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ARID ECOSYSTEMS

Журнал освещает фундаментальные исследования и результаты прикладных работ по проблемам аридных экосистем и борьбы с антропогенным опустыниванием в региональном и глобальном масштабах. Издается с 1995 года по решению Бюро Отделения общей биологии Российской академии наук.

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РОССИЙСКАЯ АКАДЕМИЯ НАУК
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Научного совета по проблемам экологии биологических систем

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ABSTRACTS

TO THE USE AND INTERPRETATION OF THE "DESERTIFICATION" TERM IN RUSSIA

© 2011. G.S. Kust

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The article discusses the issue on contradictions and shortcomings in the application and interpretation of the "desertification" term used in the UN Convention to Combat Desertification (UNCCD) ratified by Russia in 2003, and in official documents of the Government of the Russian Federation (State reports, projects, and programs). The attention is paid that the risks connected with these contradictions can cause an inhibition of preparation and implementation of measures combating desertification and soil degradation in Russia. Two different consistent approaches are offered for the further use of this term for internal political and legislative purposes, including state programs in Russian Federation.
Key words: desertification, land degradation, soil degradation, drought, UNCCD (Convention to combat desertification).

ECOLOGICAL-GEOCHEMICAL ASSESSMENT OF WOODY VEGETATION CONDITION IN ULAANBAATAR CITY (MONGOLIA)

© 2011. N.S. Kasimov*, N.E. Kosheleva*, O.I. Sorokina*, P.D. Gunin, S.N. Bazha**, S. Enkh-Amgalan*****

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Based on the results of the biogeochemical survey, the assessment of the woody vegetation state in the functional zones of Ulaanbaatar was given. The strong accumulation is detected for Zn and Cd in the poplar leaves, for Mo and V in the larch needles. Among the factors responsible for the accumulation of microelements in poplar leaves, the basic ones are the altitude (for As, Cd, Co, Cu, Ni, Zn), the city sector (V, Pb), functional zone (Cr, Sr) and the composition of soil and rock (Mo). The elements with high- (Pb, V) and low-range (As, Cd, Co, Cr, Ni, Sr, Zn) of atmospheric transfer are revealed. The poplar-trees are tolerant to pollution while larch-trees have a significant deterioration in vital functions.
Key words: Mongolia, Ulaanbaatar, biogeochemistry, urban plants, pollution, *Populus laurifolia, Larix sibirica.*

REGULARITIES IN DISTRIBUTION AND AREAS OF SALT-AFFECTED SOILS IN NORTH-CAUCASIAN FEDERAL DISTRICT OF RUSSIA

© 2011. A.F. Novikova, E.I. Pankova, A.A. Kontoboytseva

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Under consideration are zonal, provincial and lithologic-geomorphological peculiar features of salt-affected soils distribution in North Caucasian Federal District of Russia. Salt-affected soils occupy 23.2 % of the total area of the district. Their share in the soil cover is increasing eastwards from steppe chernozems zone to the semi desert zone. The chemical composition of salt-affected soils inside the particular soil province was also considered in relation to the lithologic-geomorphological conditions.
Key words: salinization, soil province, lithologic-geomorphological conditions, areas of salt-affected soils.

EMISSION OF METHANE FROM THE SOILS OF ROSTOV REGION

© 2011. D.N. Garkusha*, **, Yu.A. Fedorov*, N.S. Tambieva**

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The results of field experiments on the determination of the methane emission and of its concentration in the principal types of steppe zone soils of Rostov Region are presented. In the soils the concentration of methane varied from less than 0.01 up to 15.1 μg/g of wet weight, and its vertical distribution was characterized by decrease of concentration from the surface to the lower soil layers. The maximum quantities of the gas are detected in the alluvial meadow chernozem soils and the minimum ones are detected in the dark-chestnut and chestnut soils as well as in the saline soils. The rate of methane emission from the soils varied from less than 0.1 up to 1.5 mg/m^2 per diem, and it correlated with the methane concentration in the superficial soil layer. The total methane emission from the soils of Rostov Region makes up 16 tons per diem, and the most part of this quantity (66.8%) is provided by the chernozem soils.
Keywords*:* steppe zone, soils, methane, concentration, distribution, emission.

GEOINFORMATIONAL SUPPORT FOR MONITORING TRANSFORMATION OF NATURAL LANDSCAPES IN BASIN LAKE BAIKAL BASED ON RETROSPECTIVE CARTOGRAPHIC MATERIALS

© 2011. A.N. Beshentsev

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Presents the results of the use of retrospective maps in the study of nature use and dynamics of the geographical environment in the basin of Lake Baikal in the XX century. Defined spatial and temporal parameters of the dynamics of forests and plowing into the territory of the XX century. Completed metric estimation of transformation of natural landscapes and identified areas of their degradation.
Keywords: retrospective maps, dynamic of the geographical environment, land use, transformation of natural landscapes, GIS-monitoring.

THE METHOD AND TECHNICAL EQUIPMENT FOR PROTECTIVE FORESTATIONS REJUVENATION IN ARID REGIONS OF COUNTRY

© 2011. Yu.M. Zhdanov, V.N. Horoshavin, V.D. Shulga, Yu.M. Koloskov

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New method for increasing protective forestations longevity in arid regions to preserve their meliorative influence in adjoining agricultural lands is descriled in the paper is descriled, aeso a mechanism of new machine for forestations rejuvenation provited with a hydro-drive of a cutting operating unit and combined wifh a 1.4 class tractor by means of a special hanging-on equipment.
Keywords: method, rejuvenation of forestations, machine, hydro-drive.

INTERANNUAL VARIABILITY OF DISTRIBUTION OF NUTRIENTS DISSOLVED FORMS IN WATERS OF THE VOLGA RIVER DELTA AND ITS INTERRELATION WITH VARIATIONS OF PHYTOPLANKTON BIOMASS

© 2011. A.V. Savenko*, V.F. Brekhovskikh, E.N. Labunskaya****

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Existence of neatly expressed interrelation between concentrations of dissolved mineral phosphorus and silica according to the data of natural observations in the Volga River delta lead with 2007 for 2010 during period of greatest biological productivity is established. Character of this interrelation is defined by interannual variations of phytoplankton biomass, more than on 90% formed by the diatoms consuming not only phosphorus, but also silica.
Keywords: mineral phosphorus, silica, phytoplankton, diatoms, interannual variability, the Volga River delta.

STRUCTURAL CHANGES IN HELMINTHOFAUNA OF RODENTS RESULTED FROM INTRODUCTION AND SETTLING OF ANIMALS IN THE VOLGA DELTA

© 2011. V.M. Ivanov*, A.P. Kalmikov, V.V. Fedorovich**, N.N. Semenova*, O.U. Parshina****

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All changes in parasitic-hosting systems are caused by natural and anthropogenic reasons. Helminthofauna of the introduced animals develops under the influence of the animals settling. In this case helminthes enlarge their areal by infecting the local animals' species (*E. sisjakowi, P. eutamiatis, A. macrocephala* from the muskrat which was brought). They are invaded by new species of parasitic worms from local species. Enriching of the helminthofauna of the introduced animals can occur while the cyclic and noncyclic migration of the rodents into the neighboring areas takes place (such as Kazakhstan, Kalmykia, Volgograd area). One more reason for the structural changes in the helminthofauna of the brought animals is the changing of the areal of the

intervening hosts (the genus of Lithoglyphus, which penetrated into the Volga delta from the Black Sea basin and which stopped the development cycle of A.muehlingi and R.donicum). Finally, brought animals can adopt the worms' species not only from the specific hosts, but from the other local animals (mainly birds) too. In some cases the helminthofauna of the introduced animals becomes poor. This occurs, for example, in case of the lack or small number of the intervening hosts. While introducing animals, it's necessary, first of all, to study their helminthological status and to make the dehelminthization of the objects marked for the acclimatization.
Key words: introduction, helminthes, invasion, rodents, changes.

PASTURE IMPACT ON TRANSFORMATION OF DRY STEPPE ECOSYSTEMS IN THE MANYCH VALLEY

© 2011. N.V. Lebedeva*,, L.P. Ilyina*, A.V. Ponomarev*, R.M. Savitsky*,****

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Pasture impact on soil condition, cover vegetation, spiders and terrestrial nesting birds in dry steep ecosystems in Manych valley is discussed. It was established that vegetation cover, height of grass and overground phytomass, content of humus, humidity of soils decreased, but soil density of surface layer of soil increased in accordingly of pasture impact increasing. These processes reduced to change of spider and bird communities.
Keywords: pasture impact, dry steppe ecosystem, soil, cover vegetation, spiders, birds, Kumo-Manych valley.

SPATIAL DISTRIBUTION OF SOIL MACROFAUNA ON THE BURNED AREAS IN XEROPHILOUS ECOSYSTEMS OF THE BLACK SEA COAST OF THE CAUCASUS

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Spatial distribution of soil macrofauna was studied at two wildfires, 2 and 7 years old, and at two adjacent control plots in a Mediterranean shrubland on light-brown soils, 35 km from Novorossiysk, Russia. At each plot, 25 samples collected as a 5x5 grid with a 5 m distance between were taken with the help of a soil corer with a diameter of 98 mm. Abundance of soil macrofauna in control was 219±77 individuals m^{-2}. Spiders, embia, julida and polyxenida dominated the community. After fires, both diversity and abundance decreased, the latter being 53±23 individuals m^{-2} after 2 years, and 95±23 individuals m^{-2} after 7 years. The distribution became patchier, as judged by variograms. The SADIE revealed that the macroinvertebrates were correlated with the patches of less burnt litter over the burnt plots. Seven years after the fire, only abundance of embia has recovered. This allows ascribing them as a fire-adapted group of soil animals in a fire-prone Mediterranean ecosystem.
Keywords: soil macrofauna, wildfire, geostatistics, SADIE.

CURRENT STATUS OF RUSSIAN GROUND SQUIRRELS (GENUS SPERMOPHILUS): PEST CONTROL AND CONSERVATION

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9 species of ground squirrels (g. *Spermophilus*) inhabit Russia. Representatives of this group are known as agricultural pests and carriers of zoonotic infection pathogens, and it's a reason for intensive 2-centures-long control actions. Up to the end of last century in natural hotbeds of plague up to 80 million hectares of natural arid areas were chemicalized for the destruction of *S. pygmaeus* - the main carrier of the causative agent of this infection. Nevertheless, the intensity of the epizootic in the treated areas did not decrease. The existing methodological guidelines for deratization in natural hotbeds of plague recommended the destruction of 4 species of ground squirrels (*S. musicus, S. dauricus, S. pygmaeus, S. undulatus*). One more species *S. erythrogenys* annihilated as a pest of crops. In connection with the general trend of the conservation of biodiversity, regardless of their negative impact on the human, it needs to revise their attitude to the ground squirrels as a pest and enhance the conservation status of these rodents that have important biocenotic weight in arid ecosystems. Four of the 9 species of ground squirrels in Russia demonstrate long-term reduction of quantity (*S. erythrogenys, S. dauricus, S. pygmaeus, S. suslicus*). Two species (*S. dauricus, S. musicus*) occupy small areas, which greatly increases their risk of extinction. The coordination of work on the protection of Russian ground squirrels with organizations recommending their destruction is required.
Keywords: Russian ground squirrels, pest control, biodiversity, conservation, extinction risk.

COMPARATIVE ANALYSIS OF STRUCTURE VARIABILITY OF WEIGHT CHARACTERISTICS OF *TRIFOLIUM PRATENSE* L. GENERATIVE RUNNER IN NATURAL CONDITIONS OF INNER MOUNTAINOUS DAGESTAN

© 2011. A.D. Khabibov*, P. M.-S. Muratchaeva, D.M. Abdulaeva***

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The comparative analysis of variability for weight characteristics of generative runner of *T. pratense* depending on high-altitude gradient was conducted in conditions of Inner mountainous Dagestan (Gunib). It is determined that with increase of height of *T. pratense* habitat the dry weight of generative runner and its constituent parts (stem, leaves, inflorescences) decreases. In conditions of Gunib («Majak») 2340 m above sea level *T. pratense* have small generative runner and accordingly low weight characteristics in comparison with plants from Khotoch (1180 m above sea level). With increasing of high-altitude gradient the part of dry weight of inflorescence increases through decreases the dry weight of stem. With increasing of high-altitude gradient the reproductive effort – main index of adaptive strategy increases as well. The positive correlation connection was determined between high-altitude gradient and reproductive effort for *T. pratense.*
Keywords: *Trifolium pratense,* dry weight of generative runner and it constituent parts (stem, leaves, inflorescences), reproductive effort, high-altitude gradient, population, excerpts.

EXPERIENCE OF MAPPING OF CONFLICTS OF A NATURAL MANAGEMENT ON AN EXAMPLE OF THE ASTRAKHAN AREA

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Astrakhan Region is characterized by great natural diversity, and complex component and territorial structure of the natural resource potential and the specific conditions of its exploitation. Mapping information is a fundamental in the geographic sciences. When we are mapping conflicts of nature we can get the possibility of visual monitoring of adverse events such as the local areas, as well as in administrative units as a whole. In this article several types of conflicts in nature management are identified and cartographic mapping is presented that gives a visual representation of the impact of a particular type of nature using on the environment of the Astrakhan region.
Keywords*:* conflicts, nature using, nature management, anthropogenic influence, transport, recreation, poaching.

ABOUT THE POLYDISPERSE SYSTEM PARTICULARITIES OF MAIN SOIL TYPES IN THE WESTERN PART OF THE CASPIAN SEA

© 2011. D.B. Asgerova, M.Z. Zalibekova, A.B. Biarslanov

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The meaning of polydisperse system study is connected with its leading role in formation of soil stability in the processes of desertification and aridisation. Many properties of soil depend on grade analysis: physical and chemical, hydrous, air, thermal properties of soil polydisperse system and soil-forming rock, it is four-phase bio-inert heterogeneous polydisperse system of the open type, which in its developing aspires to the condition of the dynamic stability. In this case heterogeneous system is considered from the position of determinant ratio of its components.
Keywords*:* polydisperse system, physical sand, physical clay, loamy and sandy soils, system analysis, hydrophilic and hydrophobic mass, salt accumulation, concentration.