

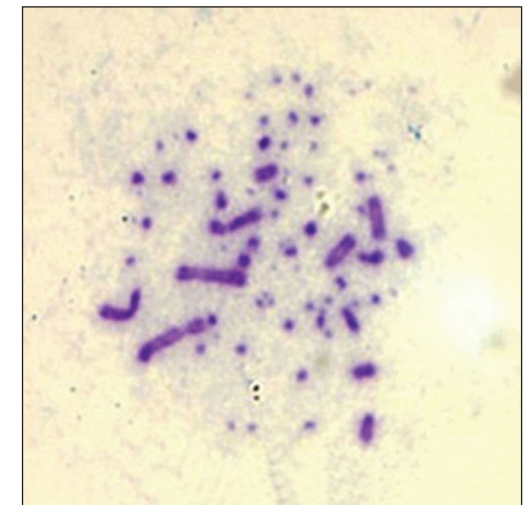
# Contents

- 1** **Banding cytogenetics of the vulnerable species *Houbara bustard* (Otidiformes) and comparative analysis with the Domestic fowl**  
*Leila Mabiddine-Aoudjit, Ouahida Boucekkine, Kafja Ladjali-Mohammedi*
- 19** **Two types of highly ordered micro- and macrochromosome arrangement in metaphase plates of butterflies (Lepidoptera)**  
*Vladimir A. Lukhtanov*
- 27** **Constitutive heterochromatin heteromorphism in the Neotropical armored catfish *Hypostomus regani* (Ihering, 1905) (Loricariidae, Hypostominae) from the Paraguay River basin (Mato Grosso do Sul, Brazil)**  
*Greicy Ellen de Brito Ferreira, Ligia Magrinelli Barbosa, Ana Camila Prizon-Nakajima, Suzana de Paiva, Margarida Maria de Rossi Vieira, Raquel Bozini Gallo, Luciana Andreia Borin-Carvalho, Renata da Rosa, Cláudio Henrique Zawadzki, Isabel Cristina Martins dos Santos, Ana Luiza de Brito Portela-Castro*
- 41** **Cytological markers used for identification and transfer of *Aegilops* spp. chromatin carrying valuable genes into cultivated forms of *Triticum***  
*Michał T. Kwiatek, Danuta Kurasiak-Popowska, Sylwia Mikołajczyk, Janetta Niemann, Agnieszka Tomkowiak, Dorota Weigt, Jerzy Nawracala*
- 61** **Comparative analysis of C-heterochromatin, ribosomal and telomeric DNA markers in chromosomes of Pamphagidae grasshoppers from Morocco**  
*Olesya G. Buleu, Ilyas Y. Jetybayev, Dragan P. Chobanov, Alexander G. Bugrov*
- 75** **Analysis of chromosome karyotype and genome size in echiuran *Urechis unicinctus* Drasche, 1880 (Polychaeta, Urechidae)**  
*Zhenkui Qin, Xueyu Li, Danwen Liu, Qing Wang, Li Lu, Zhifeng Zhang*
- 87** **Karyotypes of three species of *Hyperophora* Brunner von Wattenwyl, 1878 (Tettigoniidae, Phaneropterinae) enable morphologically similar species to be distinguished**  
*Bruno Cansanção Silva, Lucas Henrique Bonfim Souza, Juliana Chamorro-Rengifo, Douglas Araujo*



# COMPARATIVE Cytogenetics

International Journal of Plant & Animal Cytogenetic, Karyosystematics,  
and Molecular Systematics



13(1) ♦ 2019



COMPARATIVE A peer-reviewed open-access journal  
**Cytogenetics**

International Journal of Plant & Animal Cytogenetics,  
Karyosystematics, and Molecular Systematics

**Editors-in-Chief:**

Prof. **Dr. Valentina G. Kuznetsova**  
Zoological Institute, St. Petersburg  
valentina\_kuznetsova@yahoo.com

Dr. **Ilya A. Gavrilov-Zimin**  
Zoological Institute, St. Petersburg  
coccids@gmail.com

**Managing Editor:** Dr. Lyubomir Penev

**Language Editors:** Robert B. Angus

**Editorial Board:**

**Robert B. Angus** (University of London, r.angus@rhul.ac.uk), **Irina Yu. Baklushinskaya** (Koltzov Institute of Developmental Biology RAS, Moscow, irina.bakl@gmail.com), **Alicja Boron** (University of Warmia and Mazury, Olsztin, alibo@uwm.edu.pl), **Nina Sh. Bulatova** (Institute of Ecology and Evolution, Moscow, ninbul@mail.ru), **Julio R. Daviña** (Universidad Nacional de Misiones, Posadas, juliordavina@gmail.com), **Grazyna Furgala-Selezniow** (University of Warmia and Mazury, Olsztin, graszka@uwm.edu.pl), **Natalia V. Golub** (Zoological Institute, St. Petersburg, psocid@zin.ru), **Vladimir E. Gokhman** (Moscow State University, gokhman@bg.msu.ru), **Veronika V. Golygina** (Institute of Cytology and Genetics, Novosibirsk, nika@bionet.nsc.ru), **Ekaterina Gornung** (University of Rome "Sapienza", ekaterina.gornung@gmail.com), **Snejana Grozeva** (Institute of Biodiversity and Ecosystem Research, Sofia, sgrozeva@yahoo.com), **Vladimir A. Lukhtanov** (St. Petersburg State University, lukhtanov@mail.ru), **Anna Maryanska-Nadachowska** (Institute of Systematics and Evolution of Animals, Krakow, maryanska@isez.pan.krakow.pl), **Seppo Nokkala** (University of Turku, seppo.nokkala@utu.fi), **Andrey Polyakov** (Institute of Cytology and Genetics SB RAS, Novosibirsk, polyakov@bionet.nsc.ru), **Petr Rab** (Institute of Animal Physiology and Genetics, Libechov, rab@iapg.cas.cz), **Nazar Shapoval** (Russian Academy of Sciences, St. Petersburg, nazaret@bk.ru), **Joan Vallès** (Universitat de Barcelona, joanvalles@ub.edu), **Jan Zima** (Institute of Vertebrate Biology, Brno, jzima@brno.cas.cz)

**International Advisory Board:**

**Ekaterina D. Badaeva** (Institute of Molecular Biology, Moscow, \_badaeva@mail.ru), **Katsuhiko Kondo** (Hiroshima University, Hiroshima, kkondo@hiroshima-u.ac.jp), **Iya I. Kiknadze** (Institute of Cytology and Genetics, Novosibirsk, kiknadze@bionet.nsc.ru), **Frantisek Marec** (Institute of Entomology, Ceske Budejovice, marec@entu.cas.cz), **Jon Martin** (University of Melbourne, Melbourne, j.martin@unimelb.edu.au), **Paraskeva Michailova** (Institute of Zoology, Sofia, michailova@zoology.bas.bg), **Benjamin B. Normark** (University of Massachusetts, Amherst, bnormark@ent.umass.edu), **Walther Traut** (University of Luebeck, Luebeck, traut@molbio.uni-luebeck.de), **Ludmila V. Vysotskaya** (Novosibirsk State University, Novosibirsk, vysot@fen.nsu.ru)

All correspondence with reference to editorial matters should be addressed to: Dr. Ilya Gavrilov-Zimin by e-mail: coccids@gmail.com with subject "Comparative Cytogenetics" or to the address: Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia.

**Creative Commons Attribution License.** This is an open access journal distributed under the terms of the Creative Commons Attribution License 3.0 CC-BY, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Subscription for 2014:**

The printed version: institutional subscription - € 145.00; individual subscription - € 70.00; subscribers from Russia - € 120.00.

PENSOFT Publishers  
Prof. Georgi Zlatarski 12, 1700 Sofia, Bulgaria  
Tel. +359-2-8704281  
Fax: +359-2-8704282  
e-mail: info@pensoft.net  
<http://compcytogen.pensoft.net>