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ADOP 2025

Fifth International Conference on

Agriculture Digitalization and Organic Production

ADOP 2025

Conference Programme and Abstracts

June 3–6, 2025
Barnaul, Altai Region, Russia

SPC RAS

Altai state agricultural university

Springer

Organizer

- Altai State Agricultural University (ASAU, Barnaul, Russia)
- St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS, St. Petersburg, Russia)

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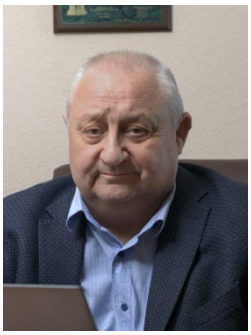
Conference at a glance

Tuesday, June 3, 2025		
08:30-09:00	**On-line Registration**	
09:00-12:30	**Oral Session 1: Digital Technologies, Aquaculture and Bioinformatics** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Oksana Ogij and Roman Meshcheryakov	**Online Oral Session 2: Organic Production and Sustainable Agriculture** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Valentina Kundius and Olga Cherepanova
12:30-13:00	**Lunch break**	
13:00-13:30	**Opening Ceremony** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Vladimir Pleshakov and Andrey Ronzhin	
13:30-15:00	**Plenary Session 1** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Chair:** Valentina Kundius and Vladimir Surovtsev	
15:00-15:15	**On-line Joint Photography of Conference Participants** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09	
16:00-18:00	**Dinner**	
Wednesday, June 4, 2025		
09:00-12:30	**Oral Session 3: Biologization of Animal Husbandry** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Roman Nekrasov and Georgy Laptev	**Online Oral Session 4: Mathematical Support and Remote Monitoring** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Boris Sokolov and Alexey Stepanov
12:30-13:00	**Lunch break**	
13:00-15:00	**Plenary Session 2** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Chair:** Nadezhda Bogolyubova and Georgy Laptev	
Thursday, June 5, 2025		
09:00-12:30	**Oral Session 5: Biologization of Plant Growing** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Viktar Lemiasheuski and Liudmila Sokolova	**Online Oral Session 6: Application of Ground and Air Robots** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Cochairs:** Andrey Ronzhin and Mikhail Tatur
12:30-13:00	**Lunch break**	
13:00-15:00	**Plenary Session 3** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Chair:** Kirill Golokhvast and Igor Smirnov	
15:00-15:30	**Closing Ceremony** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09 **Chair:** Vladimir Pleshakov and Andrey Ronzhin	
Friday, June 6, 2025		
09:00-20:00	**Cultural Program**	

Conference Programme

Tuesday, June 3, 2025	
08:30-09:00	**On-line Registration**
09:00-12:30	**Oral Session 1: Digital Technologies, Aquaculture and Bioinformatics** https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgvZEZob3ZUNlp4UT09 **Cochairs:** Oksana Ogij, Roman Meshcheryakov
	Roman Meshcheryakov, Konstantin Rusakov, and Gleb Tevyashov. Determining Average Size and Average Speed of Fish Using Deep Learning Technologies
	Van Le, Quyen Vu, and Andrey Ronzhin. Real-time Fish Detection and Counting with YOLOv11
	Sergei Maslennikov, Darya Borisova, and Tigran Gevorgian. The Potential of Mariculture and Artificial Reproduction of the Red King Crab Paralithodes Camtschaticus for the Stabilization of Biological Resources
	Al-Mamoori Loay Mohammed Mazbin, Lina Lagutkina, Alexander Martyanov, and Viktor Kryuchkov. Stimulation of Carp Spawning Using OVASIS Hormone and Pituitary Extract under Iraqi Conditions
	Alexander Bekarev. Digital Maturity of the Fisheries Sector: The Regional Aspect
	P. Gourkhede, A. Naikwadi, Gopal Shinde, M. Pendke, and B. Wankhede. Digital Tools in Soil Health Diagnostic and Organic Farming: A Sustainable Way
	Petr Akmarov, Olga Knyazeva, Dmitry Kondratiev, and Natalia Gorbyshina. Regional Features and Problems of Production Digital Transformation in Russia
	Mariya Golovko and Maksim Belousov. Digitalization of Agriculture: Prospects and Threats
	Abusupyan Dibirov. The Impact of Digitalization on the Sustainability of the Food Supply Chain
	Gregory Komlatsky. Digital Transformation in Russian Beekeeping
	Elena Yildirim, Georgi Laptev, Daria Tiurina, Valentina Filippova, Larisa Ilina, Natalia Novikova, Kseniya Sokolova, Ekaterina Ponomareva, Vasiliy Zaikin, Irina Klyuchnikova, Elena Korochkina, Darren Griffin, and Michael Romanov. Bioinformatic Data Analysis from Metagenomic Whole Genome Sequencing of Endometrial Microorganisms in Cows with Normal and Pathological Conditions
	Elena Yildirim, Georgi Laptev, Daria Tiurina, Vitaliy Morozov, Valentina Filippova, Larisa Ilina, Natalia Novikova, Kseniya Sokolova, Ekaterina Ponomareva, Vasiliy Zaikin, Alesya Savicheva, Darren Griffin, and Michael Romanov. Bioinformatic Analysis of NGS Sequencing Data of the Intestinal Microbiome in Broilers Fed Supplements of Glyphosate, Probiotic Bacterial Strains and Antibiotics
	Vyacheslav Shalamov. Trends and Cases of AI Implementation for Agriculture and Agro-Industry Based on the Company's Requests and Cases
	Olga Prozorovskaya. Competencies of the 21st Century: The Relevance of Digital Knowledge and Skills for a Successful Career in the Agricultural Sector
	Vasily Lyubimtsev, Svetlana Sladkova, Sergey Kholodkevich, Andrey Ponomarev, and Maria Medyankina. Early Detection of Dangerous Toxicity of Biologically Treated Wastewater Using an Electronic System for Continuous Analysis of Cardioactivity of Crayfish
	Nikita Kochetkov, Victoria Gaffarova, Vasily Lyubimtsev, Svetlana Sladkova, and Sergey Kholodkevich. Digital Analysis of Histological Images for the Purpose of Quantitative Characterization of Goblet-Shaped Intestinal Cells of Sterlet (Acipenser Ruthenus) to Assess the State of the Digestive Tract
	Elchin Khalilov, Zang Min, Andrey Lazukin, Anton Saveliev, Zengling Ma, Farid Khalilov, Min Wang. Aqua-Aero Robotic System – AARS for Hyperspectral Monitoring of Pollution of Water Bodies and Their Purification from Cyanobacteria

	challenges is monitoring bee populations within hives, the use of in-hive sensors and IoT devices allows beekeepers to gather real-time data on microclimate conditions, colony strength, overall hive health, and honey productivity – enabling them to make timely and informed decisions. Artificial intelligence and machine learning can be applied to analyze collected data, identify patterns and trends, and help beekeepers prevent issues while optimizing hive management. Machine vision systems can process images captured by sensors to assess bee health, monitor behavior, and detect diseases and pests. Additionally, satellite imagery can be used to determine the blooming periods of entomophilous agricultural crops, ensuring the timely deployment of bees for pollination. The study identifies key challenges hindering digitalization in the beekeeping sector. It has been established that the development of digital resources is constrained by a lack of necessary financial resources among beekeepers, an underdeveloped information and communication network, the absence of widespread broadband internet access, a lack of experience in digital technologies, insufficient knowledge among specialists, and weak motivation. The study concludes that there is a critical need for a unified platform for data processing, storage, and decision-making based on collected information.
	**Elena Yildirim, Valentina Filippova, Larisa Ilina, and Kseniya Sokolova**, Molecular Genetics and Microbiomics Laboratory, BIOTROF+ Ltd, Pushkin; Federal State Budgetary Educational Institution of Higher Educa-tion "St. Petersburg State Agrarian University", Pushkin, St. Petersburg, Russia. **Georgi Laptev, Daria Tiurina, Natalia Novikova, Ekaterina Ponomareva, Vasiliy Zaikin, and Irina Klyuchnikova**, Molecular Genetics and Microbiomics Laboratory, BIOTROF+ Ltd, Pushkin, St. Petersburg, Russia. **Elena Korochkina**, Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State University of Veterinary Medicine", St. Petersburg, Russia. **Darren Griffin**, School of Natural Sciences, University of Kent, Canterbury, Kent, UK; Animal Genomics and Bioresource Research Unit (AGB Research Unit), Faculty of Science, Kasetsart University, Chatuchak, Bangkok, Thailand. **Michael Romanov**, Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State Agrarian University", Pushkin, St. Petersburg; L.K. Ernst Federal Research Center for Animal Husbandry, Dubrovitsy, Podolsk, Moscow Oblast, Russia; School of Natural Sciences, University of Kent, Canterbury, Kent, UK; Animal Genomics and Bioresource Research Unit (AGB Research Unit), Faculty of Science, Kasetsart University, Chatuchak, Bangkok, Thailand. **Lecture Title:** Bioinformatic Data Analysis from Metagenomic Whole Genome Sequencing of Endometrial Microorganisms in Cows with Normal and Pathological Conditions. **Abstract:** There remains no consensus on the microbiological causes of endometritis in cows. The aim of this study, therefore, was to analyze the endometrial microbiome using metagenomic whole genome sequencing (WGS) with subsequent bioinformatic data analysis using high-yielding cows kept on an organic farm (Group 1A) compared to animals kept on a large industrial complex as follows: clinically healthy (Group 2A), with subclinical (Group 2B), or purulent-catarrhal endometritis (Group 2C). Using Illumina MiSeq platform, WGS results revealed that the dominant bacterial phyla were Bacillota in Groups 2A, 2B and 2C, as well as Bacteroidota, Fusobacteriota and Bacillota in Group 1A. In industrial farm conditions, subclinical and clinical endometritis was associated with an increase in the amount of *Clostridium botulinum* in the uterus ($p < 0.05$). In contrast to

	Group 2A, the dominant bacterial species in the organic eco-farm Group 1A were *Bacteroides fragilis* (55.1 ± 3.92%) and *Fusobacterium necrophorum* (28.8 ± 2.63%). The use of bioinformatic techniques demonstrated that the endometrial microbiome of clinically healthy cows kept in eco-farm conditions (Group 1A) was enriched in bacteriocin genes compared to other studied animal Groups 2A, 2B and 2C. Thus, the standards of feeding and cattle husbandry adopted to eco-farm conditions imply a different composition and functionality of the cattle endometrial microbiome compared to the more common industrial approaches.
 	**Elena Yildirim, Valentina Filippova, Larisa Ilina, and Kseniya Sokolova**, Molecular Genetics and Microbiomics Laboratory, BIOTROF+ Ltd, Pushkin; Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State Agrarian University", Pushkin, St. Petersburg, Russia. **Vitaliy Morozov**, Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State Agrarian University", Pushkin, St. Petersburg, Russia. **Georgi Laptev, Daria Tiurina, Natalia Novikova, Ekaterina Ponomareva, Vasiliy Zaikin, and Alesya Savicheva**, Molecular Genetics and Microbiomics Laboratory, BIOTROF+ Ltd, Pushkin, St. Petersburg, Russia. **Elena Korochkina**, Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State University of Veterinary Medicine", St. Petersburg, Russia. **Darren Griffin**, School of Natural Sciences, University of Kent, Canterbury, Kent, UK; Animal Genomics and Bioresource Research Unit (AGB Research Unit), Faculty of Science, Kasetsart University, Chatuchak, Bangkok, Thailand. **Michael Romanov**, Federal State Budgetary Educational Institution of Higher Education "St. Petersburg State Agrarian University", Pushkin, St. Petersburg; L.K. Ernst Federal Research Center for Animal Husbandry, Dubrovitsy, Podolsk, Moscow Oblast, Russia; School of Natural Sciences, University of Kent, Canterbury, Kent, UK; Animal Genomics and Bioresource Research Unit (AGB Research Unit), Faculty of Science, Kasetsart University, Chatuchak, Bangkok, Thailand. **Lecture Title:** Bioinformatic Analysis of NGS Sequencing Data of the Intestinal Microbiome in Broilers Fed Supplements of Glyphosate, Probiotic Bacterial Strains and Antibiotics. **Abstract:** Xenobiotics have a negative impact on the composition and function of the intestinal microbiome; this requires measures to correct these disorders. The aim of the study was thus to conduct bioinformatic processing and analysis of NGS sequencing data of the intestinal (caecum) microbiome in broiler chickens, including the analysis of the taxonomic composition and predicted metabolic pathways. Experimental groups of broilers included: Group I fed the basic diet (BD); experimental Group II received BD and glyphosate; experimental Group III fed BD, glyphosate and probiotic bacterial strains; and experimental Group IV received BD along with a combination of glyphosate, antibiotics and probiotic bacterial strains. As a result, a reduction in the live weight of broilers by 4.2% ($p < 0.05$) was observed in Group II (against the background of glyphosate pre-sent in feed). Introduction of a mixture of probiotic bacteria into feed (Group III) resulted in an increased body weight compared to Group II ($p < 0.05$). In Group II, dysbiotic changes in the composition of the caecum microbiome were observed: an 8.7-fold increase in the number of Streptococcus genus members compared to the control Group I ($p < 0.05$). In Group IV, an increase in Bacteroidota by 6.2% was observed compared to Group II ($p < 0.05$). In birds from Group II, compared to Group I, a decline ($p < 0.05$) in

Format of the Conference

The conference is held in a hybrid format: on site of Altai State Agricultural University (ASAU, 98 Krasnoarmeysky Ave., Barnaul, Russia) and in the format of videoconference. A single link to the video conference for the opening ceremony, plenary sessions, oral sessions, closing ceremony for participants and listeners: **https://us06web.zoom.us/j/87926743169?pwd=Y1RWWGtua1JtWEgyZEZob3ZUNlp4UT09**: connection to Oral sessions is carried out in the Halls in accordance with the names of the sessions.

The time of the videoconference is indicated in the time zone of St. Petersburg/Moscow (UTC + 3): **https://www.worldtimebuddy.com/utc-to-russia-moscow/**. The time in Barnaul is **4 hours ahead** of the time in Moscow.

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