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Yildirim, Elena A., Laptev, Georgi Yu., Tiurina, Darya G., Morozov, Vitali Yu., Filippova, Valentina A., Ilina, Larisa A., Novikova, Natalia I., Sokolova, Kseniya A., Ponomareva, Ekaterina S., Zaikin, Vasiliy A. and others (2025) ***[Bioinformatic analysis of NGS sequencing data of the intestinal microbiome in broilers fed supplements of glyphosate, probiotic bacterial strains and antibiotics] Биоинформационный анализ данных секвенирования NGS кишечного микробиома у цыплят-бройлеров, получавших добавки с глифосатом, пробиотическими штаммами бактерий и антибиотиками.*** **[Conference item]**

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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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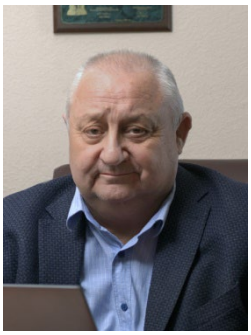
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Conference at a glance

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

	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

	the intensity of various types of predicted metabolic pathways of the microbiome in the intestinal chyme was established. In particular, those associated with energy, carbohydrate, protein types of metabolism, methanogenesis, synthesis of cofactors, etc. were noted.
	**Vyacheslav Shalamov**, Statanly, LLC, St. Petersburg, Russia. **Lecture Title:** Trends and Cases of AI Implementation for Agriculture and Agro-Industry Based on the Company's Requests and Cases. **Abstract:** In recent years, agro-industrial enterprises, along with the mining and energy sectors, have become leaders in digitalization and the implementation of solutions based on artificial intelligence technologies. Using the example of company requests, the most popular cases of implementing AI for livestock complexes, poultry farms, as well as unique requests, as well as the difficulties, nuances and risks of implementation will be analyzed. Trends and forecasts for the digitalization of agriculture in the coming years will be determined.
	**Olga Prozorovskaya**, recruitment agency, Moscow region, Pushkin city, Russia. **Lecture Title:** Competencies of the 21st century: the relevance of digital knowledge and skills for a successful career in the agricultural sector. **Abstract:** Digital technologies are transforming the agricultural sector, including the use of drones, sensors and precision farming systems to improve production efficiency and reduce costs. It should be emphasized that mastering the skills of working with data, analyzing and interpreting information is becoming critical for future professionals, as decision-making is often based on large amounts of data. Discussion of the role of cloud technologies and Internet of Things (IoT) in agricultural business will also prove relevant, as they provide new opportunities for monitoring and management of agricultural processes. Attention should be paid to the need to develop soft skills such as adaptability and teamwork, which become important in a rapidly changing work environment. Finally, the importance of integrating new technologies into educational programs should not be overlooked so that students can practically apply the acquired knowledge and skills, which in turn will contribute to their successful career in the agricultural sector.
	**Vasily Lyubimtsev and Sergey Kholodkevich**, St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS), St. Petersburg, Russia. **Svetlana Sladkova**, St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS); St. Petersburg University, St. Petersburg, Russia. **Andrey Ponomarev and Maria Medyankina**, Federal State Budget Educational Institution of Higher Education "K.G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University)", Moscow, Russia. **Lecture Title:** Early Detection of Dangerous Toxicity of Biologically Treated Wastewater Using an Electronic System for Continuous Analysis of Cardioactivity of Crayfish. **Abstract:** Using the example of biologically treated wastewater from the Southwestern Sewage Treatment Plants in St. Petersburg, a long-term (30-day) study of the variability of characteristics (markers) of cardioactivity in a group of freshwater crayfish of the species Pontastacus leptodactylus, used as bioindicators of the quality of biological wastewater treatment, was conducted. When comparing the values of heart rate (HR) in cancers at rest (HRSp), in a state of spontaneous nocturnal activity (HRN) and in a state of maximum stress caused by the so-called "handling" (HRSs) in the same representative group of cancers before and after prolonged exposure to OSV, it was confirmed that a good functional condition of the crayfish, necessary for their functioning as bioindicators of changes in the quality of biological purification.

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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