

OBITUARY
ANDREY N. ALEKSEEV
1930–2015



Professor Andrey N. Alekseev, an outstanding Russian parasitologist and epidemiologist, Doctor of Medical Sciences, chief researcher of the Laboratory of Molecular-Genetic Systematics of the Zoological Institute of the Russian Academy of Sciences, died on September 9, 2015, at the age of 85.

Andrey N. Alekseev was born on December 11, 1930, in Leningrad (now St Petersburg) in the family of an army doctor. In 1948 he finished secondary school in Leningrad with a gold medal and entered the Military Medical Academy. He graduated *summa cum laude* in 1954, having specialized at the Department of Parasitology under the supervision of E.N. Pavlovsky. In the same year he published his first scientific research paper “Conserving cysts of Protozoans from the Human Intestine for Diagnostic Purposes”.

After graduation Andrey N. Alekseev worked in a closed military medical institute, first in Zagorsk and then in Kirov (1954–1960). He was demobilised in 1960 and worked in the All-Union Scientific Research Institute of the USSR Ministry of Health (Moscow) until 1971, first as a junior and then as a senior researcher. His research in the institute resulted in a candidate thesis “Biology and Sensitivity to Insecticides of Plague Vectors, Fleas *Ceratophyllus consimilis* Wagn.1898” (Moscow, 1962). At the same time he studied history extramurally in the Moscow

State University and obtained a second university degree in 1966. His graduate thesis “On the So-Called Plague of Athens” was published in the Bulletin of Ancient History (*Vestnik Drevnei Istorii*, 1966, no. 3). In 1969 Andrey N. Alekseev was awarded the higher doctorate degree in medicine for the thesis “Interactions between Bloodsucking Arthropods and Human Pathogens (Quantitative Characteristics of Interactions in ‘Pathogen-Vector’ Pairs Studied by the Method of Individual Batch Infection of Arthropods)”. The thesis was based on the results of numerous experiments employing a special device for batch feeding of fleas, mosquitoes, lice and other blood-suckers invented by the author himself.

In 1971 Andrey N. Alekseev was made Chief of Department of Medical Entomology of the Martsinovskiy Institute of Medical Parasitology and Tropical Medicine (Moscow). He worked there from 1977 to 1982, supervising at the same time the course of medical entomology at the Central Institute of the Postgraduate Training of Physicians (Moscow).

In 1986–1990 Andrey N. Alekseev worked in the Laboratory of Ecology of Arboviruses in the Institute of Poliomyelitis and Viral Encephalitis of the USSR Academy of Medical Sciences (Moscow). There he focussed his efforts on the study of *Ixodes* ticks as vectors of tick-borne encephalitis (TBE), which was the main research direction of

the laboratory headed by S.P. Chunikhin. Experimental research conducted by Andrey N. Alekseev there made it possible to reveal and systematise factors underlying the stability of TBE infection foci and to prove that the pathogen could be transmitted aviremically as well as transptially (with the saliva).

In 1990 Andrey N. Alekseev moved to St Petersburg. For two years he worked in the Sechenov Institute of Evolutionary Physiology and Biochemistry of the Russian Academy of Sciences in the laboratory studying human impact on living organisms. There he laid down the foundations of a new research direction, the influence of anthropogenic load on ticks as disease vectors.

In 1992 Andrey N. Alekseev began to work in the Zoological Institute of the Russian Academy of Sciences. For a long time he was the leader of the group studying the functioning of parasitic systems under conditions of anthropogenic load. In the last years of his life he worked as a chief researcher of the Laboratory of Molecular-Genetic Systematics.

At the Zoological Institute Andrey N. Alekseev continued to study the influence of anthropogenic load on ticks. He showed that the changes in the tick exoskeleton were associated with the level of environmental pollution and correlated with the susceptibility of ticks to pathogens. The proportion of “modified” ticks in the population might serve as an indicator of environmental pollution and, even more importantly, of epidemiological hazard in an area.

Andrey N. Alekseev was the first to consider in an ecological context the interaction between the two pathogens coexisting in ticks, TBE virus and Lyme disease agents *Borrelia*. He decoded synergetic and antagonistic mechanisms in this complex parasitic system, providing a solid basis for the assessment of the hazard of mixed tick-borne infection foci. He developed an idea of “tick-pathogen” pairs as complex systems with emerging properties. These studies resulted in a monograph “Tick-Pathogen System and Its Emerging Properties” (St Petersburg, ZIN RAN, 1993).

Andrey N. Alekseev postulated a number of fundamental theoretical concepts in epidemiology and parasitology: emerging properties of parasitic systems (1993), multiple transmission ways of arthropod-borne infections (1994), antagonistic and synergic interactions in multicomponent parasitic systems (1998), specificity of mixed infections in

ixodid ticks, vectors of humans pathogens (1999), regular alternation of paradigms of interactions between the parasite and its vector (1999), correlation between genetic composition of the population of arthropod hosts and their ability to serve as vectors of tick-borne infections (2001).

The last 25 years of life were the most productive for Professor Alekseev. At that time he focussed on forecasting the spreading of tick-borne infections under conditions of the global climate warming and the technogenic pollution of the environment. He supervised fundamental research programmes of the General Biology Department of the Russian Academy of Sciences “Monitoring of anthropogenic influence on the functioning of the ‘tick-vector’ parasitic systems” and “Study of interaction between several pathogens in two species of ticks from different regions of Russia and the influence of the pathogens on the hosts”, a Russian-Danish Agreement, an international project “Forecasting the risk of mixed tick-borne infections under conditions of increasing anthropogenic load” (Sweden, Russia, Belarus, Estonia) and a number of other fundamental research projects.

Developing the scientific legacy of V.N. Beklemishev and E.N. Pavlovsky and being, in fact, the leader of the Russian school of medical entomology, Andrey N. Alekseev studied evolutionary and trophic links between various groups of blood-sucking arthropods and complex parasitic systems under anthropogenic load. The results of this research were summarised in: Alekseev A.N., Dubinina H.V., Jushkova O.V. 2010. Influence of anthropogenic pressure on the system “tick — tick-borne pathogens” (Pensoft, Sofia — Moscow — St Petersburg, 190 pp.) and a chapter “Zoonotic peculiarities of *Borrelia burgdorferi* s.l.: Vectors competence and vertebrate host specificity” in the monograph: Ali Karami (Ed.) Lyme disease (Tech, Rijeka, Croatia. Chapter 2: 27–54).

Andrey N. Alekseev was a brilliant experimentalist, the author of 7 invention certificates and more than 300 academic publications, including 5 monographs. He supervised 16 candidate theses and a thesis for a higher doctorate degree. In recognition of his academic achievements, Professor Alekseev was elected President of the Society of Parasitologists of the Russian Academy of Sciences (since 2006, Honorary President). From 1976 to 2005 he was an expert of the World Health Organization (WHO) Panel of Experts “Vector Bi-

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ology & Control”; from 1980 to 1994, an expert of the WHO/FAO/UNEP Committee Panel of Experts “Environment management for vector control”. He was awarded the Jubilee Medal “40 Years of the Armed Forces of the USSR”, Distinguished

Conduct Medal, 3rd class, and a Public Health Service Expert Badge.

Professor Andrey N. Alekseev, an outstanding scientist and a remarkable person, will always be remembered by his colleagues.