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There are things that remain
from departed scientists...
For a long, surprisingly long time, they are conveyed from disciples to disciples of disciples...

Daniil Granin, “The Bison”

Chronicle of scientific life

In memory of Nelli M. Radchenko (May 28, 1942–October 08, 2012)

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Есть вещи, которые остаются
от ушедших ученых...
Долго, удивительно долго, передается
от учеников к ученикам учеников...

Д.А. Гранин, «Зубр»

Хроника научной жизни

Памяти Нелли Михайловны Радченко (28.05.1942–08.10.2012)

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May 28, 2022 marks the 80th anniversary of the birth of Nelli M. Radchenko, Doctor of Biological Sciences, Professor, Leading Ecologist Teacher in Vologda.

"Modern trends in the development of environmental education are the backbone of complex ecology: biological, global, social and human ecology," these were the issues Nelli M. Radchenko was worried about, so she devoted her entire scientific and pedagogical life to them (Radchenko and Shabunov, 2006).

Nelli M. Radchenko was born in the city of Gulkevichi, Krasnodar Krai, Russia, where the family of her father, Mikhail P. Radchenko, fought on the Western Front in WWII, was evacuated. With special holiness and love, Nelli M. Radchenko cherished the memory of her mother, Anastasia G. Lebedeva, and her father, who had lived a long life together. She was feeling their support always and in all matters.

Childhood and school years were spent in the city of Rzhev, Kalinin (nowadays, Tver) Oblast, Russia. Exceptionally active and inquisitive, Nelli M. Radchenko immersed herself in everything that the school could give then: art reading, puppet theater, cutting and sewing, driving a car, etc. Studying in the orchestra of folk instruments, where schoolchildren also taught and performed Russian and Neapolitan songs, she became acquainted with the musical classics, which endowed her with a lifelong love of Art. During her student years, she was an amateur actress in the Rzhev Regional Drama Theater; later, during her business trips to Leningrad (nowadays, St. Petersburg), she always "run away" to the Philharmonic.

In the post-war years, teachers selflessly tried to give schoolchildren what the war had deprived them of, as much as they could do. They tried in every way to develop in them an understanding of the beauty of the world, interest and love for people, for life, to instill a high level of culture, contributing much not only to a school education, but to the child

Fig. 1. N.M. Radchenko at the Scientific and Practical Conference dedicated to the 15th anniversary of the Russian North National Park. Russia, Kirillov city, September 20–21, 2007. (All photos provided by E.V. Dubinina).

self-development. All this had an impact on Nelli M. Radchenko as the impressionable and active student when she was choosing a profession, and this was only pedagogy. Interest in everything that makes it possible to learn something new and to understand this, Nelli M. Radchenko retained until the end of her days.

Naturally, after graduating from school, she started working in the Rzhev City Department of Public Education and was studying in the evenings at the Faculty of Natural Geography of the Kalinin Pedagogical Institute (nowadays, Institution of Pedagogical Education and Social Technology of Tver State University), specializing in geography and biology. An active student life has begun, including student volunteer trips to harvest not only near Rzhev city, but also to the Crimea and Moldova. However, the aim to become a teacher was overwhelming, so Nelli M. Radchenko and some classmates began to teach starting from the third year of their studies, still learning, for six months in rural schools where no enough teachers were that times.

Nevertheless, even this was not enough for her: combining all these duties and a number of others (Nelli M. Radchenko always knew where and how to find them), even while studying at the university, she started to conduct scientific work at the Department of Physical and Economic Geography. After graduating from the University, being assigned to the Knyazhegorsk secondary school (Kalinin (=Tver) Oblast), where she taught chemistry as a student; in 1966, Nelli M. Radchenko has entered the Department of Chemistry of Kalinin Pedagogical Institute and completed it in 3.5 years with a degree in chemistry. At the same time (1966–1968), she was working in the Rzhev Sanitary and Epidemiological Station as a parasitologist-epidemiologist and simultaneously lecturing on public health education.

Realizing a lack of parasitological literacy, Nelli M. Radchenko was undergoing specialization in Moscow at the Institute of Medical Parasitology and Tropical Medicine of Academy of Sciences of the USSR (nowadays) tutored by Evgeny I. Marcinovsky in several areas (protistology, helminthology, sanitary helminthology, and medical geography). At the end of the internship, she has got an invitation to enter a graduate school, but, having no medical education, she chose to study parasitology at a pedagogical university.

Already from the first steps of her scientific activity, Nelli M. Radchenko relentlessly followed the motto, which she formulated for herself: *"You can't be a scientist a little, you can be one or cannot be!".* This approach to science led her to the Department of Zoology of the Volgograd Pedagogical Institute (nowadays, Volgograd State Pedagogical University), where she entered the graduate school of Professor Georgy S. Markov, who finally led her to the scientific path ("sculpted" the scientist, as he said), and she remembered him with great gratitude all her life. Markov was a student of Valentin A. Dogel, Head of the Department of Invertebrate Zoology at Leningrad State University (nowadays, St. Petersburg State University), the founder of the doctrine of ecological parasitology. The ecological direction in the study of parasites, which was developed by Markov at his department, the creative upsurge that reigned there, became the basis for the further scientific life of Nelli M. Radchenko. Thus, her two main interests merged together: ecology and parasitology.

After graduating from graduate school, Radchenko was assigned to the Department of Zoology of the Kostroma Pedagogical Institute (nowadays, Institute of Pedagogy and Psychology of Kostroma State University named after N.A. Nekrasov), where she held the position of senior lecturer: she lectured on invertebrate zoology, zoogeography, and taught the special course on parasitology. At this time, she began parasitological research on amphibians actively bringing students into scientific studies. Nelli M. Radchenko collected material for her future dissertation in expeditions organized by the Academies of Sciences of Uzbekistan and Turkmenistan: in the central Kyzyl-Kum, the foothills of the Kopet-Dag, in the Badkhyz Reserve. There, unique data on the parasites of agama lizards from previously unexplored territories were obtained. Two new species of nematodes, one of which was named by her in honor of her teacher, Prof. Georgy S. Markov,

Fig. 2. N.M. Radchenko with her student V.V. Petrova (left) at the Cherepovets State University on the anniversary of the Department of Biology.

Thelandros markovi Radchenko et Sharpilo, 1975 (Nematoda, Pharyngodonidae), Nelli described jointly with Viktor P. Sharpilo, helminthologist from Kiev, and Vadim V. Kornyushin (Radchenko and Sharpilo 1975; Sharpilo et al., 1983). Their friendship and scientific mutual assistance persisted for many years.

Ecological school of Valentin A. Dogel and Georgy S. Markov brought Nelli to pay attention to everything that was in front of her, especially when working in situ. When dissecting lizards, she was the first in the USSR to find a parasitic crustacean, characteristic of the tropics and subtropics, pentastomida *Raillietiella geckonis* (L., 1758) (Arthropoda, Pentastomida) (Radchenko, 1973).

This was a very unusual find, since the range of final owner, the redbelly rock agama *Laudakia erythrogaster* Ananjeva et al. 2020, covered only East Asia: southeast India, Bangladesh, Indonesia, Thailand, the Philippines and New Guinea; it is known, however, that, having been introduced to North America, this species has also adapted well to the USA.

Carefully collected and processed the richest material on parasite fauna of agamic lizards became the subject of her PhD thesis “Parasites of the Agamas of Central Asia”, defended in 1975 at the Council of the Zoological Institute of the Academy of Sciences of Ukraine. Thus, another stage of self-education has ended, however, not the last.

After defending her PhD thesis, while maintaining her passion for teaching, Radchenko entered the competition for the position of associate professor of the Department of Zoology at the Vologda State Pedagogical Institute (nowadays, Vologda State Pedagogical University) in 1978. Since that time, Vologda has become her home, her city, to which she gave her life, her soul and her talent.

Developing a curriculum for the gymnasium “Harmonia” and lessons on the experimental model “Ecology and Dialectics”, Nelli M. Radchenko repeatedly improved her skills at the State Pedagogical University named after A.M. Herzen (Leningrad – St. Petersburg): she listened to lectures by famous scientists and participated in various conferences. She actively shared her knowledge by holding seminars with teachers, advising teachers of secondary schools, developing and introducing author’s courses into school curricula (Radchenko, 2004, 2006; Radchenko and Nogteva, 2006).

Being invited to the Vologda Institute of Law and Economics to teach the course “Environmental Law” at the Faculty of Law, Radchenko was selected for the position of professor of the Department of Administrative and Legal Disciplines. She tried to convey to future lawyers the idea that environmental and legal culture is the key to maintaining a favorable environment for humans. Cadets learned from her love for nature, their small homeland. It brought up the ability to make environmentally competent decisions in future lawmakers and officials, which were so often lacking at different levels of government (Radchenko, 2008).

All ecological provisions put forward by the teacher were made only on the basis of specific scientific results obtained by her, her students, and her colleagues. The desire for professional growth contributed to the

expansion of her scientific interests in a new place of residence. The agamic lizards were replaced by amphibians, which Radchenko studied at the Department of Zoology of the Kostroma Pedagogical Institute. During expeditions to study the natural monuments of the Vologda Oblast, she managed to visit most areas; studying their faunal complexes, she was continuing the research on the changes in the parasite fauna of amphibians, linking the infestation of amphibians with the degree of anthropogenic pressure on their habitat (Radchenko and Budalova, 1980; Radchenko and Shabunov, 2008).

In 1985, Nelli M. Radchenko added research on fish to her work on the study of amphibians in the Vologda Oblast. The idea appeared in connection with the need to stay constantly and to teach at the training base of the Faculty of Natural Geography of the Vologda State Pedagogical Institute at Lake Kubenskoe. The scientific material "went into hands by itself". In the process of helping students to collect data for their term papers and theses, the richest material on the parasitology of fish in the studied lake was obtained in all seasons of the year. Naturally, this lake has become a model reservoir for monitoring the issues of ecological parasitology of the water basins of the Vologda Oblast. Moreover, a special attention to Lake Kubenskoe, which serves as a transport artery in this region, made it possible to study anthropogenic pollution of both the water and the terrestrial environment at the same time (Radchenko, 2002a).

Without dwelling on the research of one reservoir, Nelli M. Radchenko asked herself the question, what was the state of the other lakes of the region? So, the studies have been launched lakes Beloe and Vozhe, which differed both in hydrological characteristics and in economic use. Each expedition usually involved about a dozen students who collected material for term papers and theses and then successfully defended them at the university. Among the team that joined her scientific school, some talented students attracted attention, in particular, Victoria V. Barkovskaya (Petrova) and Aleksey A. Shabunov. In the future, at the suggestion of Nelli M. Radchenko, they were trained as graduate students of the State Research Institute of Lake and River Fisheries (Leningrad – St. Petersburg) and, after linking their lives with science, remained constant assistants both in work and in life of Nelli M. Radchenko.

As a result of a systematic study at the Lake Beloe, 172 species of fish parasites were found, in the Lake Vozhe, where ichthyoparasitofauna was studied for the first time, 84 species. In 11 fish species inhabiting the Lake Vozhe, there was a number of parasites identified as potentially epizootic and epidemiologic for the local animal and human populations. These parasites might also serve as indicators of the distribution of plankton and benthos (intermediate hosts of natural focal fish diseases) in different parts of the lake water area (Radchenko, 2002b).

Therefore, the work carried out at three lakes in the Vologda Oblast contributed both to comparison of

Fig. 3. Excursion of Vologda teachers to the Darwin State Natural Biosphere Reserve, 2005.

Fig. 4. N.M. Radchenko and A.N. Alekseev in Veliky Ustyug, April 28, 2008.

many biological and environmental parameters and to assessment of the influence of human economic activity. The results of all studies formed the basis of Radchenko's doctoral dissertation (Radchenko, 1999a), defended in 1998 in Moscow at the All-Union Institute of Helminthology named after K.I. Skryabin (nowadays, All-Russian Scientific Research Institute of Fundamental and Applied Parasitology of Animals and Plants named after K.I. Skryabin).

The zoogeographic analysis of fish parasites of the European North of Russia formed the basis for the zoning of the north of the country; the lakes of the Vologda Oblast (Beloe, Kubenskoe, and Vozhe), examined in detail by Nelli M. Radchenko, were assigned to the Severo-Dvinsky District. Comparison of all the material studied in the northwest of Russia made it possible to assume that the further development of these lakes in terms of existing and new parasitic and natural focal diseases would continue.

As a parasitologist, Radchenko focused in her dissertation on the diseases transmitted mainly through fish, which was extremely important for the Vologda Oblast. In the studied lakes, three powerful anthropogenic foci of diphyllobothriasis were identified, supporting the incidence of the population, which has especially increased in recent years and exceeded the average for Russia. In addition, the mechanisms regulating the parasite infestation of fish in shallow lakes, which fluctuated significantly in different seasons of the year, have been revealed. The results of the formation of the parasitic fauna of pike-perch introduced into the lake Kubenskoe in the 1930s were summed up, when it has been enriched with 20 species of parasites (mainly larval forms).

The identification a significant number of fish infected with larvae of helminths associated with fish-eating birds in many water bodies was another result of her analysis of the parasite fauna of the fish of the European North. In particular, the parasite fauna of these birds might serve as an indicator of the processes occurring in the reservoir.

In her dissertation, Nelli M. Radchenko gave a number of recommendations to reduce the infestation of fish with parasites, to improve sanitary and veterinary supervision of natural focal diseases. She noted the need to continue and expand the ecological and parasitological monitoring of large lakes not only in the Vologda Oblast, but also in all water bodies of the European North of Russia. Being always the Teacher, she supplemented the complex of proposed activities by the original educational program for the advanced training of teachers and school administrators with courses on human environmental safety in natural foci.

Therefore, the entire dissertation was full of practical ideas aimed at caring for the population of the Vologda Oblast: this was her life, this she was always organizing and defending, –first of all, in the regional administration and the management of the Coordinating Council for Scientific Research.

Apparently, Nelli paid special attention to diphyllobothriasis, opisthorchiasis, and other parasitic natural focal diseases, the culprits of which were parasites eaten by fish and completing their development in fish-eating birds (Radchenko, 1999b).

Fig. 5. At a reception with Ded Moroz, January 2008. On the left, A.N. Alekseev, on the right, N.M. Radchenko.

In particular, gulls (Laridae family) play an important role in creating foci of human diseases in water bodies. This process is facilitated by anthropogenic changes in coastal areas (deforestation, plowing of land) and significant development by birds of lake shores suitable for their nesting and feeding (Radchenko, 2002b).

Gulls are the definitive hosts of a number of helminths, primarily the causative agent of ligulosis, caused by *Ligula intestinalis* (L., 1758). The larval forms of this parasite develop in common bream, white bream, and a number of other cyprinids, causing their death. According to her observations, on the territory of the Vologda Oblast, the main distributor of this type of helminths is the herring gull *Larus argentatus* Pontoppidan, 1763, the infection rate of which reaches 31.6% (Radchenko and Shabunov, 2012) This species of gull may serve as an indicator of the possible appearance of new foci of ligulosis or the strengthening of existing ones.

The results of a number of complex expeditions and their analysis formed the basis of a number of monographs on fish parasites, where special attention was paid to the influence of environmental factors on the parasite fauna of fish and fish-eating birds (Radchenko, 2002a, 2002b; Radchenko and Shabunov, 2005, 2012). Such an extended study of the ecosystems of large reservoirs of the Vologda Oblast was carried out for the first time, and only thanks to the efforts of Nelli M. Radchenko. The results obtained made it possible to combine parasitological studies of amphibians, fish, and gulls in relation to the epidemiological state of the region, and to brought new information to specialists from various sectors of the national economy, the veterinary service, state sanitary and epidemiological supervision, as well as to the employees of fishing organizations.

Nelli M. Radchenko was a passionate ecologist and strove to cover the issues of the state of the environment in cities where most of the population was concentrated. “The city is an environment artificially created by man, relatively new for the habitat of animals, very specific in all respects” (Radchenko and Shabunov, 2006). N.M. Radchenko believed that the urban environment should not be considered as a single ecosystem; as a rule, it is a mosaic of various biotopes (Radchenko and Shabunov, 2006). In addition, soils, climate, vegetation in individual urban areas are different, which leads to the formation of characteristic zoocenoses. An analysis of the urban fauna allows obtaining objective information about how harmful it is for organisms to live in cities where there is air, water, soil, and green space pollution, and to what extent conservation measures are needed in certain areas.

This approach was the main one in the teaching manual written by Nelli M. Radchenko together with her former student Aleksey A. Shabunov (post-graduate student, then lecturer in the Department of Zoology of the Vologda State University) on the basis of many years of field research. It was intended primarily for teachers, pupils, students, and all those who were not indifferent to the state of the terrestrial and aquatic environment of their own habitat, those who were concerned about environmental changes (Radchenko and Shabunov, 2006). The manual is provided with methods and techniques for researching objects, analysis of the results obtained, conclusions, as well as literature in sections, which made it possible to use it as a practical guide for independent research.

According to the authors, “many organisms are more sensitive to anthropogenic impacts than humans, and observations of them are more efficient and economical, and often more accurate.” Numerous objects widely distributed in industrial centers, water areas and soil have been proposed as bioindicators: insects, aquatic organisms, soil worms, parasites, and plants. Due to their small size and short development cycles, these organisms show variability under adverse impacts in a relatively short time. An analysis

Fig. 6. N.M. Radchenko, E.V. Dubinina, A.N. Alekseev, and V.V. Petrova. Anniversary scientific conference dedicated to the 60th anniversary of the Darwin State Natural Biosphere Reserve. Cherepovets, 2005.

of the relationship between the noted changes and anthropogenic pollution makes it possible to make a short-term or even long-term forecast of the state of the tested ecosystem.

Nelli M. Radchenko emphasized that the bioindication method was especially relevant for the Vologda Oblast, which belonged to areas with a high level of industrial pollution associated with a large number of enterprises (especially in the Cherepovets region).

She maintained constant contact with the Cherepovets State University, where her former students worked and, above all, Viktoria V. Petrova (Ph.D., Associate Professor), the Head of the Department of Biology of the Faculty of Biology and Human Health. Professor Nelli M. Radchenko for many years was the Chairman of the State Attestation Commission of the Cherepovets State University.

In addition, every year she held practical ecological and parasitological classes with students and teachers of secondary schools in Vologda in the Darwin State Biosphere Reserve. These trips, in which the specialists of the reserve conducted classes in “natural laboratories”, were a major event for teachers. Acquaintance of visitors with the flora and fauna of the reserve was conducted by such connoisseurs of nature as Andrey V. Kuznetsov (Director of the Reserve in 1999–2009, later deputy director for science) and Irina A. Rybnikova (Acting Deputy Director of the Reserve for environmental education). It is worth noting that PhD Andrey V. Kuznetsov was also a student of Nelli M. Radchenko (Radchenko et al., 2008).

Being an enthusiast in her field, Nelli constantly reacted to emerging new scientific ideas and got to know them better during business trips, in particular, to St. Petersburg: to the All-Russian Research Institute for Fisheries and Oceanography (VNIRO), the Zoological Institute of the Russian Academy of Sciences (ZIN RAS), and Russian State Pedagogical University named after A.I. Herzen. This is how Radchenko got acquainted with the Chief Researcher of ZIN RAS prof. Andrei N. Alekseev and his wife Elena V. Dubinina, who also worked there. The common ideas of ecology and interest in the foci of transmissible infections in the north-west of Russia brought them together. Joint work in this direction was subsequently continued due to close ties with students and parasitologists of the Cherepovets State University.

Naturally, the activities of Andrei N. Alekseev and her collaborators in the study of the taiga ticks *Ixodes persulcatus* (Schulze, 1930), abounding in the northwest of Russia and serving the carriers of tick-borne encephalitis and ixodid tick-borne borreliosis, have fascinated Radchenko. She tried not to miss the opportunity to conduct such research on the territory of the Vologda Oblast and invited the couple to Vologda, where, having introduced them to the city epidemiologist Nina A. Rybnikova, an expert in the habitats of these ticks, she organized the first joint field trip (Radchenko, 2007).

With the help of Nelli M. Radchenko, this was followed by other acquaintances in the Vologda region and other collections of tick-carriers (Veliky Ustyug, Kirillov). At the request of Nelli M. Radchenko,

Fig. 7. N.M. Radchenko gives a lecture at the Scientific and Practical Conference dedicated to the 15th anniversary of the Russian North National Park. Russia, Kirillov, September 20–21, 2007.

Andrey N. Alekseev and Elena V. Dubinina were invited to give a series of lectures on public health and parasitology at the gymnasium in the city of Veliky Ustyug, where she herself sometimes came and lectured on ecology. The meeting with infectious disease specialists in Ustyug allowed the employees of the Zoological Institute to obtain material from taiga ticks from this northern point of Russia, which had not been studied before.

Another starting point for field work was the Department of Biology of the Cherepovets State University, where PhD Viktoria V. Petrova worked. There, under the guidance of Prof. Andrey N. Alekseev, a study of tick-carriers began on the territory of Zelenaya Roshcha (vicinity of Cherepovets), a place of mass recreation for citizens. The main work on the collection and processing of material was carried out by biology students as part of course and diploma projects. With the assistance of R.A. Fedorov, an employee of the department, it was managed to significantly increase the sample. The study of the morphology of the covers of these ticks as an indicator of the contamination of their habitat with heavy metals has become another significant biotest in the study of ecosystems in the urban environment (Miskevich and Petrova, 2016).

The involvement of specialists in molecular genetic research methods from the Institute of Virology (Tallinn, Estonia) and the Institute of Zoology of the Moldavian Academy of Sciences (Kishinev, Moldova) made it possible to examine ixodid ticks in the Cherepovets region for the presence of pathogens of human tick diseases (Dubinina et al., 2010). In particular, it has been found that tick-borne encephalitis diagnosed in the region belonged to the Siberian subtype, which, in combination with the bacterium *Borrelia garinii,* which was quite widespread in cities, caused a more severe course of the disease. In addition, a detailed study of the collected material revealed the presence in the foci of the area *B. burgdorferi* sensu stricto (the causative agent of Lyme disease itself), *B. lusitaniae* and a number of rickettsiae (the causative agents of typhus), previously all unknown in the region.

These studies, initiated by Nelli M. Radchenko, contributed to a significant expansion of epidemiological research in the region, their popularization, and the invitation of specialists to participate in conferences and lectures (Alekseev et al., 2010).

“Science has entered the XXI century with an understanding of the need to educate ecological culture as a specific means of uniting a person with the biosphere... Speaking in unity, cognition and education in the process of environmental education presupposes the formation of environmental knowledge in a person, the scientific foundations of nature management, a value attitude to nature, a certain value orientation in interaction with nature and an active practical position on rational nature management, conservation and reproduction of natural forces,” – this was not only declared in the speeches and publications (e.g., Radchenko and Nogteva, 2006), but was her life credo.

In 1998–2003, she was a professor, Head of the Department of Environmental and Natural-Mathematical Education at the Vologda Institute for

Fig. 8. N.M. Radchenko with the azalea grown by her on the balcony, 2012.

the Development of Education, in 2003–2012, held a professor position in the Department of Administrative and Legal Disciplines at the Vologda Institute of Law and Economics.

Over the 27 years of her work at the university, she trained one and a half thousand biology teachers. Communication with graduates continued at the Vologda Institute for the Development of Education, where teachers improved their qualifications and where Nelli M. Radchenko worked for about eleven years. Educational and methodological materials on environmental monitoring for teachers were also prepared there, i.e., "Study of the lake ecosystems in the Vologda Oblast" (Shabunov and Radchenko, 2003), "Bioindication methods in assessing the state of the environment" (Radchenko and Shabunov, 2006), "Ecological fundamentals of life safety on the territory of the Vologda Oblast" (Radchenko, 2007), "Protected areas of the Vologda Oblast" (Radchenko et al., 2008).

One of her latest books, "Protected areas of the Vologda Oblast", was awarded a diploma of the National Education Development Fund as the best scientific book in 2008.

Nelli M. Radchenko brought up a lot of students, whose diplomas won prizes at all-Russian competitions. Two of them, Viktoria V. Petrova (Associate Professor, Head of the Department of Biology at Cherepovets State University) and Aleksey A. Shabunov (Associate Professor of the Department of Biology and Chemistry at Vologda State University), having defended their dissertations, continue her work with dignity.

Viktoria V. Petrova and Aleksey A. Shabunov are developing the research direction that they have chosen long ago together with Professor Nelli M. Radchenko. In 2020, the Department of Biology of Cherepovets State University published an educational and methodological manual "Parasites of fish in water bodies of the Vologda Oblast" edited by Viktoria V. Petrova (Petrova et al., 2020), dedicated to the memory of the Teacher and scientist, parasitologist Nelli M. Radchenko.

The result of the scientific and pedagogical contribution of Nelli M. Radchenko are 129 published works (8 monographs, 10 textbooks, and 111 scientific articles), without mentioning of those of all the students and followers of Nelli M. Radchenko.

Nelli M. Radchenko died on October 8, 2012; she was buried in her beloved city of Vologda.

As the final chord of the story about this extraordinary wonderful person, one more love of Nelli M. Radchenko should be mentioned – her passion for indoor and ornamental plants. Her balcony always looked like a real greenhouse, where something bloomed all year round.

References

Alekseev, A.N., Dubinina, E.V., Golovleva, I., Movile, A., Fedorov, R.A., Petrova, V.V., 2010. Izmenenie klimata i problemy kleshchevykh infektsii v gorodakh [Climate change and the problems of tick-borne infections in cities]. *Materialy III Vserossiiskoi nauchno-prakticheskoi konferentsii "Ekologiia i zdorov'e: problemy i perspektivy sotsial'no-ekologicheskoi reabilitatsii territorii, profilaktiki zabolevaemosti i ustoichivogo razvitiia" [Materials of the III All-Russian Scientific and Practical Conference "Ecology and health: problems and prospects of socio-ecological rehabilitation of territories, prevention of morbidity and sustainable development"].* Vologda, Russia, 9–12. (In Russian).

Dubinina, E.V., Movile, A., Golovleva, I., Alekseev, A.N., Petrova, V.V., 2010. K voprosu o bioraznoobrazii kleshchevykh patogenov v Vologodskoi oblasti Rossii [On the issue of biodiversity of tick-borne pathogens in the Vologda region of Russia]. *Materialy IIX Vserossiiskoi nauchno-tekhnicheskoi konferentsii "Vuzovskaia nauka – regionu" [Materials of the IIX All-Russian Scientific and Technical Conference "University Science for the region"].* Vologda, Russia, 403–406. (In Russian).

Miskevich, I.P., Petrova, V.V., 2016. Sostoianie populiatsii kleshcha taezhnogo *Ixodes persulcatus* v predelakh g. Cherepovtsa [The state of the population of the taiga tick *Ixodes persulcatus* within the city of Cherepovets]. *Uchenye zapiski Perozavodskogo gosudarstvennogo universiteta [Scientific Notes of the Perozavodsk State University]* **8** (161), 75–78. (In Russian).

Petrova, V.V., Shilova, D.E., Kolesova, I.A., 2020. Parazity ryb vodoemov Vologodskoi oblasti (po materialam issledovanii, vypolnennykh na kafedre biologii Cherepovetskogo gosudarstvennogo universiteta) [Parasites of fish reservoirs of the Vologda region (based on the materials of research carried out at the Department of Biology of Cherepovets State University)]. Cherepovets State University, Cherepovets, Russia, 141 p. (In Russian).

Radchenko, N.M., 1973. Novye dannye o parazitakh khorasanskoi agamy *Agama erythrogastra* (Scuamata, Agamidae) [New data on parasites of Khorasan agama *Agama erythrogastra* (Scuamata, Agamidae)]. *Zoologicheskii zhurnal [Zoological Journal]* **52** (9), 1398–1400. (In Russian).

Radchenko, N.M., 1999a. Parazity ryb ozer Evropeiskogo Severa Rossii (sistematika, ekologo-faunisticheskii analiz, zoogeografiia) [Fish parasites of lakes of the European North of Russia (taxonomy, ecological and faunal analysis, zoogeography)]. *Dissertation in the form of a scientific report for the degree of Doctor of Biological Sciences*. Moscow, Russia, 69 p. (In Russian).

Radchenko, N.M., 1999b. Antropurgicheskie ochagi difillobotrioza v basseinakh krupnykh rek Evropeiskogo Severa Rossii [Anthropurgical foci of diphyllobothriosis in the basins of large rivers of the European North of Russia]. *Meditsinskaia parazitologiia i parazitarnye bolezni [Medical Parasitology and Parasitic Diseases]* **2**, 55–58. (In Russian).

Radchenko, N.M., 2002a. Ekologo-parazitologicheskie issledovaniia ryb Kubenskogo ozera [Ecological and parasitological studies of fish of the Kubensky Lake]. Vologda Institute for the Development of Education, Vologda, Russia, 156 p. (In Russian).

Radchenko, N.M., 2002b. Parazity ryb ozera Vozhe (sistematika, fauna, ekologiia, zoogeografiia) [Parasites of fish of Lake Vozhe (taxonomy, fauna, ecology, zoogeography)]. Vologda Institute for the Development of Education, Vologda, Russia, 160 p. (In Russian).

Radchenko, N.M., 2004. Ekologicheskaia kul'tura i zdorov'e [Ecological culture and health]. *Materialy III Vserossiiskoi konferentsii «Deti i molodezh' – budushchee Rossii [Materials of the III All–Russian Conference "Children and youth – the future of Russia"].* Vologda, Russia, 173–178. (In Russian).

Radchenko, N.M., 2006. Ekologicheskie problemy bezopasnosti zhiznedeiatel'nosti v Vologodskoi oblasti [Environmental problems of life safety in the Vologda region]. *Tezisy dokladov mezhdunarodnoi nauchno-prakticheskoi konferentsii "Ugolovnaia i ugolovno-ispolnitel'naia politika sovremennoi Rossii: problemy formirovaniia i realizatsii" [Abstracts of reports of the international scientific and practical conference "Criminal and penal enforcement policy of modern Russia: problems of formation and implementation"]*. Vologda, Russia, 242–245. (In Russian).

Radchenko, N.M., 2007. Ekologicheskie osnovy bezopasnosti zhiznedeiatel'nosti na territorii Vologodskoi oblasti: Uchebnoe posobie [Ecological fundamentals of life safety in the Vologda region: A textbook]. Vologda Institute for the Development of Education, Vologda, Russia, 132 p. (In Russian).

Radchenko, N.M., 2008. Ekologicheskie problemy bezopasnosti zhiznedeiatel'nosti na territorii Vologodskoi oblasti [Environmental problems of life safety on the territory of the Vologda region]. *Vestnik instituta: prestuplenie, nakazanie, ispravlenie [Bulletin of the Institute: Crime, Punishment, Correction]* **2**, 78–86. (In Russian).

Radchenko, N.M., Budalova, T.M., 1980. Gel'minty amfibii Kostromskoi oblasti [Helminths of amphibians of the Kostroma region]. *Tezisy dokladov IX konferentsii Ukrainskogo parazitologicheskogo obshchestva [Abstracts of the IX Conference of the Ukrainian Parasitological Society]*. Kiev, Ukraine, 179–181. (In Russian).

Radchenko, N.M., Nogteva, E.Yu., 2006. Ekologicheskaia kul'tura – metodologiia XXI veka [Ecological culture is the methodology of the XXI century]. *Materialy konferentsii "Ekologicheskaia kul'tura i obrazovanie: innovatsionnyi opyt Vologodskoi oblasti" [Materials of the conference "Ecological culture and education: innovative experience of the Vologda region"]*. Vologda, Russia, 3–6. (In Russian).

Radchenko, N.M., Shabunov, A.A., 2005. Ekologicheskii monitoring vodoemov Vologodskoi oblasti: Uchebnoe posobie [Ecological monitoring of reservoirs of the Vologda region: An educational

manual]. Vologda State Pedagogical University, Vologda, Russia, 99 p. (In Russian).

Radchenko, N.M., Shabunov, A.A., 2006. Metody bioindikatsii v otsenke sostoianiia okruzhaiushchei sredy: Uchebno-metodicheskoe posobie [Methods of bioindication in the assessment of the state of the environment: An educational and methodological manual]. Vologda Institute for the Development of Education, Vologda, Russia, 148 p. (In Russian).

Radchenko, N.M., Shabunov, A.A., 2008. Ekologo-gel'mintologicheskie issledovaniia amfibii v Vologodskoi oblasti [Ecological and helminthological studies of amphibians in the Vologda region]. *Materialy IV s'ezda Parazitologicheskogo obshchestva pri RAN "Parazitologiia v XXI veke – problemy, metody, resheniia». T. 3 [Materials of the IV Congress of the Parasitological Society at the Russian Academy of Sciences: "Parasitology in the XXI century – problems, methods, solutions. Vol. 3].* Saint Petersburg, Russia, 72–75. (In Russian).

Radchenko, N.M., Shabunov, A.A., 2012. Parazity ryb, zemnovodnykh i chaikovykh ptits v ekosistemakh krupnykh vodoemov Vologodskoi oblasti [Parasites of fish, amphibians and seagull birds in the ecosystems of large reservoirs of the Vologda region]. Vologda State Pedagogical University, Vologda, Russia, 243 p. (In Russian).

Radchenko, N.M., Shabunov, A.A., Kuznetsov, A.V., Rybnikova, I.A., 2008. Zapovednye territorii Vologodchiny: Darvinskii gosudarstvennyi prirodnyi biosfernyi zapovednik. Natsional'nyi park "Russkii Sever" [Protected areas of Vologda region: Darwin State Natural Biosphere Reserve. Russian North National Park]. Vologda Institute for the Development of Education, Vologda, Russia, 156 p. (In Russian).

Radchenko, N.M., Sharpilo, V.P., 1975. Dva novykh vida oksiurat (Nematoda, Oxyuridae) – parazitov agam Srednei Azii i Kavkaza [Two new species of oxyurates (Nematoda, Oxyuridae) – parasites of agamas of Central Asia and the Caucasus]. *Sbornik nauchnykh trudov Ukrainskogo obshchestva parazitologov "Parazity i parazitozy zhivotnykh i cheloveka" [Collection of scientific papers of the Ukrainian Society of Parasitologists "Parasites and parasitoses of animals and humans"].* Kiev, Ukraine, 200–206. (In Russian).

Shabunov, A.A., Radchenko, N.M., 2003. Izuchenie ozernykh ekosistem Vologodskoi oblasti [Study of lake ecosystems of the Vologda region]. Vologda Institute for the Development of Education, Vologda, Russia, 160 p. (In Russian).

Sharpilo, V.P., Radchenko, N.M., Kornyushin, V.V., 1983. *Oochoristica pseudocotylea* (Cestoda, Skrjabinochoridae) – novyi vid v faune SSSR [*Oochoristica pseudocotylea* (Cestoda, Skrjabinochoridae) is a new species in the fauna of the USSR]. Vestnik zoologii *[Bulletin of Zoology]* **1**, 37–40. (In Russian).

Список литературы

Алексеев, А.Н., Дубинина, Е.В., Головлева, И., Мовилэ, А., Федоров, Р.А., Петрова, В.В., 2010. Изменение климата и проблемы клещевых инфекций в городах. *Материалы III Всероссийской научно-практической конференции «Экология и здоровье: проблемы и перспективы социально-экологической реабилитации территорий, профилактики заболеваемости и устойчивого развития».* Вологда, Россия, 9–12.

Дубинина, Е.В., Мовилэ, А., Головлева, И., Алексеев, А.Н., Петрова, В.В., 2010. К вопросу о биоразнообразии клещевых патогенов в Вологодской области России. *Материалы IIX Всероссийской научно-технической конференции «Вузовская наука – региону».* Вологда, Россия, 403–406.

Мискевич, И.П., Петрова, В.В., 2016. Состояние популяции клеща таежного *Ixodes persulcatus* в пределах г. Череповца. *Ученые записки Перозаводского государственного университета* **8** (161), 75–78.

Петрова, В.В., Шилова, Д.Е., Колесова, И.А., 2020. Паразиты рыб водоемов Вологодской области (по материалам исследований, выполненных на кафедре биологии Череповецкого государственного университета). ЧГУ, Череповец, Россия, 141 с.

Радченко, Н.М., 1973. Новые данные о паразитах хорасанской агамы *Agama erythrogastra* (Scuamata, Agamidae). *Зоологический журнал* **52** (9), 1398–1400.

Радченко, Н.М., 1999а. Паразиты рыб озер Европейского Севера России (систематика, эколого-фаунистический анализ, зоогеография). *Диссертация в виде научного доклада на соискание ученой степени доктора биологических наук.* Москва, Россия, 69 с.

Радченко, Н.М., 1999b. Антропургические очаги дифиллоботриоза в бассейнах крупных рек Европейского Севера России. *Медицинская паразитология и паразитарные болезни* **2**, 55–58.

Радченко, Н.М., 2002a. Эколого-паразитологические исследования рыб Кубенского озера. ВИРО, Вологда, Россия, 156 с.

Радченко, Н.М., 2002b. Паразиты рыб озера Воже (систематика, фауна, экология, зоогеография). ВИРО, Вологда, Россия, 160 с.

Радченко, Н.М., 2004. Экологическая культура и здоровье. *Материалы III Всероссийской конференции «Дети и молодёжь – будущее России».* Вологда, Россия, 173–178.

Радченко, Н.М., 2006. Экологические проблемы безопасности жизнедеятельности в Вологодской области. *Тезисы докладов международной научно-практической конференции «Уголовная и уголовно-исполнительная политика современной России: проблемы формирования и реализации».* Вологда, Россия, 242–245.

Радченко, Н.М., 2007. Экологические основы безопасности жизнедеятельности на территории Вологодской области: Учебное пособие. ВИРО, Вологда, Россия, 132 с.

Радченко, Н.М., 2008. Экологические проблемы безопасности жизнедеятельности на территории Вологодской области. *Вестник института: преступление, наказание, исправление* **2**, 78–86.

Радченко, Н.М., Будалова, Т.М., 1980. Гельминты амфибий Костромской области. *Тезисы докладов IX конференции Украинского паразитологического общества.* Киев, Украина, 179–181.

Радченко, Н.М., Ногтева, Е.Ю., 2006. Экологическая культура – методология XXI века. *Материалы конференции «Экологическая культура и образование: инновационный опыт Вологодской области».* Вологда, Россия, 3–6.

Радченко, Н.М., Шабунов, А.А., 2005. Экологический мониторинг водоемов Вологодской области: Учебное пособие. ВоГТУ, Вологда, Россия, 99 с.

Радченко, Н.М., Шабунов, А.А., 2006. Методы биоиндикации в оценке состояния окружающей среды: Учебно-методическое пособие. ВИРО, Вологда, Россия, 148 с.

Радченко, Н.М, Шабунов, А.А., 2008. Эколого-гельминтологические исследования амфибий в Вологодской области. *Материалы IV съезда Паразитологического общества при РАН «Паразитология в XXI веке – проблемы, методы, решения». Т. 3.* Санкт-Петербург, Россия, 72–75.

Радченко, Н.М., Шабунов, А.А., 2012. Паразиты рыб, земноводных и чайковых птиц в экосистемах крупных водоемов Вологодской области. ВоГТУ, Вологда, Россия, 243 с.

Радченко, Н.М., Шабунов, А.А., Кузнецов, А.В., Рыбникова, И.А., 2008. Заповедные территории Вологодчины: Дарвинский государственный природный биосферный заповедник. Национальный парк «Русский Север». ВИРО, Вологда, Россия, 156 с.

Радченко, Н.М., Шарпило, В.П., 1975. Два новых вида оксиурат (Nematoda, Oxyuridae) – паразитов агам Средней Азии и Кавказа. *Сборник научных трудов Украинского общества паразитологов «Паразиты и паразитозы животных и человека».* Киев, Украина, 200–206.

Шабунов, А.А., Радченко, Н.М., 2003. Изучение озерных экосистем Вологодской области. ВИРО, Вологда, Россия, 160 с.

Шарпило, В. П., Радченко, Н.М., Корнюшин, В.В., 1983. *Oochoristica pseudocotylea* (Cestoda, Skrjabinochoridae) – новый вид в фауне СССР. *Вестник зоологии* **1**, 37–40.