XI МЕЖДУНАРОДНЫЙ СИМПОЗИУМ
ПО БИОИНДИКАТОРАМ

СОВРЕМЕННЫЕ ПРОБЛЕМЫ БИОИНДИКАЦИИ И БИОМОНИТОРИНГА

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ON BIOINDICATORS

PROBLEMS OF TODAY IN BIOINDICATION AND BIOMONITORING

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РОССИЙСКАЯ АКАДЕМИЯ НАУК
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ТЕЗИСЫ ДОКЛАДОВ

ABSTRACTS

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Современные проблемы биоиндикации и биомониторинга: Тезисы докладов XI Международного симпозиума по биоиндикаторам. (Сыктывкар, Республика Коми, Россия, 11-21 сентября 2001 г.). — Сыктывкар, 2001.— 402 с. (Коми научный центр УрО РАН).

В сборник включены материалы XI Международного симпозиума по биоиндикаторам. Работа десяти предыдущих симпозиумов в основном была посвящена разработке критериев и методов оценки качества окружающей среды. Публикуются работы, освещающие новые методы биоиндикации, включая дистанционное зондирование, и новые подходы, охватывающие комплексные методы индикации: от традиционных биогеохимических до создания геоинформационных систем.

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HEAVY METALS IN THE PROCESS OF WASTES UTILIZATION IN THE SYSTEM: SETTLINGS OF SEWAGE — GROUND — PLANTS

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Use of deposits of sewage of cellulose-paper combines is perspective in the conditions of negative balance of humus on poor soil in the North of Europe. The main reason not to use them in agriculture is connected with the raised contents in them of heavy metals ions (HM), though HM saturation is not the highest among industries. Hg, Cd, Pb, Zn, Cu are priority pollutants in this case.

Usage of deposits (active slime) in conditions of the North has the specific features stipulated by the subjects, that they should be applied in soils, which don't have suf-

ficient buffer capacity to contaminants. Besides the operations on slime depositing are connected with engaging of expensive engineering, that does it economically inexpedient to use small doses (less than 80-100 t/ha). The most effective is the following technology of utilization, tested in practice and not accepting HM accumulation in finite production:

1. The initial decontamination of toxic components of wastes is carried out in bulk airing clamps. After degradation of inhibiting compounds the substance is invaded by soil biota, the processes of biotransformation of organic matter starts with the rise of temperature. The colour and odour of slime alter, the poorly smelling compounds disappear, green appears, earthworms settle. The structure also changes — from paste look consistence to aggregation structure and further, after exposition during three years — to friable structure.

2. The active slime is brought in superficially, is held out within day under operation of solar radiation. Then double milling on the depth of 12-15 cm for its even distribution in soil and ploughing is carried out. Thus there are the conditions for HM transition from linked to the mobil form, they become accessible to migration downwards under the soil profile. As the result of a vertical displacement upper horizon of low humus and acidic soils gets free from HM. In deep strata HM are inaccessible to the plants root systems, deposit soils with fine texture link them and, thus, there is a HM burial place as insoluble compounds.

3. Residual amounts of HM in arable layer are deposited by humus matter, which is brought in as dung-peat compost for the subsequent year. The high cation-exchange capacityof humic acids allows linking practically all HM. In outcome the inflow HM through assemblage of rootlets in plants is limited.

On infield thus soils fast growing culture from the family Cruciferae (Sinapis alba, Raphanus sativus, Brassica napus, Tiphon) are cultivated first of all. These plants are patient of cold, are capable to digestion of high levels of units supply during durable growing season. Main sowing is carried out in mixtures with traditional cultures, and after narwest — repeated and stubbly seeding in the pure state. In late autumn the biomass is turned in ground, that follow-up enlarges its buffer capacity.

The productivity of improved agricultural soils is higher in 3-4 times than check metrics (3.3-3.8 t/ha). Bioaccumulation of HM in production is comparable with their content in green of uncontaminated territories. Mercury is not detected which can be explained by overcoming of the evaporative barrier after transition in the free form.

FLOROGENESIS IN MAN-MADE ECOTOPES

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Control of the evolution at its transition into the phase of noosphere (anthropogenesis) is becoming one of the most important tasks of the society and science. To achieve this purpose a detailed study of regularities of anthropogenously transformed ecosystems is needed, and in case of studying flora — of the regularities of its florogenesis.

The research of florogenesis is necessary because: 1) the global network of industrial ecotopes has been formed all over the world and affects significantly the case of natural florogenesis, 2) currently there arises the necessity to investigate problems of florogenesis of not only regional floras but also of topological level floras constituting them and which evolution under the effect of some factor may take place in different and even contrary direction (Didukh, 1992), 3) flora of industrial ecotopes is very dynamic. For the last 8 years we have found 52 new species for the region. Out of them 12 are new ones for Ukraine and three are reported for the first time for the Eastern-European plain (Tokhtari, 1993; 1998; 2000).

We regard modern florogenesis in anthropogenous landscapes as a part of irreversible process of flora's historical development, the result of which is the formation of anthropotolerant version of regional floras, which got historically formed under the total impact of anthropogenous factors. Various types of anthropogenously transformed floras exist simultaneously and reflect different phases of floras transformation — from flora of the Natural Reserve Resourses System to floras of industrial ecotopes. That is why we regard them as stage models of anthropogenous flora's evolution, which are characterized by different biological diversity of phytobiota (R. Burda, 1998).

We have found that anthropogenous effects on plant populations cause enhancement of divergence, broadening of variability spectrum, transformation of correlative links between traits and accelerated formation of interpopulation distinctions (Burda, Ostapcko, Tokhtari, 1997; Tokhtari, 1998; 1998). The analysis of conjugate migration of alien species of lower fungi and phytophages enables to define links of neofloras which are being formed with floras of the ancient Mediterranian region (Tokhtari, Burda, Kolomoets, 1999; Tokhtari, Khomyakov, 2000). Processes of florogenesis increase the speed, acquiring new directions under the influence of dominating anthropogenous factors.