

Informational notes

The XIII International Congress of Entomology (ICE 2008) will take place in Durban, South Africa from the 6th to the 12th July, 2008 and will include a Section “Genetics, Genomics and Evolution”.

6-th International Y Chromosome User Workshop will be held as a part of the congress “DNA in Forensics 2008” 27th - 30th May 2008 in Ancona, Italy. For further information, please, visit: www.yhrd.org/rcms/navigation/1000032.html

XX-th International Congress of Genetics will be held in Berlin, Germany, July 12-17, 2008.

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The XX-th International Congress of Genetics will review recent developments in genetics and genomics and will cover the following topics: 01) Aging and Longevity; 02) Agricultural Applications; 03) Behavior; 04) Biodiversity / Adaptation; 05) Biotechnology; 06) Cancer Genetics; 07) Chromosome Segregation; 08) Clocks and Rhythms; 09) Complex Traits; 10) Comparative Genomics; 11) Computational Genomics; 12) Developmental Genetics (1): Signalling; 13) Developmental Genetics (2): Movement; 14) Epigenetic Mechanisms and Chromatin; 15) Epigenetics and Development; 16) Evolution / Speciation; 17) Evolution of Development (Evo-Devo); 18) Evolutionary Genomics; 19) Evolution of Humans; 20) Genetic Model Organisms: Discovery to Translation; 21) Genetics and World Hunger; 22) Genetics of Parasitism; 23) Genetics of Sex; 24) Genetics of Fungi; 25) Genetics of Symbiosis; 26) Genome-Environment Interactions / Ecology; 27) History of Genetics; 28) Human Diseases: Animal Models; 29a) Human Genetics (1); 29b) Human Genetics (2); 30) Immunogenetics; 31) Infection; 32) Mammalian Genetics; 33) Metagenomics; 34) Microbial Genetics; 35) Mutation / DNA Repair / Recombination; 36a) Neurogenetics (1); 36b) Neurogenetics (2); 37) Omics: Genomics, Transcriptomics, Proteomics, Metabolomics; 38) Pharmacogenomics; 39) Plant Genetics; 40) Population Genetics; 41) Quantitative and Statistical Genetics; 42) RNA World (1): RNA Machines; 43) RNA World (2): microRNAs and endogenous siRNAs; 44) Societal, Ethical, Legal Issues of Genetics (SELIG); 45) Stem Cells; 46) Synthetic Biology; 47) Systems Biology / IT; 48) Teaching Genetics; 49) Technology / Bioimaging; 50) Veterinary Genetics 51a) Last Minute Excitement (1); 51b) Last Minute Excitement (2).



About the work of the karyosystematics, molecular systematics and insect genetics section at the XIII Congress of the All-Russian Entomological Society (Krasnodar, September 9-15, 2007).

There were 18 participants at the section, including entomologists who are interested in the problem of usage of karyotype and molecular markers in the insect systematics. 11 speeches and 2 stand presentations were made during the section. Most speeches presented the research projects of scientific teams. Among authors there were specialists from three countries (Russia, Portugal, Poland) and from various universities and research institutes of Russia (Zoological Institute of the Russian Academy of Sciences, St. Petersburg State University, St. Petersburg State Agrarian University, Moscow State University, Biochemistry and Genetics Institute of Ufa Research Center RAS, Saratov State Medical University). The speakers touched upon the problems of karyosystematics and molecular systematics of Hymenoptera (2 speeches), Coleoptera (1), Psocoptera and Phthiraptera (1), Homoptera: Psyllinea (1), Coccinea (1), and Auchenorrhyncha (1), Lepidoptera (2) and Diptera (2). All speeches and presentations were followed by numerous questions and lively discussion. In V.E. Gokhman's speech (Moscow) there was given a detailed phylogenetic analysis of karyotype changeability in various Hymenoptera groups. N.A. Durnova and M.U. Voronin (Saratov) presented a speech "Cytogenetical Characterization of *Glyptotendipes glaucus* and *G. pallens*, and their hybrids (Diptera, Chironomidae) in Saratov District". According to the authors, these forms have not achieved species status, which is proved by minor "cytogenetic distances" between them and existence of hybrid specimens in each pool that was studied. Scientists from the Institute of Biochemistry and Genetics (Ufa) gave two speeches. The topics were as follows: "Analysis of Acetylcholinesterase 980A>G Gene Mutation of the Colorado Beetle *Leptinotarsa decemlineata* Say in the Southern Urals" (M.B. Udalov and G.V. Benkovskaya) and "Sequential Analysis of *Apis mellifera mellifera* L. in the Urals" (R.A. Ilyasov, A.V. Poskryakov, and A.G. Nikolenko). The first speech presented the research results for the population of Colorado beetle in Ufa district of Bashkortostan, which is characterized by high resistance to carbophos. It had been shown before that lowered resistance of Colorado beetle to organophosphorous compounds is connected with point missense-mutation (transition of 980A>G) of acetylcholinesterase (AChE) gene. Having analyzed this gene in resistant population specimens, the authors came to the conclusion that long-term treatment with insecticides led to elimination of specimens with sensitive genotypes from this population. Authors of the second report spoke about results of the analysis of the fragment of gene ND2 (mitochondrial DNA) in bees of Ural population. The authors made a conclusion that a part of the unique European population of *Apis mellifera mellifera* remained in this region and validated the necessity of serious scientific research for preservation of gene pool and recruitment of original area of subspecies.

St. Petersburg scientific school of karyosystematics and molecular systematics presented a number of speeches. The group of V.G. Kuznetsova (Zoological Institute RAS) presented 5 speeches. One of them was devoted to chironomids (N.A. Petrova: "Tandem Integration of Chromosomes as a Mechanism of Emergence of Karyotype with $2n=6$ in *Strictochironomus* sp. (Diptera, Chironomidae) from the Sakhalin Population"). Other presentations covered Psocoptera and Phthiraptera orders and various groups of the Homoptera order (Psyllinea, Coccinea, Auchenorrhyncha). E.S. Labina (together with A. Maryanska-Nadachovska and V.G. Kuznetsova) presented new data on karyotypes, structure of internal parts of reproductive system and spermiogenesis of the largest psyllid family Psyllidae. The

speaker showed all types of spermiogenesis known in psyllids, analyzed their distribution in different families and made a conclusion about the importance of this character for macrosystematics of Psyllinea. N.V. Golub in her report “Karyotypes and Characteristics of Gametogenesis in Superorder Psocidea” summarized literature and her own data, including the new facts, on karyology and cytogenetics of Psocoptera and Phthiraptera and made interesting conclusions about ways and mechanisms of karyotype evolution in Psocidea in general. The authors of the speech “Some Genetic Consequences of Gamma Irradiation of Males of *Pseudococcus viburni* Sign. (Coccinea)” (G.A. Nechaeva, A.I. Anisimov, V.G. Kuznetsova) showed types and frequency of chromosomal rearrangements that emerge as a result of irradiation of *P. viburni* males with different doses and are a basis for the development of genetic method of fight with this dangerous agricultural pest. V.G. Kuznetsova (together with D. Aguin-Pombo from Funchal University, Madeira, Portugal) presented a speech about finding of three bisexual species and three parthenogenetic forms of the *Empoasca* genus (Auchenorrhyncha) on Madeira Island. The report highlighted that species and forms have different chromosome numbers, while parthenogenetic forms that are diploid or triploid apomicts emerged on the Island through various ways – as a result of interspecies hybridization or as a result of abnormality in the meiosis in one of conspecific bisexual species.

The V.A. Lukhtanov group (St. Petersburg State University) that deals with karyosystematics, molecular phylogenetics and molecular systematics of Lepidoptera, presented three speeches. Two of them were made at this section: “Analysis of Cryptic Species Diversity in the *Agrodiaetus* Genus with the Help of Molecular and Chromosome Markers” (N.A. Shapoval, V.A. Lukhtanov) and “Application of the DNA-Barcoding Method for the Analysis of Cryptic Species Diversity in the *Erebia* Genus” (M.S. Vishnevskaya, V.A. Lukhtanov). One more speech was made at the section devoted to Lepidoptera: “Biogeography and Biodiversity of the *Agrodiaetus* Genus of European Fauna” (V.A. Lukhtanov). The general idea common to all these speeches is that synergism emerges in the effect of molecular and cytogenetic approaches as an instrument of systematics, and the application of both methods increases greatly the resolving power of taxonomic and phylogenetic analyses.

Apart from section speeches, at the plenary session of the Congress there was made a report “Molecular-Genetic and Cytogenetic Approaches to Insect Systematics” (V.A. Lukhtanov, V.G. Kuznetsova). The authors of this study brought numerous examples from various groups of insects and showed that application of new approaches enables to solve a wide range of problems, from species identification to systematics of higher taxa. Molecular approaches enable scientists to make objective delimitation of taxa, identify their relationships, identify monophyletic groups, test naturalness of polytypic species, discover cryptic evolutionary lines and test hypotheses about their taxonomic status, reveal the history of emergence and colonization of species and populations. Unfortunately, though, some systematicists and especially molecular geneticists use molecular markers in an uncritical way for systematics and phylogenetic schemes. The report gave a detailed analysis of limitations in the use of molecular markers connected with the effect of saturation of nucleotide sequences with secondary substitutions (higher taxa are especially sensitive to this effect) and insufficient level of differentiation of nucleotide sequences (which happens often in comparison of closely related species). This problem can be resolved with the use of cytogenetic characteristics, the evolutionary rate of which varies in the wider range. Chromosomal rearrangements turn out to be effective markers for the identification of young sister species, whereas type of chromosome organization (monocentric one or different variants of holokinetic one) and meiosis particularities (chiasmatic or achiasmatic, prereducational and

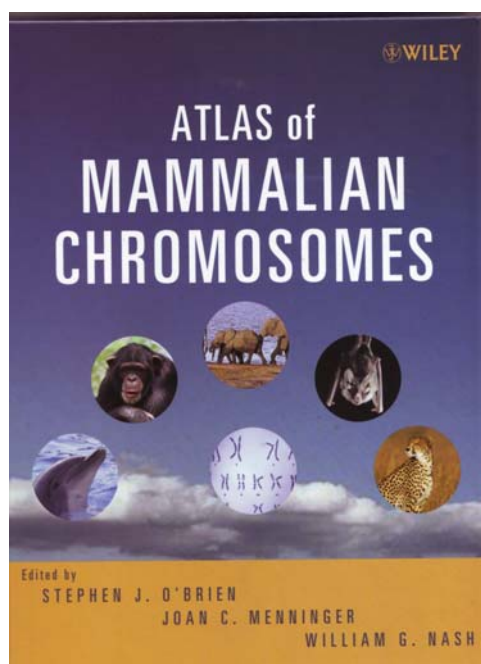
postreductional) characterize high-rank taxa up to order and group of orders. Until recently the use of cytogenetic markers for most insects was limited by the difficulty of identification of many chromosomal rearrangements. At present this problem is being solved with the use of methods of differential staining of chromosomes and FISH method. The last approach that combines cytogenetic and molecular methods opens new wide perspectives for insect karyosystematics.

Thus, XIII Congress of All-Russian Entomological Society showed considerable success in the development of karyosystematics, molecular systematics and insect genetics in Russia and increasing interest of entomologists to new methods of the study of systematics and phylogeny of insects.

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New publications



ATLAS of Mammalian Karyotypes

O'Brien S.J., Nash W.G., Menninger J.C., (Eds). John Wiley and Sons Publishers (2006). 714 pp.

The International Atlas of mammalian chromosomes includes G-banded karyograms of 805 species from the majority (28 orders, 108 families) of higher taxa of the Class Mammalia.

The karyotypes collected from promoted laboratories/authors of different countries are presented as first published originals or copies of formerly published figures. Russian presentation is based on rich data of A.S.Grafodatsky with collaborators. In total, karyograms of 132 species are included under the names connected with this team at present or in the recent past – Sevil I. Radjabli, first of all, as well as A. Grafodatsky himself, O. Sablina, L. Biltueva, P. Perelman, V. Trifonov, N. Rubtsov, and O. Serov. Karyograms of high resolution banding are shown for mammals of Russia and adjacent territories in frameworks of FSU area, presented by hamsters (g.g. *Calomyscus*, *Phodopus*, *Cricetus*, *Allocricetulus*, *Cricetulus*, *Mesocricetus*, *Tscherskia*), voles (g.g. *Alticola*, *Arvicola*, *Chionomys*,

Blanfordimys, *Microtus*, *Prometheomys*, *Ellobius*), birch-mice (g.g. *Muscardinus*, *Myoxus*, *Dryomys*, *Eliomys*, *Myomimus*). Also, hedgehogs of 4 genera (*Erinaceus*, *Paraechinus*, *Hemiechinus*, *Mesechinus*) are presented along with other insectivores – *Sorex* (*S. minutus*, *S. caeacutiens*, *S. raddei*, *S. araneus*, *S. granarius*), *Crocidura* (*C. horsfieldi*, *C. pergrisea*, *C. sibirica*, *C. dsinezumi*), *Neomys* (*N. fodiens*), *Suncus* (*S. murinus*), *Talpa* (*T. altaica*).

Main corps of Russian mustelids are shown in specific karyotypes of *Mustela erminea*, *M. nivalis*, *M. altaica*, *M. lutreola*, *M. sibirica*, *M. s. itatsi*, *M. vison*, *M. putorius putorius*, *M. p. furo*, *M. eversmanni*, *Vormela peregusna*, *Martes martes*, *M. zibellina*, *Gulo gulo*, *Lutra lutra*, together with other carnivore species in and out the national boundaries karyotyped by the same authors (*Vulpes vulpes*, *Fennecus zerda*, *Nyctereutes procyonoides procyonoides*, *Canis familiaris*, *M. melampus*, *Ictonix striatus*, *Paguma larvata*, *Parahyena brunnea*). An essential contribution has been made also into high resolution banding of large mammals such as *Camelus bactrianus*, *Cervus nippon hortulorum*, *C. elaphus sibiricus*, *Alces alces*, *Capreolus pygargus*, *Bos taurus*, *Bos grunniens*, *Bison bonasus*, *Capricornis crispus*, *Nemorhedus goral*, *Ovibos moschatus*, *Capra hircus domesticus*, *Sus scrofa domestica*, *Equus burchelli*). Besides, some other separate species representing exotic faunas are supplied (i.e. *Monodelphis domestica* – Marmosidae, *Potorous tridactylus* – Potoroidae).

Particular figures are taken from Russian publications under various authorships, but in all cases the karyograms have been made by V. Aniskin (*Marmosa* sp., *Thylamys elegans*, *Metachirus nudicaudus* – Marmosidae, *Didelphis marsupialis* – Didelphidae, *Oligoryzomys flavescens*, *O. microtis*, *Amphinectomys savamus*, *Akodon simulator*, *A. toba*, *Tachyoryctes macrocephalus*, *T. splendens*, *Clethrionomys rufocanus*, *C. sikotanensis*, *C. rutilus*, *C. glareolus*, *C. centralis*, *Stenocephalemys albocaudata*, *S. griseicauda*, *S. albipes*, *Lophuromys melanonyx*, *L. brevicaudus*, *L. chrysopus* – Muridae s.l.). At the account of descendants of the Russian school nowadays working abroad (V. Volobouev, Paris; E. Ivanitskaya, Haifa), the joint value approaches 180 mammalian karyotypes of best quality chosen for this comprehensive international edition.

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The Atlas compiled by L.A. Chubareva and N.A. Petrova and entitled “**Cytological maps of polytene chromosomes and some morphological characters of blackflies (Diptera: Simuliidae) of Russia and adjacent territories**” (ed. by V.G. Kuznetsova) will be issued in 2008 (KMK Scientific Press Ltd., Moscow).

The Atlas includes karyotypes and morphology of different stages of development of 123 species from 32 genera. The Atlas is of interest to specialists in karyotaxonomy and cytogenetics of blackflies, and to entomologists.

The Atlas will be available on special order (N.A. Petrova, Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia. E-mail: chironom@zin.ru).