Embryology**  
**Plants • Animals • Humans**

May 18–21, 2016  
Wojślawice, Poland

*Conference organized and sponsored by:*



**Uniwersytet  
Wrocławski**

University of Wrocław, Poland  
Faculty of Biological Sciences  
Institute of Experimental Biology  
Department of Animal Developmental Biology  
Wrocław, Poland



Polish Academy of Arts and Sciences –  
Commission on Embryology and Morphology  
Cracow, Poland

### ***Honorary Committee***

Marek Bojarski	Rector of the University of Wrocław, Wrocław, Poland
Dariusz Skarżyński	Dean of the Faculty of Biological Sciences of the University of Wrocław, Wrocław, Poland
Andrzej Białas	President of the Polish Academy of Arts and Sciences, Cracow, Poland
Szczepan Biliński	Director of the IVth Division of the Polish Academy of Arts and Sciences, Cracow, Poland
Elżbieta Pyza	President of the Commission on Embryology and Morphology of the Polish Academy of Arts and Sciences, Cracow, Poland
Tomasz Nowak	Director of the Botanical Garden of the University of Wrocław, Wrocław, Poland

### ***Scientific Committee***

Elżbieta Bednarska-Kozakiewicz	Nicolaus Copernicus University in Torun, Department of Cell Biology, Torun, Poland
Małgorzata Daczewska	University of Wrocław, Department of Animal Developmental Biology, Wrocław, Poland
Piotr Dzięgiel	Medical University of Wrocław, Department of Histology and Embryology, Wrocław, Poland
Teresa Jagła	University of Clermont-Ferrand, GReD, INSERM U1103, CNRS UMR6293, Clermont Ferrand, France
Krzysztof Jagła	University of Clermont-Ferrand, GReD, INSERM U1103, CNRS UMR6293, Clermont Ferrand, France
Elżbieta Kuta	Jagiellonian University, Department of Plant Cytology and Embryology, Cracow, Poland
Maria Ogielska	University of Wrocław, Department of Evolutionary Biology and Conservation of Vertebrates, Wrocław, Poland
Maria Jolanta Rędownicz	Nencki Institute of Experimental Biology, Laboratory of Molecular Basis of Cell Motility, Warsaw, Poland
Jolanta Saczko	Medical University of Wrocław, Department of Medical Biochemistry, Wrocław, Poland
Bożena Simiczyjew	University of Wrocław, Department of Animal Developmental Biology, Wrocław, Poland
Teresa Szklarzewicz	Jagiellonian University, Department of Developmental Biology and Morphology of Invertebrates, Cracow, Poland
Piotr Świątek	University of Silesia, Department of Animal Histology and Embryology, Katowice, Poland
Beata Zagórska-Marek	University of Wrocław, Department of Plant Developmental Biology, Wrocław, Poland

### ***Organizing Committee***

Małgorzata Daczewska	Chairwoman
Bożena Simiczyjew	Vice-chairwoman
Sylwia Nowak	Secretary
Elżbieta Rudnik	Treasurer
Magda Dubińska-Magiera	Member
Arnold Garbiec	Member
Jadwiga Jabłońska	Member
Izabela Jędrzejowska	Member
Anna Kosieradzka	Member
Damian Lewandowski	Member
Marta Mazurkiewicz-Kania	Member
Joanna Niedbalska-Tarnowska	Member
Katarzyna Pajer	Member
Ewelina Posytniak	Member
Mariusz Jaglarz	Coordinator on behalf of the Commission on Embryology and Morphology of the Polish Academy of Arts and Sciences, Cracow, Poland