

# ХРОНИКА НАУЧНОЙ ЖИЗНИ

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## History of Soil Invertebrates Zoology and Ecology study: A Conference Commemorating the 90th Anniversary of Professor N.M. Chernova's Birth

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At the end of January 2025, a conference on soil zoology, held in memory of Professor Nina Mikhailovna Chernova (1935–2010), took place at the Severtsov Institute of Ecology and Evolution (IPEE RAS) in Moscow. Chernova is renowned for her organisation of soil invertebrate (microarthropods) research and was a pioneer in ecological education in Russia. Her work began under the supervision of M.S. Ghilarov, after which she became a professor at the Moscow State Pedagogical Institute, where she organised soil zoology research. Presentations at the conference highlighted the scientific and pedagogical contributions of N.M. Chernova, showcasing the development of the fundamental methods and study areas she initiated with her followers. This work evolved into an independent research school focused on soil microarthropods at Moscow Pedagogical State University. The conference highlighted the importance of collaboration in soil invertebrate zoology and its historical significance, noting that despite its development in Russian-language literature, it remains largely unknown internationally due to language barriers.

**Keywords:** Nina Mikhailovna Chernova, Mercury Sergeyevich Ghilarov, Institute of Biology and Chemistry, Moscow Pedagogical State University (MPGU), Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences (IPEE RAS), Center for Collembola Research,

Conference commemorating the legacy of N.M. Chernova, zoology of soil invertebrates, microarthropods, history of soil science.

Professor Nina Mikhailovna Chernova (1935–2010) was a prominent scientific organiser in the field of small soil invertebrates (mostly microarthropods) study, and a leading figure in the development of educational programmes in Ecology for universities and secondary schools in Russia (Matrosov, 2012). Her lectures were instrumental in shaping ecological thinking among educators, and her textbooks in ecology were among the first of their kind in Russia (Chernova et al., 1981, 1995). Chernova made significant contributions to the popularisation of ecological knowledge, the promotion of a scientific approach to nature conservation, and the development of environmental impact assessments.

Academician Merkursy Sergeevich Ghilarov (1912–1985), who laid the foundations for the study of soil zoology, served as Chernova's research and PhD advisor. He was the head of the Soil Zoology Laboratory (since 1956) at the Severtsov Institute of Animal Morphology AS USSR, and held a professorship in the Department of Natural Sciences (1949–1979) at the Moscow State Pedagogical Institute, where Chernova was a student during that period (Borisov et al., 2012). In 1975, she was appointed as a professor in the Department of Zoology and Darwinism within the Biological and Chemical Faculty of the same Institute, where she led several research areas focused on soil microarthropods (Abdurakhmanov, 2010; Kuznetsova et al., 2010; Makarova et al., 2011).

That is why the organisers of the Conference commemorating the legacy of N.M. Chernova were her students and colleagues from both institutions: one academic and one educational. These included organisers from the Department of Biology and Ecology at the Institute of Biology and Chemistry of Moscow State Pedagogical University (MPGU), as well as the Severtsov Institute of Ecology and Evolution (IPEE RAS), specifically the Laboratory of Synecology and the Laboratory of Soil Zoology and General Entomology.

On January 29 and 31, 2025, in Moscow, at the IPEE RAS, all those who knew professor Chernova not only through her publications but also personally gathered and connect online. The soil-zoological scientific school led by Chernova continues to unite soil scientists, zoologists, ecologists, biogeographers, molecular geneticists, educators, and historians of science to this day. The high quality of the results obtained has significantly contributed to the recognition of the scientific school and has shaped the future directions of its development. A fundamental principle of this scientific school is inheritance — the transfer of organisational approaches, research methodologies, and knowledge from one generation to the next. The educational institution itself plays a crucial role in this scientific continuity by providing student research circles, expeditions, professional training, meetings, and managing the publication of scientific results. Followers of Chernova have established extensive scientific networks that meet all the criteria of a well-established scientific field. Most of the research is centred on soil microarthropods (*Collembola*, *Oribatida*, and other mites). Significant time and effort are dedicated to sample analysis, preparation, and the use of high-quality microscopy and taxonomy. Despite challenges, these small but abundant organisms are sensitive to environmental changes, and are valuable for studying various ecological aspects. Standardised extraction and analysis methods have been established (Potapov et al., 2011), allowing for the examination of their relationships with soil conditions in ecosystem studies and laboratory experiments. They are used for bioindication and assessing anthropogenic impacts, while modern technologies have facilitated research into their genetics, histology, and physiology at advanced levels.

These issues began to be addressed at the Problem Biological Laboratory Population Dynamics of Plants and Animals and Reproduction of Useful Species (modern Educational and Scientific Center for Ecology and Biodiversity in MPGU). Chernova worked there in the 1960s. The laboratory became a training ground for scientific and pedagogical personnel (Kratkaya istoriya, 2018). In parallel, the Department of Zoology and Darwinism (now the Department of Zoology and Ecology of the Institute of Biology and Chemistry, MPGU) organised a modern Center for Springtails (*Collembola*) Research, featuring a unique library and a reference collection, which facilitated the description of over 260 new species and over 20 genera.

A lot depends on the leadership style, the pursuit of promising and long-term scientific programs, as well as the ability to set tasks for researchers and master modern tools and new methods. Chernova, as a member of several scientific, educational, and expert commissions and councils, understood current research problems in the context of global trends. She was able to determine the future directions of research in soil biology of poorly studied areas. Professor Chernova organised the work of graduate and postgraduate students, was involved in holding regular meetings, conferences, and workshops that united specialists from many regions, and established international collaborations. Chernova edited and published thematic collections of papers and modern identification keys of soil invertebrates (springtails, earthworms, etc.).

For historians, it is noteworthy that the memorial conference program well reflected Chernova's life, professional journey and research directions. Retrospective presentations highlighted the history of soil zoology and the significance of the selected scientific themes. The reports addressed several key topics:

- **Professor Chernova's Life in Science and Education**
  - Biography, Scientific Directions, and Students of N.M. Chernova (N.A. Kuznetsova, MPGU)
  - Contribution of N.M. Chernova to Environmental Education (I.A. Zhigarev, MPGU)
- **Successions and Dynamics of Soil Invertebrates**
  - The Theory of Successions in the Works of N.M. Chernova (A.V. Uvarov, IPEE RAS)
  - Invertebrate Successions During the Retreat of Glaciers in the North Caucasus (M.D. Antipova, IPEE RAS)
  - Dynamics of Soil Macrofauna During Restoration Successions (A.P. Geraskina, Center for Forest Ecology and Productivity Problems, RAS)
  - Soil Fauna in the Process of Forest Restoration After Clear-Cutting of Middle-Taiga Spruce Forests (A.A. Taskaeva, Institute of Biology, Komi Scientific Center, Ural Branch RAS)
- **Agricultural ecology**
  - Agroecology in the Scientific School of N.M. Chernova in the 20th Century and Today (A.I. Bokova, MPGU)
  - **Synecology** (Soil invertebrate community's ecology)
  - Following the Principle "Work Sets Itself" (O.L. Makarova, IPEE RAS)
  - Modern Times — New Methods (N.A. Kuznetsova, MPGU)
  - Partitioning as a Method for Studying the Structure of Diversity (A.K. Saraeva, Forest Institute, Karelian Research Center, Russian Academy of Sciences)

- **Education and Popular Soil Biology**
  - Soil Zoology and Education (I.P. Taranets, Museum of Earth Science, Moscow State University)
  - Popularization of Soil Zoology. Collembola Culture, and Modern Macro Photography (Yu.Yu. Davydova, Nizhny Novgorod State Pedagogical University)
- **Genetic Research**
  - The Emergence of Genetics in Collembology (A.V. Stryuchkova, MPGU)
  - The Caucasus Region as a “Hot Spot” for the Diversity of Genetic Lines of *Parisotoma notabilis* (D.D. Romanova, MPGU)
  - Laboratory Experiments with Genetic Lines of *Parisotoma notabilis* (M.D. Glagoleva, A.V. Stryuchkova, S.A. Lazareva, MPGU)
- **Collembola Morphology and Systematics**
  - Morphology of Springtails: Past and Present (D.A. Rumak, Moscow State University)
  - Study of the Fauna of Springtails in Russia (M.B. Potapov, MPGU)
  - Phenotypic Plasticity (M.B. Potapov, MPGU)
  - Current Studies of the Genus *Megalothorax* (K.S. Panina, MPGU)
  - Development of Taxonomy of Onychiurids and Odontellids (Yu.B. Shveenkova, “Privolzhskaya Lesostep” Nature Reserve)
- **Springtails Behavior**
  - Study of the Behavior of Springtails in the Scientific School of N.M. Chernova: Past and Present (Yu.Yu. Davydova, Nizhny Novgorod State Pedagogical University)
  - Behavior of Springtails: Video Recordings of Interesting Moments (M.D. Antipova, IPEE RAS)
- **History, Discussion and Plans**
  - On the Connection Between Generations of the Scientific School of Soil Zoologists (A.B. Babenko, IPEE RAS)
  - Discussion of Prospects (Historical Reviews, Publications, and Meetings)

From the topics mentioned above, it became evident that the scientific themes established by Professor Chernova continue to develop. Her ideas and methodological approaches remain relevant, as they combine fundamental research with practical tasks in nature conservation and environmental education. During the conference discussions, the importance of further collaboration in the field of soil invertebrate zoology and the inclusion of this area in the history of science was emphasised. It is significant that this scientific field originated and began to develop actively within Russian-language scientific literature; however, due to language barriers, it is not sufficiently known in other countries.

Unfortunately, the conference materials have not been published. We hope that it will be available in the next meetings. A brief overview of the presented reports has been prepared in the form of a photo report (Russian Wikinews 2025), and the news is posted on the websites of MPGU and IPEE RAS. The organizers plan to hold such meetings regularly, which will help preserve traditions, establish new scientific connections, and educate young followers in this scientific field from various regions. The conference participants hope for cooperation and the continuation of work at a new level.



Fig. 1. The main participants of the conference



Fig. 2. The Theory of Successions in the Works of N.M. Chernova (A.V. Uvarov, IPPEE RAS)



Fig. 3. Contribution of N.M. Chernova to Environmental Education (I.A. Zhigarev, MPGU)



Fig. 4. Agroecology in the 20th Century and Today (A.I. Bokova, MPGU)



Fig. 5. Center for Springtails (*Collembola*) Research (N.A. Kuznetsova, M.B. Potapov and A.B. Babenko)

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## **История изучения зоологии и экологии почвенных беспозвоночных: Конференция, посвященная 90-летию со дня рождения профессора Н.М. Черновой**

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29 и 31 января 2025 г. в Москве состоялась почвенно-зоологическая конференция памяти профессора Нины Михайловны Черновой (1935–2010). Она известна организацией работ по изучению мелких почвенных беспозвоночных (микроартропод), и стояла у истоков экологического образования в России. Ее работа началась под руководством М.С. Гилярова, затем она стала профессором Московского государственного педагогического института, где организовала почвенно-зоологические исследования. Доклады на конференции рассказали о научной и педагогической деятельности Н.М. Черновой, показали развитие методов и направлений изучения педобионтов, которые она начинала со своими учениками. Это сформировало самостоятельную научную школу на кафедре биологии и экологии МПГУ. Во время обсуждений подчеркивалась важность дальнейшего сотрудничества в области зоологии и экологии почвенных беспозвоночных и изучение этого направления в истории науки. Важно, что почвенная зоология зародилась и начала активно развиваться именно в русскоязычной научной литературе, однако из-за языкового барьера и слабого онлайн доступа, наших классиков науки недостаточно знают и цитируют в англоязычной литературе.

**Ключевые слова:** Нина Михайловна Чернова, Меркурий Сергеевич Гиляров, Институт биологии и химии, Московский педагогический государственный университет (МПГУ), Институт проблем экологии и эволюции имени А.Н. Северцова Российской академии наук (ИПЭЭ РАН), конференция, посвященная памяти Н.М. Черновой, биология почв, зоология почвенных беспозвоночных животных, микроартроподы, история почвенной зоологии.

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