

15 Years Journal of Balkan Ecology

BALKANS AND EUROPE



PROCEEDINGS

INTERNATIONAL CONFERENCE

ECOLOGY - INTERDISCIPLINARY SCIENCE AND PRACTICE

SOFIA, 25 – 26 OCTOBER 2012

PART ONE

15 Years Journal of Balkan Ecology

BALKANS AND EUROPE



**Under the patronage of the Ministry of Environment and Water (MEW)
Federation of Scientific and Technical Unions (FSTU)**

Organizers:

Federation of Scientific and Technical Unions (FSTU)

S. T. Union of Water Affairs (STUWA); S. T. Union of Forestry (STUF); S. T. Union of Specialists in Agriculture (STUSA)

University of Forestry (UF)

Balkan Ecological Federation (BEF)

PublishScieSet-Eco(PSSE)

International Editorial Board of *Journal of Balkan Ecology* (JBE)

Bulgarian Academy of Sciences (BAS)

Forest Research Institute (FRI); Institute of Meteorology and Hydrology (IMH); Institute for Nuclear Research and Nuclear Energy (INRNE); Institute of Biodiversity and Ecosystem Research (IBER)

Sofia University St. Kliment Ohridski

Faculty of Biology (FB)

Agricultural Academy (AA)

Poushkarov Institute for Soil Science, Agrotechnology and Plant Protection; Institute of Agriculture – Karnobat (IA-K)

University for National and World Economy (UNWE)

Union of Scientists in Bulgaria (USB)

Bulgarian Food Safety Agency (BFSA)

Central Laboratory of Veterinary Control and Ecology (CLVCE)

Thracian University of Stara Zagora

Faculty of Agriculture (FA-SZ);

Overgas Inc. AD; SWECO ENERGOPROEKT AD (SEP)

Organizing Committee

Chairman

Prof. Ilia Christov, DSc. (JBE)

Deputy Chairman

Prof. Veselin Brezin, DSc. (UF)

Secretaries

Dipl. Eng. Yllina Dimitrova (JBE)

Assoc. Prof. Dr. Alexander Delkov (FRI-BAS)

Members:

Prof. Yana Topalova, DSc. (FB); Prof. Orlin Zagorov, DSc. (JBE); Prof. Dr. Svetla Marinova (PISS); Prof. Dr. Elena Zheleva (UF); Prof. Dr. Dimitar Tadarakov (UNWE); Assoc. Prof. Radko Petkov, DSc. (IMH-BAS); Assoc. Prof. Dr. Anna Damianova (INRNE-BAS); Assoc. Prof. Dr. Yancho Naydenov (JBE); Assoc. Prof. Dr. Yuliana Markovska (FB); Assoc. Prof. Dr. Paunka Bozhinova (UF); Assoc. Prof. Dr. Emin Atasoy (Bursa Univ., TR); Dipl. Eng. Margarita Syarova (STUWA); Dipl. Eng. Georgi Krumov (STUF); Dipl. Eng. Boris Tiholov (BEF); Dipl. Eng. Stela Blagova (Overgas Inc. AD).

Scientific Committee

Chairman

Acad. Prof. Alexander Alexandrov, DSc. (FRI-BAS)

Deputy Chairman

Assoc. Prof. Dr. Georgi Kostov (UF)

Members:

Prof. Ivan Yachev, DSc./Acad. Prof. Vasil Sgurev, DSc. (FSTU); Prof. Damyan Damyanov, DSc. (USB); Prof. Arch. Atanas Kovachev, DSc. (UF); Prof. Dimitar Nankinov, DSc. (IBER-BAS); Prof. Dr. Dimitar Tadarakov (UNWE), Prof. Ivan Ivanov, DSc. (IMH-BAS); Prof. Georgi Petkov, DSc. (FA-SZ); Prof. Valyu Valev, DSc. (STUSA); Prof. Plamen Mishev, DSc. (UNWE); Prof. Dr. Metodi Teoharov (PISS); Prof. Dr. Dimitranka Stoycheva (PISS); Prof. Dr. Svetla Ruseva (PISS); Prof. Dr. Fani Ribarova (FSH MU); Assoc. Prof. Dr. Botyo Zaharinov (NBU); Assoc. Prof. Dr. Valentin Kazandzhiev (IMH-BAS); Assoc. Prof. Dr. Velichka Koteva (AI-K); Assoc. Prof. Dr. Kiril Kirov (BFSA); Assoc. Prof. Dr. Emil Burnaski (IMH-BAS); Assoc. Prof. Dr. Emil Galev (UF; ULAB); Dipl. Eng. Dimitar Popov (SEP).



PublishScieSet-Eco – Publisher

Tel. (+3592) 987-10-79; E-mail: psse@abv.bg

ISBN 978-954-749-096-3

CONTENTS

PART ONE

PLENARY PAPERS

I. CHRISTOV. Fundamental Features of Ecology as Interdisciplinary Science and Practice.....	7
A. ALEXANDROV, B. ROSNEV. State of Forests in South-East Europe.....	11
A. KOVACHEV. Sustainable Architecture and Urban Planning.....	15
S. ROUSSEVA. Factors and Rates of Soil Erosion in the Balkan Peninsula.....	43
T. MITOVA. Major Trends and Characteristic of Greenhouse Gas Emission from the Agrarian Sector of Balkan Countries.....	48

LAND AND SEA GLOBAL ECOLOGY, AGROECOLOGY, HYDROECOLOGY, BIODIVERSITY

I. SCHNEIDER, S. LINCHEVA, L. IVANOVA, Y. TOPALOVA. Modelling of Biodegradation Process of Trivial Organic Matter in Sediments of Lakatnik HEPP.....	55
J. MAJERČÁK. Subprograms for Identification of Extreme Water Regime Situations in Mathematical Simulation Model.....	61
L. RAKONJAC, Z. TOMIĆ, M. RATKNIĆ, D. DRAŽIĆ, A. LUČIĆ, R. NEVENIĆ. Potential Vegetation and Ecological Classification of Reforestation Sites.....	64
A. LIVIU CIUVĂT, I. VASILE ABRUDAN, V. BLUJDEA. Biomass Production in Young Black Locust Plantations in Southern Romania.....	70
I. KIRILOV, M. TEOCHAROV, E. FILCHEVA. Humus Formation Processes in Modern and Old Marine Terraces of Bulgarian Black Sea Coast.....	75
N. OGNJANOVA-RUMENOVA. Diversity, Distribution and Ecology of Diatoms from Nine High Mountain Lakes, Rila National Park (Bulgaria).....	80
G. LETCHOV. Monitoring Land Surface Phenology Dynamics with Elevation in Central Rhodopes Mountain from MODIS (NASA) LAI/FPAR Time Series.....	88
D. DENCHEV, V. HUBENOV, I. SIMEONOV. Microbial Diversity in Anaerobic Digestion of Cellulose Materials at Different Temperatures.....	94
I. YOTINOV, S. LINCHEVA, L. KENDEROV, I. SCHNEIDER, Y. TOPALOVA. Functional Structure of Microbial Communities - Mechanism for Management of Biotransformation Processes in Sediments.....	100
M. STANACHKOVA, D. KOZUHAROV, I. BOTEV, T. TRICHOVA, Y. TOPALOVA. Development of Zooplankton of Ogosta Dam within 2009 - 2010 Period in Relationship with Mussels from Dreissena Genus.....	108
M. GLUSHKOVA, V. GYULEVA, K. VELINOVA, G. P. GEORGIEV. Nutritional Quality of Nuts from Seven Sweet Chestnut (<i>Castanea sativa</i> Mill.) Ecotypes from Bulgaria.....	116
M. GLUSHKOVA, V. GYULEVA, P. DIMITROVA, K. VELINOVA. Variation in Germination Capacity and Seedling Growth of Sweet Chestnut (<i>Castanea Sativa</i> Mill.) Populations.....	123
G. SHTEREVA. Water Quality of Kamchiya River Downstream.....	129
D. GEORGIEVA, R. DONKOVA, S. DRAGANOVA. Interactions between Entomopathogenic Fungi and Some Soil Bacteria.....	134
D. GEORGIEVA, R. DONKOVA, S. DRAGANOVA. Influence of Entomopathogenic Fungi on the Density of Some Main Groups of Soil Microorganisms.....	138
S. GEORGIEV, A. TASHEV, K. KOEV. Floristic-ecological Characteristics and Conservation Significance of the Maintained Balabana Reserve.....	144
V. GYULEVA, M. TCHORBADIEVA, M. GLUSHKOVA, K. VELINOVA. Esterase Discrimination and Growth of <i>Paulownia elongata</i> (S.Y.Hu) and Its Hybrids in Three Different Regions of Bulgaria..	152
V. GYULEVA, M. GLUSHKOVA, K. VELINOVA, P. DIMITROVA. Ecological-biological Peculiarities of Some Paulownia Species Growing in Bulgaria and Prevention of Potential Negative Consequences for Environment.....	162
N. GADJALSKA. Application of Good Agricultural Practices for Irrigation in Farms Using Hose Reel Machines.....	170
I. GANCHEV. Immobilization Yeasts - Basis for Development of Bioethanol Industry.....	177
I. GANCHEV. Biotechnological Aspects of Hydrolysis of Lignocellulosic Source.....	183
D. BACHVAROVA, A. DOYCHINOV, N. CHIPEV. Contribution to Study of Myriapods (Diplopoda, Chilopoda) in Shelterbelts near City of Shoumen, Bulgaria.....	191
E. UZUNOVA, A. FUTEKOVA, I. GEORGIEVA, L. RASHKOVA. Microhabitat Preferences of <i>Barbus petenyi</i> (Actinopterygii; Cypriniformes; Cyprinidae) in Upper Course of Iskar River, Bulgaria	200

R. MIRCHEV, A. TRIFONOVA. <i>Dirofilaria immitis</i> in Jackals from West Part of Upper Thracian Plain.....	208
E. UZUNOVA, I. MILANOVA, A. FUTEKOVA, L. RASHKOVA, E. TASHEVA. Fish Diversity and Community Structure in Highly Fragmented Section of Upper Iskar River, Bulgaria.....	215
HUMAN ECOLOGY, URBAN ECOLOGY, SOCIAL ECOLOGY, ECOLOGICAL EDUCATION, ECOLOGICAL PHILOSOPHY, ETHICS, ENVIRONMENTAL POLICY	
A. KOVACHEV, J. LYUBENOV. Energy Problems of Modern Cities.....	226
L. NAYDENOVA, T. ANTOVA, K. VASILEV, V. KAMBUROVA, M. SIDJIMOV. Health Effects of Indoor Air Quality. A Review.....	233
N. MIHAIOV, L. SAKELARIEVA. Ecology, Ethics, Philosophy – Man's Responsibility for Nature	238
B. KART. Ethical Responsibility of Man for Ecological Problems in Context of Hydroelectrical Power Plant (HPP).....	243
K. HADJIBIROS. Systems Ecology and Environmental Policy.....	247
D. DRAZIC, M. VESELINOVIC, L. RAKONJAC, L. BRASANAC-BOSANAC, N. CULE, S. MITROVIC. Forest Ecosystems as Basis for Recreational Valorisation of Sava and Danube Riverside Area in Belgrade Region.....	252
H. TEPE. Philosophical Ecology and Anthropology: Does Ecology need Philosophical Anthropology?.....	266
E. NUÝAN. Can Spirituality Save the World?.....	271
S. DIMITROVA, E. MAVRODIEVA, R. LOUKANOVA. Determination and Evaluation of Asbestos Materials in Buildings.....	276
B. ÇALIŞ, B. ARKAN. Views of High School Students Regarding the Effects of Nuclear Power Plants on People and the Environment.....	281
M. ŞENSES. Human Being, Patient, Illness and Human Rights.....	285
A. K. ÇÜÇEN, T. BAYER. Living in Deep Ecology and the Ethic of Respect for Nature.....	291
S. YILMAZ, F. NASIBOV. Abstractness of Geometry and Importance of Shapes in Education.....	298
Y. SIMŞEKLI. Views of Science and Technology Teacher Candidates on Environmental Consciousness and Environmental Education Methods.....	303
GLOBAL ENVIRONMENT PROTECTION, ENVIRONMENT POLLUTION, ECOLOGICAL ENGINEERING, SUSTAINABLE DEVELOPMENT	
G. KOSTADINOVA, G. PETKOV. Sustainable Development of Agroecosystems and Environmental Protection in Bulgaria.....	310
C. KÜTAHYALI, N. ÇEVİRİM, F. BELLONI. Investigation of Uranium Adsorption on Carbon Nano tubes for Nuclear Waste Management Applications.....	318
S. AYTAS, S. YUSAN, M. A. A. ASLANI, T. KARALI, D. A. TURKOZU, C. GOK, S. EREN-TURK, M. GOKCE, K.F. OGUZ. Assessment of Natural Radioactivity with Hazardous Nature and Heavy Metal Concentration of Maritsa and Tundja Riverbank Sediments.....	321
S. AYTAS, T. KARALI, S. YUSAN, M.A.A. ASLANI, D.A. TURKOZU, C. GOK, S. ERENTURK, M. GOKCE, K. F. OGUZ. Determination of Gross Alpha and Gross Beta Activities of Maritsa and Tundja Riverbank Sediments and Evaluation of Results with Sediment Characteristics.....	325
E. GELEVA, A. DAMIANOVA, M. IOVTCHEV. Natural Radioactivity of Some Spring Mineral Water of Bulgaria.....	328
I. PENEV, A. DAMIANOVA. Monitoring of Radiological Status of Some Bulgarian Rivers.....	333
I. PENEV, S. GEORGUIEV, H. ANGELOV, I. KALAPOV, N. ARHANGELOVA, H. HRISTOV, N. UZUNOV, A. DAMIANOVA. Trans-continental Transfer of Radioactive Isotopes from Fukushima NPP Failure.....	339
ZH. BEKYAROVA, D. DINKOV, Y. SPASOVA. Study on Heavy Metal Content in Soils and Aboveground Plant Biomass along Hemus Highway.....	343
L. HRISTOVA, ZH. YORDANOVA, M. DIMITROVA, M. ROGOVA, V. KAPCHINA-TOTEVA. Initiating <i>in vitro</i> Cultivation of Rare and Endangered Species from Bulgarian Flora.....	348
B. YANGYOZOY. Afforestations in Kardzhali Forest Enterprise.....	352
L. KENDEROV, I. BOTEV, I. PANDOURSKI, A. APOSTOLOV, I. KARANOVIĆ, V. PEŠIĆ. Is Hyporheic Community Suitable to Assess Ecological Status of River Ecosystems? Key Study: Iskar River Catchments.....	355
G. SATCHANSKA, A. DOYCHEMA. Quantitative Microbial Analysis of Breads Produced without Preservatives.....	356
S. SAHIN, G. YAPRAK, E. OZEL, I. SERT. Distribution of Natural and Fallout Radionuclides in Cardarli Gulf of Aegean Sea, Turkey.....	357
S. ANGELOVA, V. KYOSEVA, I. DOMBALOV. Comparative Analysis of Thermal Methods for Municipal Solid Waste Treatment.....	361
D. YORDANOVA, V. KYOSEVA, I. DOMBALOV. Hazardous Household Waste - Definition and Choice of Appropriate Treatment Method.....	365

PART TWO

POSTERS

I. CHRISTOV. Ecotechnology for Monitoring, Estimating and Managing Water and Nutrient Statuses of Agroecosystems for Economically Effective Crop Production and Environment Protection.....	377
B. DIKOVA, A. DJOURMANSKI, H. LAMBEV. Essential Oil-bearing and Medicinal Plants New Hosts of Tomato Spotted Wilt Virus in Bulgaria.....	382
A. STOEV, B. DIKOVA, TZ. VUCHEV. Risk Estimation of Epidemics in Oil-seed Rape Agroecosystem (<i>Brassica napus</i> var. <i>Oleifera</i> – <i>Canola</i>) in Bulgaria.....	385
G. KYZAS, N. LAZARIDIS, M. KOSTOGLOU, D. BIKIARIS. Ecological Impact of Reuse of Coffee Wastes on Decolourisation of Industrial Dyeing Waste Water.....	389
V. KOVÁČOVÁ, Y. VELÍSKOVÁ. Groundwater as the Most Important Aspect of Soil Salinization....	399
J. ŠÚTOR, P. ŠURDA, V. ŠTEKAUEROVÁ, V. NAGY. Quantification of Rate of Soil Water Storage Decrease in Aeration Zone of Soil.....	408
J. VITKOVÁ, V. ŠTEKAUEROVÁ, M. PÁSZTOROVÁ, J. SKALOVÁ. Consequences of Climate Change on Soil Water Storage.....	416
A. ČELKOVÁ. Transport and Cation Exchange Reactions in Soil Columns.....	425
Z. LEKA, V. VUKSANOVIC. Influence of Newly Synthesized Dithiocarbamate, K-daap, on <i>Enterococcus faecalis</i> and <i>Enterobacter aerogenes</i>	431
S. ERENTURK, S. HACIYAKUPOGLU, Z. CAMTAKAN, S. KIZILTAS, M. OKKA, M. GENCERLI, M. MERCIMEK, E. GENCERLI, S. YUSAN, F. GUR, K. OLGEN, T. TANBAY. Determining Spatial Distribution of Industrial Pollution In Terms of Ecological Risk Levels.....	435
P. IVANOV. Revised Classification of Technogenic Soils in Bulgaria.....	439
E. KACHAUNOVA, S. BRATANOVA-DONCHEVA, N. CHIPEV. Concept of Ecosystem Services and Their Protection on Usage in Agriculture and Local Handicrafts in Strandzha Mountain.....	443
S. LINCHEVA, L. KENDEROV, I. SCHNEIDER, I. YOTINOV, Y. TOPALOVA. Influence of Exploitation of Hydroelectric Power Plants Lakatnik and Svrazhen on Self-purification Potential of Iskar River in 2011.....	454
M. BELOUHOVA, Y. TOPALOVA. Influence of Nanodiamonds on Key Enzyme Activities of Transformation of Azo-dye Amaranth in Model Sand Biofilters.....	461
TS. KIKINDONOV, Y. SLAVOVA, S. BANCHEVA, M. DELCHEVA, H. PEDASHENKO. Conservation of Population of <i>Spiraea crenata</i> (Rosaceae) in Bulgaria Applying Methods for Micro-propagation.....	469
V. VATEVA, E. TSVETKOVA. Assessment of Possibilities for Ecological Cultivation of Ricin (<i>Ricinus communis</i> L.) in Sakar Agroregion.....	470
V. VATEVA, E. TSVETKOVA, S. ROUSSEVA. Soil Protection Potential of Castor Oil Plant (<i>Ricinus communis</i> L.) in Sakar Agroregion.....	474
G. GEORGIEVA, S. BRATANOVA-DONCHEVA, N. CHIPEV. Assessment of Condition and Occurred Changes in Typical Forest Ecosystems within Strandzha Natural Park.....	479
R. KANCHEVA, S. STRATIEVA. Economic Aspect of Rehabilitation of the Arenic – Skeletic Fluvisoils with Ameliorants.....	488
R. KANCHEVA, I. MITOVA, L. NENOVA. Cost-effectiveness of Potassium Fertilization under Various Deterministic Tomato Varieties and Hybrids.....	491
S. MARINOVA, S. MIHAYLOVA, E. ZLATAREVA, R. TONCHEVA, H. PCHELAROVA, I. SIMEONOV. Effect of the Digestate from Anaerobic Co-digestion of Wasted Fruits and Vegetables and Swine Manure on the Development of Lettuce.....	493
S. MARINOVA, R. TONCHEVA, N. KATHIJOTES, E. ZLATAREVA, H. PCHELAROVA. Agricultural Use of Sludge and Treated Waste Water from Sewage Treatment Plants.....	498
E. ZLATAREVA, S. POPANDOVA. Distribution of Chemical Elements by Profile of Saline Soils and Dependence of $\text{SiO}_2/\text{R}_2\text{O}_3$ Ratio on Some of Their Physical and Chemical Index.....	504
S. MARINOVA, E. ZLATAREVA, I. MITOVA, S. STRATIEVA. Evaluation of Humus Preparation and Possibility of Its Use as Soil Enhance.....	508
D. STOYKOV. Ecological Interactions between Invasive Vascular Plants – Foreign to Bulgarian Flora and Essential Saprophytic and Parasitic Fungi in Bulgaria.....	512
N. HAMWI, G. RAIKOVA-PETROVA. Sex Ratio and Relationship between Fecundity, Length and Mass of Bogue (<i>Boops boops</i> (L.) at Syrian Coast (Eastern Mediterranean).....	513
K. MILADINOVA, T. GEORGIEVA, K. IVANOVA, M. GENEVA, K. DANOV, Y. MARKOVSKA. Cadmium and Lead Effects on <i>ex vitro</i> Growth and Antioxidative Response of Two <i>Paulownia</i> Clones.....	520

K. MILADINOVA, T. GEORGIEVA, K. IVANOVA, M. GENEVA, K. DANOVА, Y. MARKOVSKA. <i>Ex vitro</i> Growth and Antioxidative Responses of Two <i>Paulownia</i> Clones to Zn Excess.....	526
P. BORISOVA, S. STOICHEV, Y. UZUNOV. Community Structure and Diversity of Macrozoobenthos in the Meshtitsa Reservoir (South-western Bulgaria) after Refilling.....	531
D. NEKOVA. Assessment of Loss from Sheet Water Erosion on Soil Productivity.....	539
L. LOZANOVA, S. ROUSSEVA. Mean Infiltration Rate at Simulated Rainfalls on Haplic Castanozem. I. Bare Soil.....	543
L. LOZANOVA, S. ROUSSEVA. Mean Infiltration Rate at Simulated Rainfalls on Haplic Castanozem. II. Wheat.....	548
Z. BRATANOVA, V. PAVLOVA, B. LAZAROV, I. KARADJOVA. Study of Presence of Organic Pollutants in Selected Surface Water in Bulgaria.....	553
V. PAVLOVA, M. STOYNEVA, V. GEORGIEVA, Z. BRATANOVA, I. KARADJOVA. Blue-green Algae Toxins Occurrence of Microcystins in Some Bulgarian Water Bodies.....	554
M. SIDJIMOV, V. METODIEV, L. METCHKUEVA, L. CHIPILSKA, P. DIMITROV, M. TSONEVA, H. KOPCHEVA, K. BOJLOVA, L. NAYDENOVA, L. SHANOVA. Environmental Health Investigation of Sludge from Urban Waste Water Treatment Plants.....	555
H. KOPCHEVA, M. TSONEVA, A. STANCHEV, E. MAVRODIEVA, S. DIMITROVA, M. SIDJIMOV, T. ANTOVA, R. LOUKANOVA. Survey of Air Pollution in Classrooms.....	560
D. STANKOVA, L. METCHKUEVA, I. KARADJOVA, R. GEORGIEVA, G. PAUNOVA. Direct Method for Total Mercury Determination in Fish.....	567
R. GEORGIEVA, L. METCHKUEVA, I. KARADJOVA, G. PAUNOVA, M. KARADJOV. Toxic Element Contaminants (As, Cd, Hg, Pb) in Marine Fish.....	568
G. RAIKOVA-PETROVA, D. ROZDINA. Maturation and Fecundity of <i>Barbus cyclolepis</i> Heckel from Middle Stream of Maritza River, Bulgaria.....	569
I. DIMITROV, T. MITOVA, M. NENOV, D. NIKOLOVA. Changes in the physical Characteristics of Some Soil Types under Influence of Modern Tillage Systems.....	576
K. P. PRODROMOU, C. K. LAKIS, A.Z. PAPAZAFEIRIOU. Boron Adsorption on Freshly Prepared Mn(OH) ₂ and MnO ₂	583
A. Z. PAPAZAFEIRIOU, C. K. LAKIS, A. GERTSIS, K. P. PRODROMOU, D. ALIFRAGIS. Selenium Uptake by Plants in Reclaimed Mine Soils of Ptolemais Basin, Northern Greece.....	588
A. DOYCHEVA, G. PAVLOVA, G. SATCHANSKA. Antimicrobial Activity of Biofoods: Polyflower and Manov Honey.....	593
O. AMIK, C. KÜTAHYALI. Adsorption of Uranium from Aqueous Solutions Using Active Carbon/PAN Composite Adsorbents.....	594
Ç. ÖZER, M. A. A. ASLANI. Designing of the Electro-optic Device for Chemiluminescence and Study of Its Usability.....	595
A. D. PENCHEVA. Funding Opportunities for Environmental Projects.....	600

Journal of Balkan Ecology

A Conference and International Scientific Proceedings

Ecology – Interdisciplinary Science and Practice
Sofia, 25 – 26 October 2012

Call for Papers

Journal of Balkan Ecology is a scientific journal, which publishes research papers in the field of ecology and environmental science. The journal is published twice a year.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

The journal is open to all contributions from researchers, students, and practitioners in the field of ecology and environmental science. The journal is peer-reviewed and is intended for the widest possible audience, including researchers, students, and practitioners in the field of ecology and environmental science.

Ministry of Environment and Water, Federation of Scientific and Technical Unions (S. T. Union of Water Affairs, S. T. Union of Forestry, S. T. Union of Specialists in Agriculture), University of Forestry, Balkan Ecological Federation, PublishScieSet-Eco, International Editorial Board of *Journal of Balkan Ecology*, Bulgarian Academy of Sciences (Forest Research Institute; Institute of Meteorology and Hydrology; Institute for Nuclear Research and Nuclear Energy; Institute of Biodiversity and Ecosystem Research), Sofia University St. Kliment Ohridski (Faculty of Biology), Agricultural Academy (Poushkarov Institute for Soil Science, Agrotechnology and Plant Protection; Institute of Agriculture – Karnobat), University for National and World Economy, Union of Scientists in Bulgaria, Bulgarian Food Safety Agency (Central Laboratory of Veterinary Control and Ecology), Thracian University of Stara Zagora (Faculty of Agriculture), Ovrgas Inc. AD; SWECO NERGOPROEKT AD

PROCEEDINGS *International conference* **ECOLOGY – INTERDISCIPLINARY SCIENCE AND PRACTICE** *Sofia, 25 – 26 October 2012*

PART ONE

First Edition

Format 60 x 84/8; Pages 372

PublishScieSet-Eco - Publisher, ISBN 978-954-749-096-3

Dimi 99 Printing House, Ltd., Bulgaria

Potential Vegetation and Ecological Classification of Reforestation Sites

LJUBINKO RAKONJAC¹, ZAGORKA TOMIĆ², MIHAIRO RATKNIĆ¹,

DRAGANA DRAŽIĆ¹, ALEKSANDAR LUČIĆ¹, RADOVAN NEVENIĆ¹

¹Institute of Forestry, Belgrade, Serbia ²Faculty of Forestry, Belgrade, Serbia

Abstract. The paper presents the results of investigating potential vegetation in Serbia as well as the ecological classification of reforestation sites. The potential vegetation is classified into azonal, zonal, extra-zonal and intrazonal with the communities of potential vegetation presented within each group. The ecological classification and the selection of species have been done only for the areas intended for reforestation because these areas are considered to be a priority due to their role in controlling erosion. However, the fact remains that the areas unsuitable for reforestation, especially bare mountainous terrains, deserve more attention in terms of reestablishing the forest cover. It has been concluded that the unforested areas are characterized by a wide range of ecological site conditions, which have been classified into 8 ecological complexes.

Key words: potential vegetation, barren mountainous terrains, reforestation, ecological classification.

INTRODUCTION

Proper selection of species and successful reforestation require knowledge of the natural forest vegetation of the given region or locality. A great number of unsuccessful reforestation attempts, which sooner or later led to degradation of these plantations started with the introduction of native or non-native tree species into the sites unsuitable for their growth. It is therefore necessary, prior to the reforestation plan making, to define the natural potential vegetation, or better so, the whole forest ecosystems, which would be then used as a basis for the proper selection of taxa and reforestation techniques. Potential forest vegetation is defined on the basis of general principles of vegetation zoning in different plant-geographic regions of Central Serbia (Tomic, Z., 2004).

WORKING METHOD

- Potential vegetation

Potential vegetation was analyzed on the basis of Potential Vegetation Map of SFR Yugoslavia, R 1:1,000,000, forest vegetation zoning of Serbia (Tomic, Z., 2004) and the local map of potential vegetation of the Pester plateau, R 1:300,000 (Rakonjac, Lj., 2002).

- Ecological classification

Ecological classification was done on the basis of typological principles of ecosystem classification (edifying species, phytocoenoses, soil) and presented in the form of ecological units – main forest types (Jovic, D., Tomic, T., Jovic, N., 1996.).

Ecological classification of barren forest areas of Central Serbia was based on the investigations conducted by Jovic, N., Tomic, Z. and Jovic, D. (1996) and Jovic, N. et al. (1998), adhering to the basic principles of typological classification. Since we here deal with unforested areas, the developmental-productive phase of classification is missing.

- The selection of species and lower taxa for reforestation on the basis of potential vegetation

This method of the selection of species was based on the Potential Vegetation Map and applied only on a smaller, site-uniform area. Apart from the map, which covered the whole area, degradation stages and phases had to be defined in the field. The data collected in the field were used to study prior reforestation and to develop guidelines for further actions (Rakonjac, Lj. 2002).

- The selection of species on the basis of ecological differentiation

This method is used to define the soil types, subtypes or series as well as potential forest vegetation. It is based on the exact data collected in the field and available parent rock maps. These data are used to determine potential ecological-vegetation units, meeting the criteria of typological classification (Jovic, N. et al. 1991, 1996). The second phase involves the selection of autochthonous species for reforestation of each separate ecological unit. It is based on the dendroflora of potential vegetation for each particular site. Regarding the degree of degradation, three categories of species are recommended: a) main species (edificators of potential natural vegetation) on preserved sites; b) accompanying species (pioneer species) on partly degraded sites; c) shrubs (ameliorating autochthonous shrubs) in advanced stages of degradation, with partly completely destroyed vegetation.

RESULTS

Potential forest vegetation

According to modern scientific views, vegetation can be classified into the following types: zonal vegetation (climazonal – climatogenic and climaregional), which is defined by the regional macroclimate of the placid sites at lower elevations or in climaregional belts at higher elevations; extra-zonal vegetation