Equidosimetry
NATO Security through Science Series

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Advanced Study Institutes (ASI) are high-level tutorial courses to convey the latest developments in a subject to an advanced-level audience

Advanced Research Workshops (ARW) are expert meetings where an intense but informal exchange of views at the frontiers of a subject aims at identifying directions for future action

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Equidosimetry - Ecological Standardization and Equidosimetry for Radioecology and Environmental Ecology

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# TABLE OF CONTENTS

Preface xi

## Part 1. Approaches to ecological standardization

Problems of ecological standardization and dosimetry of action of different factors on biota of ecosystems

*Yu. Kutlakhmedov, V. Kutlakhmedova-Vishnyakova, P. Balan*

The principal approaches to standardization of technogenic contamination of the environment

*G. Perepelyatnikov*

Estimation of parameters of radiocapacity of biota in the ecosystem; criteria of their well-being

*Yu. Kutlahmedov, P. Balan*

## Part 2. Approaches to Equidosimetry in Ecology

Equidosimetry: A reflection on risk assessment

*Henry Maubert*

An equi-dosimetric approach to the comparison of radiation and chemical effects on natural populations of aquatic organisms

*V. Tsytsugina*

Determination of heterogeneity of biota as a perspective parameter of ecological standardization

*G.V. Talalaeva*

Phytoviruses as indicators of environment

*A. Boyko*

Protein and radioactive levels of *Patella coerulea* Linnaeus around Dardanelles

*Mustafa Alparslan, Mehmet N. Kumru*

Equidosimetric comparison of efficiency of effects of gamma-irradiation and chemical toxic agents (copper and phenol) on the red algae of Black Sea

*N. Terestchenko, V. Vladimirov*
Macrophytes as bioindicators of radionuclide contamination in ecosystems of different aquatic bodies in Chernobyl exclusion zone.  
A. Kaglyan, V. Klenus, M. Kuz’menko, V. Belyaev, Yu. Nabyvanets  
D. Gudkov  

Effects of radioactive and chemical pollution on plant virus frequency distribution  
V.P. Polischuk, T.P. Shevchenko, I.G. Budzanivska,  
A.V. Shevchenko, F.P. Demyanenko, A.L. Boyko  

Species diversity as a factor of radiostability of algal cenosis.  
N.L. Shevtsova, L.I. Yablonskay  

**Part 3. Radioecology and Ecotoxicology in General Ecology**  

Modern problems of ecotoxicology  
*G. Arapis*  

Ecosystem GIS-modeling in ecotoxicology  
*V. Davydchuk*  

Mapping transfer parameters of radionuclides in terrestrial environments  
*S. Denys, G. Echevarria, E. Leclerc-Cessac*  

Radioecological factors of the geological environment within Ukrainian territory  
*Ye. Yakovlev*  

Behaviour of the radionuclides in peat soils  
*G. Brovka, I. Dedulya, E. Rovdan*  

Evaluation of the effect of Dnipro river reservoirs on coastal landscapes  
*V. Starodubtsev, O. Fedorenko*  

Radiation effects on the populations of soil invertebrates in Belarus  
*S. Maksimova*
Part 4. Problems of Estimation of Risks from Different Factors

Generalized ecosystem indices: Ecological scaling and ecological risk
V. B. Georgievsky

Ecological risk assessment as a method for integrating risks from multiple stressors at hazardous waste sites
R. Morris, R. VanHom

Comparing risks from exposure to radionuclides and other carcinogens at Arctic coal mines
G. Shaw, K. Vicat, P. Delard, S. Clennel-Jones, I. Frearson

Risk due to joint chemical and radiation contamination of food
V. Georgievsky, A. Dvorzhak

Part 5. Problems of Synergism of Different Pollutants

Synergetic effects of different pollutants and equidosimetry
V.G. Petin, G.P. Zhurakovskya, Jin Kyu Kim

The behaviour of radionuclides and chemical contaminants in terrestrial and water ecosystems of Urals region
P. Yushkov, A. Trapeznikov, E. Voribeichik, Ye. Karavaeva, I. Molchanova

Synergism of low dose chronic radiation and biotic stress for plants
A. Dmitriev, N. Guscha, M. Krizanovska

Comparative study of the effects of endocrine disruptor and ionizing radiation with plant bioassay
Jin Kyu Kim, Hae Shick Shin, Jin-Hong Lee, V. G. Petin

Part 6. Genetic Factors, Environment and Toxicants

Cytogenetic effects in plants after weak and combined exposures and a problem of ecological standardization
S.A. Geras'kin, V.G. Dikarev, N.S. Dikareva, A.A. Oudalova, D.V. Vasiliyev, T.I. Evseeva
Role of various components of ecosystems in biochemical migration of pollutants of anthropogenic origin in forests
A. Orlov, V. Krasnov

Ecological inspection of military objects
A. Lysenko, I. Checanova, O. Molozhanova

The procedure of military sites rehabilitation with optimal planning of tender orders
Y. Bodryk, S. Chumachenko, A. Nevolnichenko, V. Shevchenko

Modeling and simulation of $^{137}$Cs migration in boreal forest ecosystems
A. Kovalchuk, V. Levitsky, A. Orlov, V. Yanchuk

Behavior of Cs-137 and Sr-90 on fish ponds in Ukraine
E. Volkova, V. Belyaev, Z. Shirokaya, V. Karapysh

Genetic effects of chronic gamma-irradiation at a low dose rate: experimental study on CBA/LAC mice
A.N. Osipov, A.L. Elakov, P.V. Puchkov, V.D. Sypin, M.D. Pomerantseva, L.K. Ramaiya, V.A. Shevchenko

Part 7. Applied Radioecology and Ecotoxicology

Methods and tasks of radiation monitoring of forest ecosystems
V. Krasnov, A. Orlov

Similarities and differences in behaviour of $^{137}$Cs, $^{40}$K and $^{7}$Be in natural ecosystems
C. Papastefanou, M. Manolopoulos, S. Stoulos, A. Ioannidou, E. Gerasopoulos

Heavy metals accumulation by agricultural crops grown on various types of soil in Polessje zone of Ukraine
L. Perepelyatnikova, T. Ivanova

The brillant blue method for water soluble Chernobyl $^{137}$Cs behaviour estimation in soils of south Belarus
N. Goncharova, K. Kalinkevich, V. Putyrskaya, A. Albrecht
Aquatic ecosystems within the Chernobyl NPP exclusion zone: The latest data on radionuclide contamination and absorbed dose for hydrobionts
D.I. Gudkov, M.I. Kusmenko, V.V. Derevets, A.B. Nazarov

Role of higher plants in the redistribution of radionuclides in water ecosystems
Z.O. Shyrokaya, Ye. N. Volkova., V.V. Beliayev, V.A. Karapis, I.Yu. Ivanova

Problems of the radiation safety on military objects of Ukraine
A. Kachinskiy, V. Kovalevskiy

Landscape criticality indexes for the different pollutants
N. Grytsyuk, V. Davydchuk

Ecosystems of 30-km zones of Khmelnytsky and Rivne NPP: estimation of migration conditions of the radionuclides and other technical pollutants
L. Malysheva, L. Sorokina, A. Galagan, S. Gayday, A. Grachev, O. Godyna, S. Demyanenko, S. Karbovskaya, R. Malenkov, A. Noson

Part 8. Possibility of Standardization of Radionuclides and Chemotoxicants

Radionuclides $^{137}$Cs and $^{60}$Co uptakes by freshwater and marine microalgae Chlorella, Navicula, Phaeodactylum
M. Švadlenková, J. Lukarvský, J. Kvidrová

Principal component analysis of chronic influence of low-doses of ionizing radiation and cadmium on organisms
V. Voitsitsky, S. Hizhnyak, A. Kurashov, O. Kysil, L. Besdrobnaya, N. Kucherenko

Characterization and treatment of actinide contaminated soils and well waters
James D. Navratil

The endogenic and exogenic factors of the realization of phenotypic adaptation
A.N. Mikhryeyev, M.I. Gusha, Y.V. Shilina
Biological approach to evaluating the ecological safety of radioactive waste disposal system: Study of small rodents


Use of photosynthesis and respiration of hydrophytes for water toxicity definition

E. Pasichna

List of Participants
Preface

Obviously, to understand the dynamics of ecosystems and their biodiversity patterns, the assessment of the influence of the effects of physical factors (light, temperature, radiation etc.), of chemical factors (various chemical pollutants - heavy metals and other), and of biological factors (viruses, phages, parasites and etc.) to biota is paramount.

In the last decades, researches on an equidosimetric evaluation of the influence of these various factors on the viability of the biological nature were carried and their ecological standardisation initiated.

A clear theoretical and a practical method of equidosimetry and consequently, an ecological normalization of the different factors in unified uniform units are necessary. Such an equidosimetric method will enable to evaluate and to describe condition and behaviour of the ecosystems under influence of the different factors and intensity of their effect, and to conduct an adequate ecological normalization of the factors and their combinations.

In radioecology and radiation protection, methods of radiation dosimetry are key for dose assessment.

Today researches on selected biological parameters are being conducted with the purpose to compare effects from radiation and from chemical factors on ecosystems. For a number of heavy metals it was possible to put forward effect equivalences.

Comparative evaluations and researches are conducted at the most different levels from molecular to cell level to the level of organisms and also to ecosystems level. Predictions can be made about regressions and loss of separate populations and their successions, through model calculations and full-scale researches.

The discussions concentrate around the following main problems and questions:
1. What criteria are to be proposed for the equidosimmetrical evaluation and prognosis of the condition of biota in the ecosystems under a complex of harmful effects and how can these effects then be translated for a reasonable ecological normalization to be reached?

2. Which features of the model objects are most adequate for equidosimetric evaluations?

3. How can the outcome of equidosimetric evaluations of the action of the different factors be used for predicting the survival and overall dynamics of biodiversity, and ecological quality of the ecosystems?

4. How can “equidosimetry” be used in the context of Environmental Decision Support Systems (EDSS) for the environmental management of affected ecosystems?

5. How can “equidosimetry” be used for the assessment of the quality of ecosystems for the use of the human population?

To solve these and other problems a Seminar has been organised devoted on "Ecological standardization and equidosimetry for radioecology and environmental ecology".

Considerable experience with radioecological and related ecological researches on terrestrial and aquatic ecosystems, especially after the accident on ChNPP and other environmental accidents, has been reached. The complicated combined effects of the radiation, chemical and biological factors, after the accident and during the post-accident countermeasures have highlighted the need for equidosimmetrical evaluations of influence of the various factors and the need for their ecological normalization.

Gilbert Desmet
Former IUR President
There is today a revitalised attention in Radioecology devoted to the so-called “multipollution context” which this Advanced Research Workshop, held in Kiev in April 2002, has certainly contributed to stimulate. A rather long publication process of these proceedings, however, has been necessary due to important changes in the managing Board of IUR, and especially the retirement of its former President, G. Desmet, who particularly promoted this development.

After some time on duty, as new General Secretary of IUR, it became obvious to me that publication would not reach reality without a strong personal commitment in pursuing the editorial task up to completion and in compliance with Kluwer Press standards. On top of many other duties, I therefore engaged in carrying over, mostly during spare time, because I had reached several convictions: the scientific pertinence of the topic, the merit of the contributing authors, the interest to the wider scientific community, and the moral responsibility of IUR as a professional Knowing Society. Above all, I am convinced that progress towards sustainable development, especially when focusing to technogenic substances that humankind gradually introduces within its environment, will not be possible without an integrated view and understanding of the combined effects of the various and concomitant sources of stress. This was precisely the focus of this pioneer Workshop.

It is with much pleasure that I see today this commitment outcome reaching reality, yielding an exciting collection of focused scientific findings and results as well as a concrete reward to the contributing authors.

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