

In memoriam

Professor Eino L. Krall (1931-2009)

With deep regret, Russian nematologists and colleagues worldwide received the news of Professor Eino Krall's death from a brain infarction on August 27, 2009. Eino Krall was the most prominent nematologist in Eastern Europe, a person of encyclopedic knowledge and a remarkably kind and open colleague and teacher. He authored over 400 publications on nematology, most of which were published in Russian during the Soviet period. His scientific and public activities were closely linked with Russian parasitology and nematology and for many years he served on the editorial boards of *Parazitologiya* and the *Russian Journal of Nematology*. In 1984 he was awarded the Academician Karl von Baer Prize (the highest scientific national prize in Estonia) and in 1992 he was elected Honorary Member of the Florida Nematology Forum. In 1995 he was unanimously elected an Honorary Member of the Russian Society of Nematologists.

Eino L. Krall was born October 9, 1931 in Tartu, Estonia, into the family of a land surveyor. He graduated from Secondary School No. 6 in Tartu in 1950 and from 1950-1955 he was a student of the biological faculty of Tartu State University. From 1955-1958 he was a post-graduate student at the Institute of Zoology and Botany, Academy of Sciences of the Estonian Soviet Socialist Republic (ESSR) (his promoter was Dr E.S. Kirjanova, Zoological Institute, Academy of Sciences of the USSR, Leningrad) and in 1959 he defended his Ph.D. thesis entitled *Phytonematodes of potatoes in Estonia* in the Academy of Sciences of the ESSR, Tallinn. His D.Sc. thesis, *Problems of the systematics and evolution of the nematodes of the families Heteroderidae and Hoplolaimidae*, was defended at the K.I. Skrjabin All-Union Institute of Helminthology, Moscow, in 1980. From 1958 to 1992 he served as a scientific researcher at the Institute of Zoology and Botany of the Academy of Sciences of Estonia (ESSR). From 1992-1996 he was Head of the Department of Systematic Zoology in the Institute of Zoology and Botany and, in the same period (1992-1997), Head of the Department of Systematic Zoology in the University of Tartu where he continued, until his death, as Professor Emeritus.

Professor Krall published a series of important taxonomic papers on the nematodes of the order Tylenchida, the majority being devoted to the cyst-forming nematodes of the family Heteroderidae and the stem nematodes of the family Anguinidae, together with significant contributions to the co-evolution of these groups with their host plant taxa. Considering the plant taxa as several groups of different stages of evolutionary development, he demonstrated that the more recent the plant taxon and the richer its species diversity, the narrower was the host range of the cyst-forming nematode species that parasitise the plant taxon.

For decades Prof Krall accumulated detailed material on his concept of co-evolution, which he had first advanced in his doctoral thesis. Amongst his important works on this topic were Krall and Krall (1970, 1973, 1978). His views on evolution of the heteroderids were later shared by many nematologists, his good friend and colleague, the late Alan Stone (Rothamsted Experimental Station, UK), being the first to support the co-evolution theory.

Earlier, E.L. Krall and E.S. Kirjanova had published the large 2-volume manual on plant nematodes (Kirjanova & Krall, 1969, 1971). The book was the second fundamental review book on plant nematology published in Russia, following that of Filipjev (Filipjev, 1934), which was later



republished by Filipjev and Schuurmans Stekhoven (1941). The book summarised almost all the records of plant-parasitic nematodes in the countries of the former Soviet Union with indication of the exact bibliographical sources, nematode species and plant hosts, as well as pathogenicity, localities, soil parameters and control measures. Due to its format, the book is also a database that may be used to study the distribution and host ranges of the pathogenic species in countries of the former USSR. The book also summarised data on world distribution records of plant pathogenic nematode species that were known up to that time. The precise and encyclopedic collection of the detailed information, and the large number of excellent illustrations, ensured that the book attracted considerable interest worldwide. It was later translated into English (Kirjanova & Krall, 1980). Much of the information in this book has been used internationally in the development of manuals on plant nematology.

In 1978, Prof Krall published a manual on the identification of spiral nematodes of the family Hoplolaimidae. It summarised their systematics, pathogenicity and world distribution. The original concept of the phylogenetic links between hoplolaimids and heteroderids was proposed in this book together with evidence on the origin of cyst-forming nematodes from the more primitive hoplolaimids, a point of view widely accepted in nematology.

During his research activities, Eino Krall described many new species and genera and published comprehensive studies on the biology and ecology of many nematode pests. He looked at nematodes not only as specimens in a collection, but as living creatures with their own peculiar habits of life. Because of this, and in addition to a voluminous nematode slide collection, Eino developed and maintained a living collection of these worms in large ceramic pipes outdoors in the experimental area of his institute. Colleagues in the ex-USSR were familiar with this living collection and often asked Eino to help them with live material of rare nematode species. Eino also mapped the outskirts of Tartu and other places in Estonia for exact localities of plant-parasitic nematode species and therefore knew where he could re-collect living specimens of interesting nematodes for research. He had an extensive practical knowledge of the Estonian wildlife and agricultural pest fauna. As he said, usually at the start of sampling trips: "Let us see what nematodes do live in our Estonia!" Of course, he also had hobbies, including, large collections of coins and stamps, ethnic handicrafts and albums of Estonian landscape painters. He liked to relax by working in his garden. He was familiar with the most aromatic and health-giving herbs and his guests often enjoyed herbal teas which he blended himself. However, Eino's main hobby was nematology and thoughts on nematodes occupied most of his time during his adult life.



For the detailed analysis of the co-evolution of nematodes and their host plant taxa, Eino Krall had a tireless and loving helper – his wife, Heljo A. Krall, a highly professional botanist and coauthor of the most important papers of Eino on heteroderid evolution. Heljo diligently researched all the details on the plant species synonymy, plant phylogenetic relations and botanical classifications according to Takhtajan and Cronquist. The couple married in 1961 and have two children: a son, Alvar, an engineer, and a daughter, Anu, a museum curator.

In the last years of his life (1997-2009) he occupied the position of Professor Emeritus in the Institute of Zoology and Hydrobiology at the University of Tartu (this institute was formed as a result of integration of the Institute of Zoology and Botany of the Academy of Sciences into the system of the University of Tartu after the declaration of the independence of Estonia in 1991). From 1993-2000, Prof. Krall delivered the Parasitology course for students specialising in zoology in the University of Tartu and, during the same period, wrote several educational books and papers on plant-parasitic nematodes in Estonia for tiro researchers and students. He continued to study the taxonomy

of his lovely stem gall nematodes of the family Anguinidae and published, in coauthorship with Russian and Western molecular specialists, a series of papers in international journals. Other collaborative contributions included a set of papers on the cyst-forming nematodes utilising scanning electron microscopy and molecular biology co-authored by Drs M. Rahi (Estonia) and D. Sturhan (Germany), as well as American and Portuguese colleagues (Drs V.R. Ferris, J.M. Ferris, M. Mundo-Ocampo, J. Faghihi, A. Sabo and L. Reis). Among the students and researchers mentored by Dr Krall are Drs E. Mägi, E. Svilponis (Estonia), K. Akopjan (Armenia), G. Belozjorova and A. Ryss (Russia). Professor Krall always helped nematologists from all over the former USSR and worldwide, regardless of their age and status.

We express our deep condolences to Heljo Krall, his son Alvar and daughter Anu. The kind memory of Eino Krall and our respect for his life and accomplishments will be kept in the hearts of nematologists forever.

A.Y. Ryss, S.Y. Tsalolikhin, Yu.S. Balashov, M.D. Sonin, S.O. Movsesjan, S.V. Zinovieva, N.I. Sumenkova, I.A. Baranovskaya, G.I. Solovyova, V.N. Chizhov, O.A. Kulinich, L.I. Gruzdeva, I.P. Kazachenko, S.E. Spiridonov, S.A. Subbotin, T.G. Terentyeva, A.V. Tchesunov, N.D. Romanenko, A.A. Shesteporov, V.G. Gagarin, Zh.V. Udalova, E.M. Matveeva.

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