

## **ESTIMATION OF AN ECOLOGICAL CONDITION OF SOILS OF NORTH AMERICA ON THE BASIS OF THEIR AGROCHEMICAL PARAMETERS**

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Temporal and spatial dynamics of the contents of the mineral forms of nitrogen in soil is investigated using information theory, fuzzy and fuzzy logical analysis, and elements of management systems (rotation, cover crop, and forms of fertilizer). Soil analyses were evaluated from a long-term crop rotation trial established in 1993 on an Alfisol sandy loam soil in the Great Lakes region of North America. Zones of ammonium and nitrate dynamics of soil were established. These ranges are offered as criterion for estimation of soil ecological condition. The conventional row crop system relied on the use of synthetic fertilizers, which provided a level of «ecological risk of pollution». Replacing nitric fertilizers in the transition, integrated systems reduced ecological pollution risk, but provided a level of “risk of depleted soil inorganic nitrogen”. Cover crop and organic manure systems guarantee a condition of ecological norm in soil ecological status.

## **WORLD TRENDS IN SOIL CHEMISTRY**

**Yu.N. Vodyanitskii**

There are the four main directions in the modern chemistry of soils: 1) study of the organic matter chemistry, 2) study of the soils biochemical processes, 3) using principles of chemistry for the soil protection, 4) study of soils as the buffer system, as geochemical barrier and pool of elements. Strong interest in studying of the soil organic matter, soil pollutions and the role of soils as a chemical compound of the ecological environment is the reflection on pragmatic trends in the modern soil chemistry. Many of breakthroughs in the soil chemistry are based on the new nonspecific analytical methods, physical methods at first. The most successful for identification of the individual chemical compounds in soils is using of synchrotron X-ray detectors.

## **ANTHROPOCHEMICAL PROCESSES IN MANKIND DEVELOPMENT**

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In article the new scientific branch the anthropochemistry, being science section about the man and having for an object studying of history of interaction of the man with various chemical elements which also consists of these elements is considered. This interaction changing throughout epoch and depending on geographical conditions, in many respects defined development, health and even behaviour of the man. Soils, as well as other components of the anthropochemical environment, play a huge role in human life. Fertility and chemical compound of soils in many respects define quantity and quality of food resources of the man, both natural, and grown up agricultural production, and also presence in food of anomalies in the content of heavy metals and other trace elements. Anthropochemical crises of the past at first arose because of absence of scientific knowledge, then, as result of absence of will in application of knowledge (a priority of the economic bases over humanistic). Now transition from reaction to influences, to their anticipation (for example, preliminary tests of new substances) is observed.

## **SOME OBSERVATIONS ON THE MIGRATION BEHAVIOR OF PESTICIDES ON SOIL AND SOIL–SILICA FLAT BEDS**

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The migration behavior of six pesticides through twenty-three stationary phases (soil, silica gel and soil + silica gel with or without impregnation) has been examined using about eight mobile phase systems. For impregnation, aqueous salt solutions (1.0 or 5.0%) of Cu, Zn, and Cd were used. The trend of relative mobility of pesticides achieved with the combination of different stationary and mobile phases has been reported. Results obtained on layers of soil and silica has been compared. The chromatographic system, soil + silica (8:2, w/w) impregnated with 5.0% aqueous salt solution of Cu, Zn, and Cd as stationary phase and acetone + 1.0% aqueous NaCl (1:1, v/v) as mobile phase was best for the separation of chlorpyrifos (CPS) from dichlorvos (DCVS), dimethoate (DMT), malathion (MLN) or methyl parathion (MePA).

## EFFECT OF DIFFERENT PLANTING DATES ON YIELD AND YIELD COMPONENTS OF RICE (*Oryza sativa* L.)

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Timely transplanting is one of the major objectives of rice production in the hilly areas of Swat valley. An experiment was conducted during summer 2007 at Agriculture Research Institute (North) Mingora Swat-Pakistan to study the effect of different planting dates on yield and yield components of rice in which six rice cultivars viz., ILLABONG-2, PR-2881, YUNLIN-2, IRI-384, GZ-5830 and JP-5 were tested on five different transplanting dates viz. 24<sup>th</sup> May, 9<sup>th</sup> June, 24<sup>th</sup> June, 9<sup>th</sup> July and 24<sup>th</sup> July to find out optimum transplanting time for the commercial growing region. Analysis of variance clarify that cultivars had highly significant ( $P \leq 0.01$ ) responses towards days to 50% flowering, days to maturity, plant height, tillers hill<sup>-1</sup> and 1000-grain weight. Analyzed data revealed that planting dates independently showed highly significant ( $P \leq 0.01$ ) differences for days to 50% flowering, days to maturity, plant height, tillers hill<sup>-1</sup> except 1000-grain weight was non significant ( $P \geq 0.05$ ). Interaction between cultivars and planting dates was significant ( $P \leq 0.01$ ) for days to 50% flowering, days to maturity and plant height while non significant ( $P \geq 0.05$ ) for tillers hill<sup>-1</sup> and 1000-grain weight. Mean lowest and highest data recorded were 48 and 72 days to 50% flowering, 92 and 113 days to maturity, 77 and 103 cm plant height, 12 and 15 tillers hill<sup>-1</sup>, 125.25 and 126.89 g and 1000-grain weight for 25<sup>th</sup> May and 24<sup>th</sup> July, 25<sup>th</sup> May and 24<sup>th</sup> June, 25<sup>th</sup> May and 24<sup>th</sup> July, 25<sup>th</sup> May and 24<sup>th</sup> July, 9<sup>th</sup> June and 24<sup>th</sup> July transplantations. Rice cultivars GZ-5830 (55) and JP-5 (67), PR-2881 (79) and JP-5 (118), GZ-5830 (71) and JP-5 (115), JP-5 (12) and YUNLIN-2 (16), IRI-384 (104.11) and ILLABONG-2 (147.53) recorded minimum and maximum days to 50% flowering, days to maturity, plant height, tiller hill<sup>-1</sup> and 1000-grain weight. It was concluded from the present experiment that early transplanting of rice cultivars produced more promising results then late and was suggested to transplant rice on 25<sup>th</sup> May produced highest yield.

## SOIL POLLUTION WITH Cu, Zn AND Cd BY NON-FERROUS METAL MINING AFFECTS SOIL-MICROBIAL ACTIVITY OF KASTANOZEMS IN THE MASHAVERA VALLEY

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The topsoils of the Mashavera valley in SE Georgia are heavily contaminated by Cu, Zn, and Cd due to irrigation with river-water loaded with suspended fines containing sulfidic trace metals (Cu, Zn, and Cd). To investigate the ecological impact of this contamination, 128 topsoils from house-gardens and arable land (irrigated either with clean or contaminated water or without irrigation) were sampled. Total content and mobile fractions of Cu, Zn, and Cd concentrations were measured. Soil-microbial parameters (enzyme and respiration activity) were measured in 37 selected samples. In soil irrigated with contaminated water, total contents of Cu, Zn, and Cd were elevated by factors of 2.1, 1.3 and 3.3 as compared to the control. Mobile fractions were elevated by factors of 18.5 for Zn and 16.4 for Cd. Phosphatase and dehydrogenase activity were significantly lower in topsoils irrigated with contaminated water (52% and 30%, respectively, as compared to control), while respiration activity was not affected. Soil fertility and food quality are strongly endangered in the Mashavera valley.

## SHORT, MEDIUM AND LONG-TERM EFFECTS OF RADIONUCLIDE CONTAMINATION AFTER A NUCLEAR ACCIDENT - LESSONS LEARNT IN AUSTRIA FROM THE CHERNOBYL DESASTER

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Austria was significantly contaminated after the Chernobyl accident in 1986. E.g. the radiocesium contamination of soils (<sup>137</sup>Cs) ranged from less than 10 kBq m<sup>-2</sup> to more than 100 kBq m<sup>-2</sup>. Fresh vegetables and milk were significantly contaminated during the first weeks after fallout. For <sup>131</sup>I and <sup>137</sup>Cs concentrations in grass during the first weeks after fallout, biological half-lives of 10.7±3.2 days and 10.5±1.4 days, respectively, were derived. This decrease was also clearly reflected by the decrease of radioiodine and radiocesium concentrations in Austrian milk samples. The long-term behavior of radionuclides is mostly governed by their interaction with the soil matrix. Most radionuclides show only very small migration velocities of a few mm per year and stay in the top soil layers, making soil an important radionuclide sink. On the other hand soil is an important source for the long-term entrance of radionuclides into the food chain. The Austrian

investigations showed that soil-to-plant transfer values differ widely between plant species and soil characteristics. Repeated transfer factor investigations indicated decreasing plant availability with time. Semi natural environments like Alpine pastures and forests deviate concerning radionuclide behavior and mobility. In both cases, radionuclides stay more mobile and plant available over longer times, biological half-lives being considerably larger than in arable systems. Cycling of radionuclides within the biological system, low nutrient contents of soils, short vegetation periods and thus, low dilution effects due to biomass growth lead to higher radionuclide concentration in produce from these ecosystems.

## **LANDSLIDES AS FACTOR OF DESTRUCTION AND FORMATION OF MOUNTAIN ECOSYSTEMS AND SOILS**

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Loose slope sediments and soils are the vital resource for mountain biota and population, and their catastrophic loss by landslides causes destruction of environment and outflow of mountain population. Examples of contributions from mountain landslides to the mass wasting are given, including the Caucasus. However the role of landslides in mountains goes beyond destructive activity. The sliding mass expose surfaces for weathering and accumulate loose material, thus starting new cycles in ecosystems development, forming new habitats for biota and in some cases new lands for agricultural ecosystems. There are many cases of mountain inhabitants using not only ancient landslide deposits and landforms, but quite recent ones. A chronological sequence of landslides and their using for human needs was studied in Mountain Adjara, Skhaltal River valley (Georgia). 15-year landslide body has a low and mound surface, covered by scattered trees, and initial thin and compacted soils are formed. 60 years age landslide is used as hayfield; its surface and soil reclamation started about 30-40 years after the event. The landslide more than 100 years old became a cultivated landscape typical of Mountain Adjara. In those cases sliding processes may be considered as a mechanism of long-term compensation for rapidly inflicted damage.

## **HUMUS SUBSTANCE AS A CARRIER OF INFORMATION ABOUT THE ENVIRONMENT OF ITS FORMATION**

**M.I. Dergacheva**

The informative importance of humic acids and their ratio to other humus components is considered on characterizing their formation environment both in the present and in the past. It is reported, that the quantities of humic and fulvic acids are closely connected with the temperatures and precipitations respectively. The composition and ratio of humic acid elements as well as characteristics of their structural features correspond precisely to the landscape conditions and the quantitative characteristics of some climatic parameters. The materials discussed in the paper show, that the main humic acid characteristics and their ratio to fulvic acids is preserved in time and can serve as a recent basis while the environment of the different Holocene periods is estimated.

## ***SOME BIOLOGICAL AND PHYSICAL PROPERTIES OF X.vesicatoria SPECIFIC PHAGE***

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Some biological and physical/chemical properties of the three lines of lytic bacteriophages specific for *Xanthomonas vesicatoria*, causing tomato bacterial spot in Georgia was studied. The bacteriophages belong to the Tailed phages, family Myoviridae. The adsorption time and latent period were short and nearly identical for the three phages. Influence of solution of blue vitriol and copper oxychloride to phages mixture was studied. Influence of high temperature on the phages and their mixture was investigated. It was found that tested bacteriophages belong to the high temperature resistant phages.

## **ECOLOGICAL ESTIMATION OF THE SOILS GOOD FOR GRAPE OF THE LOWLAND OF KUR-ARAZ OF THE AZERBAIJAN**

**M.M. Yusifova**

Contemporary agricultural science improved the known adaptive approaches in the past, for it accounting natural peculiarities of the concrete region is offered with the assistance of agroecological estimation of soil. Using of collecting materials of the soil ecological parameters of soil cover of the studying territory and applying the system of the private scales of the soil estimation on degree of display of their separate signs, the ecological estimation of the soils good for grape of the lowland of Kur-Araz where the highest ecological marks have been got mountain-grey-brown dark (95 marks) and mountain-grey-brown ordinary (92 marks) soils has been carried out.

## **NITROGEN AND PHOSPHORUS AMOUNTS IN TERMINAL PART OF GORGANROUND RIVER DURING 2009-2010**

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In the text, we are presenting the results of the research done on the terminal part of Gorganroud River from the Aghghalla city until estuary. Between April 2009 and March 2010, 12 samples were taken from 5 station along the river per month. We have established nitrate, nitrite, ammonium, orthophosphate as the main parameters. Despite the probability of introduction of waste waters, results show not serious problem in studied part of the river, regarding to aims of the river water use.

## **THE CLIMATIC EFFECT OF WEATHERING INTENSITY ON SOILS: A METHODOLOGICAL PROPOSAL**

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In 1980 an index to assess land degradation degree worldwide was proposed by FAO-Unesco for small scale utilization. This index takes into consideration only monthly and annual rainfall, along with monthly temperature and evapotranspiration. In order to include a greater number of environmental conditions in terms of soils formation and rocks weathering., it was necessary to develop a new index to be used at greater scale in different climatic regions. Then some modifications of the FAO-Unesco index coupled with some geostatistical elaborations were carried out in two different Regions of Italy (Tuscany, mainly Continental, Apulia mainly Mediterranean) and allowed to propose a new index (AGCT) based on the climatic variables which demonstrated a good correlation with soil types occurrence over the land. More intensely weathered soils occur where AGCT is higher whereas less developed soils are associated with lower AGCT values. In the opinion of the Authors the AGCT index could be useful not only to study soils and rocks weathering products but also to assess the durability of the construction materials.

## **THE REDUCTION OF SOIL SEALING AS A CONTRIBUTION TOWARDS FLOOD PROTECTION**

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The progressive sealing of valuable farmland in the industrialised countries puts food security increasingly at risk and makes us more and more vulnerable to natural disasters. Considering the obvious signs of climate change and the increasing intensity of precipitations, the role played by soil is becoming more and more vital as regards floods, particularly as a water-storing medium. The purpose of this article is to demonstrate and to preserve this socially relevant function of soils.

## **NUTRIENT MANAGEMENT IN ORGANIC AGRICULTURE**

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Nutrient management in organic cropping systems mainly consists of about adequate knowledge's about crop properties and nutrient demands, about soil properties and soil management, about rotational management and nutrient transfer. The latter is related to internal sources i.e. crop residues, soil matrix or on-farm manure sources and external sources i.e. purchased fertilizers and soil conditioners and their nutrient release. With regard to organic agriculture all external sources must be justified in consultation with certifying agents and have to be permitted as listed products in the annexes of national or international standards of organic agriculture.

## **THEORY OF SUBSTANTIATION OF THE FORM AND PARAMETERS OF KNIFE TIP OF AUGER-DRILL VIBRATION HOLE BORER**

**A. P. Tarverdyan**

By theoretical and experimental studies it is substantiated that for digging up holes to plant seedlings in grounds with concrete bound layers, high productivity and low power inputs at ensuring necessary quality of the technological process, auger-drill hole borer with conic knife vibration tips should be used. The article deals with the calculation results of the

theory of substantiation of geometrical form and working regime of knife tip of vibration hole borer. The principle of transforming dry friction into resilient one during vibration ensuring introduction of knives of vibration tips into ground and its movement along knife surface which significantly reduces resistance forces lays in the basis of engineering vibration tips. Optimal geometrical and kinematic parameters of vibration tip ensuring the condition  $K \leq 0.4$  (of kinematic parameter) during the entire technological process have been established.

#### **TECHNIQUE OF DYNAMIC GAUGING OF STRAIN GAUGES IN THE STUDY OF MODE OF DEFORMATION OF THE SELF-PROPELLED MACHINE FRAME**

**V. A. Vardanyan**

We have elaborated the technique of dynamic gauging. The aim of the technique was strain-gauge testing of mode of deformation of the self-propelled machine frame. With this purpose we considered the process of blow of one longeron about a support with the set area at free falling of a tractor. The offered technique provides the most exact results and can be successfully applied at strain-gauge testing of mode of deformation of load carrying member of the self-propelled machines.

#### **IMPACT OF ASSEMBLING TANDEM WHEEL OF SELF-PROPELLED CHASSIS ON NORMAL REACTIONS OF THE TRACK MOVERS WITH THE SOIL**

**R.M. Makharoblidze, I.M. Lagvilava, O.G. Asatiani, A.B. Kobakhidze**

The paper gives the methods to define the normal reactions of the wheels of the adapted self-propelled chassis in terms of balance suspension of the driving tandem wheels. The calculation formulae of normal reactions by considering the assembling of the working equipment to the front guides and driving tandem wheels are deduced what allows determining the optimal location of the technological working organs on the girders of the chassis by considering the minimization of the pressure of the wheels on soil. 2 ill. bibl. 5 Eng.

#### **ABOUT ANIMAL DENOMINATION**

**A. Dzh. Grigoryan**

The importance of correct animal denomination, which is very vital for their recognition, is substantiated in this paper. It leads to the solution of a number of ecological, nature protection, biocenological problems, to the protection and restoration of the integrity of the fauna as well as to the solution of a number of cattle-breeding problems on their acclimatization, breeding etc. The paper also deals with the analysis of the contemporary situation of Armenian taxonomic names of vertebrates and indicates to a lot of inaccuracy in their denomination. (different animals are given the same name or the same animal is named differently). There are found ungrounded and arbitrary translations of Russian or Latin (zoological names), therefore. By means of the etymological method they are corrected and defined more accurately giving birth to the creation of new denominations of vertebras.

#### **NATURAL ZEOLITE – SAHAPTIN FOR PREVENTING MICOTOXICOSES IN CHICKENS (EXPERIMENTAL DATA)**

**A.M. Shadrin**

In article use of natural zeolite – sahaplin for preventive maintenance micotoxicosy at chickens which allows to increase a gain of live weight by 58,5 % at a single priming their toxin T-2, and on 13 % at feeding of chickens by a forage contamination toxin T-2, in comparison with chickens against micotoxicosy a forage of not receiving fodder additives is resulted.

#### **THE MACROPHITS OF MAIN TRIBUTARIES OF LAKE SEVAN**

**H. V. Yepremyan**

The results of hydro-botanical investigations of main rivers of Lake Sevan catchment basin are presented. The samples were collected in 2009-2010. During investigations of the rivers Masrik, Makenis, Argichi, Gavaraget, as well as the river Hrazdan head we observed 30 species of macrophytes of 22 genera, 17 families, 40% out of them belonged to ecological group hydrophyte, 60% - to helophyte. Richer in species diversity was the river Argichi and the least diversity was found in the river Gavaraget, which possibly was caused by high speed streaming, type of a ground and organic pollution. For all the indicated rivers, the most widespread is the community of a *Batrachium divaricatum* which is capable to resist to a high stream and is the indicator of a weak polluted water.

## **ANALYSIS OF THE METHODOLOGICAL ISSUES OF LEASING EFFECTIVENESS ASSESSMENT**

**A. A. Hakobyan**

The main reason of the growth of leasing is preferences from buying or borrowing of assets. The present paper analyzes the cash flow of the leaser- company, as well as influences of size of taxation, loan rate, lease cash flow, credit cash flow and depreciation norms on the company financial position and the results of the analysis are used for the evaluation of the efficiency of leasing and compare effects of leasing with buying or crediting.

## **ON THE EFFECTIVE MECHANISM OF THE REVIVAL OF A VILLAGE**

**P.P. Koghuashvili**

The work concerns the development of voluntary cooperative relations and inter-branch integration as well as the technological settlement in rural areas. Under the aegis of the community unions, the most important locally available resources of the intellectual, economic and organizational arrangement will be fully highlighted as well as a single cycle of production, processing and marketing of agricultural products will be created. Based on social solidarity the cooperative community population will be in full ownership of the income from sales of the final product and it will itself decide on earmarking the respective funds for reproduction and/or handling of common social problems. Implementation of the Community Entrepreneurial Mobilization Program will bring forth a substantial growth of incomes of the major portion of the country's population and dynamic improvement of its socio-economic situation.

## **FOOD PROVISION AND POVERTY REDUCTION STRATEGY IN THE REPUBLIC OF ARMENIA**

**K. A. Grigoryan**

In article the connection of foodstuff securing, territorial and world universalities and peculiarities the formed social - economic demographical danger and expecting threats are discussed. The creation of the new conception of the agrarian territorial differentiated policy is suggested as the way of the foodstuff securing fortifying in the RA, transporting to the rails the agrarian production knowledge warp economy, many-sided intensification, structural changes of position, the extension of production, the formation of social capital in the village, the legislative regulation of agro-industrial integration.

## **200 YEARS DEPARTMENT OF FOREST SCIENCES IN THARANDT AND THE DEVELOPMENT OF NATURE CONSERVATION IN TEACHING AND RESEARCH**

**Peter A. Schmidt**

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Starting with the history of the Royal Saxon Forest Academy in Tharandt since 1811 the development of the present Department of Forest Sciences of the Dresden University of Technology is shortly outlined. Special attention is drawn to the field of nature conservation in teaching and research from the beginning in the 19<sup>th</sup> century up to selected activities of the present time. Currently many institutes teach environmental subjects and carry out investigations in environmental management and nature conservation. The Professorship of Land Improvement and Nature Conservation is in the focus of the paper, because several projects were performed in the Caucasus Region.