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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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ПРИКАСПИЙСКИЙ ИНСТИТУТ БИОЛОГИЧЕСКИХ РЕСУРСОВ
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ABSTRACTS

ALLUVIAL SOILS OF FLUVIAL FLOODPLAINS AND DELTAS AND THEIR ZONAL DIFFERENCES

© 2011. G.V. Dobrovol'skyi*, P.N. Balabko, N.V. Stasjuk**, E.P. Bykova****

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On the basis of generalization of long-term researches, are shown the morphological lines of river valleys, their classification on a morphological basis. Given the wide characteristic of an alluvial processes, stages of soil formation of inundated soils are characterized. Zonalno-geographical, gidrologo-geomorphological, geomorfologo-genetic, laboratory-analytical laws in geography of soils are revealed. Features of alluvial soils of sharply contrast environmental conditions – humid and arid are considered. It is proved high biogenic of soils and intensity of soil process in flood plains. Materials under the characteristic of structure and properties of soils in concrete river valleys and the basic micromorphological diagnostic signs of inundated soils are resulted.
Keywords: geography of soils, soil cover, inundated landscapes, alluvial soils, genesis.

NEW APPROACH TO DESERTIFICATION SEATS MONITORING

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An approach to obtain new information on desertification dynamics in the context of changing climate is proposed there. This information is concern of territorial differentiation in aridization process, which intensity is determined in negative relations with degradation processes of natural and anthropogenic origin. Thus, changing pattern of degradation processes is supplemented with assessment of interaction between these processes and aridization. Middle-scale sequences of interaction between aridization and land degradation (natural and anthropogenic origin) is displayed by correlation between albedo and surface temperature. Negative correlation shows radiation (desert) type of surface temperature regulation, and positive ones show evacotranspiration type. Radiation type occurs at degraded sub-humid and semi-arid lands. If degradation becomes middle scale then, probably, aridization growth is caused by "albedo – precipitations" positive feedback; in this case seat of desertification is formed. Based on satellite observations data (MODIS/Terra+Aqua) on albedo and surface temperature during 2000-2009 at the Nort-West Caspian region (45-50 NL, 44-51 EL), seats of desertification (natural and anthropogenic origin) with aridization growth, caused by "albedo-precipitations" feedback, are detected. On the base of comparison between 2005-2009 and 2000-2004 periods, differently directed changes in seats areas are detected: Chernozemelsky (Black Land) seat decreased, and seats in Astrakhan region and Western Kazakhstan increased and merged.

Keywords: drylands, desertification , aridization, land degradation, albedo and surface temperature, mesoscale albedo feedback-precipitation.

RESULTS OF THE LONG-TERM MONITORING OF HALOPHYTIC PLANTS DEVELOPMENT ON SOLONCHAKS IN PRIARAL'E

© 2011. Zh.V. Kuz'mina*, S.Ye. Treshkin**

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The analysis of growth and development of halophytic plants in depending from different ways of the experimental planting of long-term results (2003-2010) monitoring of phytoamelioration on automorphic solontchaks of the dried bottom of Aral Sea are considered.
Keywords: halophytic plants, black saxaul (Haloxylon aphyllum), cherkez (Salsola richteri), solonchaks.

RESPONSES OF THE ECOSYSTEMS OF THE STEPPE ZONE AT THE CHANGES OF THE WATER REGIM

© 2011. N.M. Novikova*, N.A. Volkova*, S.S. Ulanova, I.B. Shapovalova*, A.A. Vyshivkin***

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Definition of «current hydromorphysm» is given as natural-anthropogenous phenomenon, the relationships of cause and effect causing its occurrence, the basic forms and diagnostic attributes in soils, vegetation and zoocomplexes are considered. The phenomenon of current hydromorphysm in the steppe zone, a having natural-anthropogenous origin, represents response of the ecosystems on change of a water regime of the landscapes. Regional fluctuations of a climate changed all parts of a hydrological cycle and make changes to a water regime as in automorphouse, and initially hydromorphouse landscapes and ecosystems. They are shown in changes of efficiency of vegetation and specific structure of the animal population, increasing of soil's humidity. In connection with total plough of steppes most confidently regional overmoisterning can be diagnosed in vegetation only within of protected territories. In agrolandscapes it is develops as an local processes. The established interrelations between components of a landscape are opened with an opportunity of early diagnostics of changes, and to decision-making on their easing or liquidation. At coasts of water basins under their influence are formed ecotone systems testing various impact of reservoirs. As indicators of a different degrees of this influence one can use the hydro-ecological groups of plants, salts and a soil structure.
Keywords: atmospheric humidification, water economy activities, artificial reservoirs, overmoisterning, secondary salinization of soils, plant communities, successions, changes.

PECULIARITIES OF PRIMARY SUCCESSIONS IN THE CASPIAN SEA COAST

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The studies of primary successions in the north-eastern coast of the Caspian Sea have revealed the regular features of vegetation development. Three types of primary successions have been recognized in the New Caspian marine plain: psammosere, halosere and meadow sere. They differ by ecological conditions, temporal dynamics and stages. Stages of successions have been identified according to ecological-physiognomic types of dominants in plant communities. Psammosere is a primary succession on sand sediments with dwarf semishrub vegetation (Artemisia arenaria, A.lerchiana) at terminal and climax stages. Halosere is characterized by vegetation development on saline ground of heavy texture towards formation of haloxerophytic and xerophytic dwarf semishrub communities (Anabasis salsa, Artemisia terrae-albae) at final stages. Meadow sere is a primary succession on saline ground of different texture in conditions of river water influence with formation of long-term being seral communities of halophytic grasses and halophytic forbs under semihydromorphic water regime and haloxerophytic (Anabasis salsa, Artemisia pauciflora) and xerophytic (Artemisia terrae-albae, A.lerchiana) dwarf semishrub communities at terminal stages. Ecological phases of soil-ground formation have been determined for each sere. Development of vegetation on psammosere and halosere are caused by gradual movement to automorphic water regime of soils. Predominance of halomesophytic and halomesoxerophytic annual and dwarf semishrub saltwort vegetation is typical for littoral and solonchak ecological phases. Psammophytic shrubs started to dominate in plant communities after desalinization of sandy soils. Halophytic plant communities loose dominant role. They are kept as ecological relicts of previous stages. Decreasing of water table of high mineralization in halosere leads to development of solotetz soils with haloxerophytic vegetation. Meadow sere has described on a basis of study of vegetation in deltas of the Ural and Emba rivers and ancient deltaic plains of the Ural. Specificity of meadow sere has appeared on earlyseral stages in predominance of haloxeromesophytic and halomesoxerophytic grasses (Aeluropus littoralis, Puccinellia distans, P. gigantea, P. dolicholepis) in vegetation cover. In the Ural delta spatial belts correspond to temporal rows. Soil-ground mosaic is a reason of fragmentation of areas developing on meadow sere in the Emba river delta.
Keywords: primary succession, spatial-temporal dynamics, ecological relicts.

PHENOTYPIC VARIABILITY OF BASIC TRADE SPECIES OF CARP FISH (CYPRINIDAE) IN THE BASIN OF THE CASPIAN SEA

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The influence of other variable of selective features on the average value of variation coefficient by totality of morphological signs was studied with the use of 104 samples of 7 types of carp fish in the Caspian sea pool (dimensioned different quality samples, average sizes of the studied specimen, the number of the samples and etc.) for the purpose of estimations of the use ability of this factor for quantitative comparison of relative morphological variability of different types and other animal taxons and finding out of the restrictions nature in cases of the usage . It Is Shown that given

factor is affected by dimensioned different quality, average size and the number of specimens in sample and it is also subjected to sexual and measured-aged change, showing expressed type specificity and presence of differences between samples of one type, dwelling in different conditions. This fact, on the one hand, allows to consider a principal possibility of variation average coefficient usage on the basis of morphological signs at estimation relative level of the general phenotypical change of types or populations and their groups and on the other hand, superimposes variety of restrictions at its using. That's why, the use of given factor at estimation of relative variability in populations or groups of population of one type dwelling in different conditions or different parts of the areal when study of the influence of the concrete ecological factors or general ecological monitoring is the most perspective at present.

Keywords: morphology, variability, variation coefficient, correlation coefficient, population, choice, plastic signs, account signs, various guality, Cyprinidae, Caspian sea, basin.

THE CURRENT STRUCTURE OF THE PHYTOPLANKTON COMMUNITY OF THE KYZLAR AND THE SULAK BAYS OF THE CASPIAN SEA

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The current condition of the summer phytoplankton of the water areas of the Kyzlar and the Sulak bays is marked by a high taxonomic variety, a significant quantitative development of the phytoplankton community, predominance of the small cell forms and increase of the role of the Cyantophyta algae. The major contribution into the biomass has been made by the Bacillariaphyta (the dominant being Actinocyclus ehrenbergii Ralfs); the Cyantophyta (the dominant being Oscillatoria sp., Aphanothece clathrata W. et G. S. West.) have been the most numerous.

Keywords: the Caspian Sea, transgression, phytoplankton, biomass, quantity.

STRUCTURE OF PLANT COMMUNITIES IN THE DRY STEPPES OF THE CENTRAL MONGOLIA AND THEIR REACTION AT THE CONDITIONS OF A SOIL MOISTURE

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The current state of a plant cover of dry steppes in Tuv aimak is considered: structure of communities and a vitality of dominant species during the maximum vegetation and the fall-winter period. The dominance of xeromorphic dwarf shrub Ephedra sinica in communities, and considerable decrease of tussock grass Stipa krylovii most part of which was in anabiosis has been revealed. At the present stage of grazing pressure and the long period of soil moisture deficiency, a reaction of Stipa's tussock on irrigation was insignificant.

Keywords: Central Mongolia, dry steppe, structure of plant community, vitality of dominant species, natural soil moisture.

THE SCIENTIFIC AND PRACTICAL WORK BY A.N. KARAMZIN ON THE AFFORESTATION AND THE REAFFORESTATION IN THE WOODLAND ZAVOLZHIE IN LATE XIX – EARLY XX C.

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Alexander Nikolayevich Karamzin (1850-1927), an outstanding scientist, statesman and public figure, son of nephew of N.M. Karamzin. Resided in his estate Polibino, Buguruslan uyezd, Samarskaya province, where occupied himself with research of climate, flora and fauna. His biography is in focus, his experience of afforestation in trans-Volga forest-steppe is generalized.
Keywords: afforestation, watering, forestry specialist, tree planting, seedlings, nursery gardens, nature monument, woodland park.