MTA TAKI

1949-2009

RESEARCH INSTITUTE FOR SOIL SCIENCE AND AGRICULTURAL CHEMISTRY (RISSAC)






HUNGARIAN ACADEMY OF SCIENCES

ORGANIZATIONAL STRUCTURE

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Lajos Szabó — Head, Department of Agrochemistry and Plant Nutrition, szabo@rissac.hu
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RESEARCHERS

Member of the Hungarian Academy of Sciences

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Tibor Tóth - tibor@rissac.hu

PhD Degree

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RISSAC HAS

Dr. Attila Anton
Director
PhD
Honorary college professor

Preface

Soils represent a considerable part of the natural resources of Hungary. Their rational utilization, conservation and the maintenance of their multipurpose functionality therefore have particular significance both in the national economy and in environment protection, and necessitate continuous awareness and activities.

The aim and scope of activities of the Research Institute for Soil Science and Agricultural Chemistry (RISSAC) of the Hungarian Academy of Sciences is — on the basis of its scientific research results — to contribute to and support sustainable land development, soil conservation, rational soil use and management and soil amelioration.

In the following, brief information is given on the activities, fundamentals and scientific results of the Institute.

RISSAC belongs to the research institute network of the Hungarian Academy of Sciences. According to Act XL of 1994, the Academy is a scholarly public body founded on the principle of self-government, whose main task is the study of science, the publicizing of scientific achievements, and the aid and promotion of research.
The Research Institute for Soil Science and Agricultural Chemistry is located in Budapest. Field experiments are carried out at its three experimental stations situated in various parts of the country: in Nagyhörcsök, Őrbottyán and Nyírlugos.
The main fields of activity are: fundamental, applied and developmental research, extension of research results in practice (innovation), teaching and education on gradual, post-gradual and PhD level, advisory and information service, expertise.
The Institute has extensive fruitful national and international cooperation with research and educational institutes, universities and economic organizations (industrial units, companies, enterprises, farms).
The main research topics can be summarized as follows: precision plant production; the effect of plant nutrition and soil contamination in long-term fertilization field experiments; development of an environmentally friendly fertilization advisory system; the study of water and nutrient regimes and simulation modelling in the soil—water—plant—atmosphere system; methodological development of the assessment and monitoring of soil condition; soil mapping; study of soil degradation processes; the microbiological study of plant growth promoting bacteria and fungi; phytoremediation; composting and waste management.

The multifunctionality of soil is being used more and more by society for the development of sustainable agriculture. The main functions of soil are as follows:
- Soil is a conditionally renewable natural resource.
- Soil is the integrator and transformer of other natural resources (solar radiation, atmosphere, surface and subsurface waters, deeper geological strata and biological resources. Their biogeochemical cycles develop life-medium for microbiological activities, as well as ecological environment for natural vegetation and cultivated crops.
- Soil is the most important medium for biomass production, it is the primary food source of the biosphere.
- Soil is the major natural storage of heat, water, plant nutrients and potentially harmful elements or chemical compounds.
- Soil is an efficient natural filter and detoxication system that may prevent the deeper horizons and the subsurface waters from various pollutants deposited on the soil surface or put into the soil.
- Soil represents a high capacity buffer medium of the biosphere, which may buffer and moderate the various stresses caused by environmental factors and/or human activities.

Dr. Attila Anton

Budapest, 9 September, 2009

RESEARCH IN THE FIELD OF SOIL SCIENCE

Soil degradation processes and the possibilities of their control, with special regard to prevention. Characterization of soil water management, and the control of extreme moisture situations (drought—waterlogging) and their consequences. Environmental susceptibility/vulnerability of soils. Assessment of the potential effects of climate change on the moisture and mass regimes of soil. Cooperation in the elaboration of the Hungarian and European Soil Conservation Strategy. Contributor to the Soil Atlas of Europe.

György Várallyay, Member of the Hungarian Academy of Sciences, g.varallyay@rissac.hu

• Assessment of land deterioration and the possibilities of its prevention. Laying the theoretical foundations of land evaluation methods. Cooperation in the development of the basic principles of the Hungarian and the European Soil Conservation Strategy, and in their adaptation in the Agri-environment Management Program.

Tamás Németh, Member of the Hungarian Academy of Sciences, nemeth@rissac.hu

• Measurement and estimation of soil physical characteristics; use of dielectrical methods for soil moisture content measurement. Modelling of moisture regime in soil—plant—atmosphere systems. Model application and use in solving environmental problems.

Kálmán Rajkai, DSc, krajkai@rissac.hu

• Research of salt-affected soils: their formation, large-scale variability. The enhancement of the sampling and mapping of these soils. Use of remote sensing techniques and field reflectometry for the characterization, reclamation and utilization of salt-affected soils.

Tibor Tóth, DSc, tibor@rissac.hu

• Characterization of soil quality by the simultaneous interpretation of physical, chemical and microbiological properties. Soil ecological fundaments for the optimization of soil fertility. Physical, chemical and biological degradation and remediation of soils.

Attila Murányi, DSc, attila.muranyi@rissac.hu

• Development of methods for estimating soil hydraulic properties and the study of their spatial and temporal variability. Evaluation of the changes in the physical properties, moisture and heat regimes of soil under different soil cultivation techniques and land use systems with respect to climate change. The evaluation of carbon dioxide emission of soils as a function of different fertilization strategies, soil tillage and land use systems.

Csilla Farkas, PhD, csilla@rissac.hu

• Soil water content dynamics in forests, grasslands and arable lands. Effects of nature-based forest management systems on soil moisture and on the herb layer.

Andrea Hagyó, PhD, ahagyo@rissac.hu

• Soil microbial ecology. Soil ecological factors of nitrogen fixation (characterization and interrelationships).

László Ködöböcz, PhD, kodobocz@hotmail.com

RESEARCH IN THE FIELD OF ENVIRONMENTAL INFORMATICS

Environment policy support through the analysis of environmental resources data. Elaboration and development of expert and monitoring systems supporting agri-environmental management. Environmental informatics data management and service, digital soil mapping. Methodological development of soil ecological methods. • Elaboration of geoinformation applications supporting agri-environmental management and the establishment of internet-based farm-level geoinformation systems. Planning and elaboration of a monitoring system for the registration of data on agriculture-originated environmental contamination, and the informatical basis for soil data related to the environmental state of soils

József Szabó, PhD, james@rissac.hu

• Planning, elaboration and operation of spatial soil information systems and integrated environment protectional geodatabases. Spatial analysis of soil properties, digital soil mapping, spatial modelling. Integration of GIS, remote sensing, spatial stochastic models in the mapping of soil vulnerability and soil degradation.

László Pásztor, PhD, pasztor@rissac.hu

• Elaboration and application of soil databases, integration of agrogeological data into soil information systems. GIS-based analysis of soil data, updating and digital reambulation of large-scale soil maps, soil classification.

Zsófia Bakacsi, PhD, zsofi@rissac.hu

• Development of soil ecological indicator system: studying soil biological activity and biodiversity; testing the accuracy and precision of soil biodiversity measurements, especially in monitoring systems supporting Hungarian agri-environment management; and building of a soil mesofauna database for soil ecological indication.

Miklós Dombos, PhD, dombos@rissac.hu

• The effect of soil cultivation on the physical and biological properties of soils. Development of up-to-date soil survey and soil sampling methods, soil classification, soil mapping. Study of soil degradation processes (soil erosion, soil compaction).

Péter László, PhD, laszlo@rissac.hu

• Environmental management, support in river basin management. Participative planning supported by integrated methods, land evaluation, scenario developments. Assessment of the effects of landscape revitalization on environmental—economic—social processes, with special regard to the rational use of natural resources.

Zsuzsanna Flachner, flachner@rissac.hu

• Seasonal dynamics of nutrients (NPK), soil moisture and temperature of soils in fertilization and soil tillage long-term experiments. Field (in situ) and laboratory measurement of soil CO2 emission, and the methodological development of sampling methods for gas emission of soil, field testing. Elaboration and development of field soil sampling and soil survey methodology.

Sándor Koós, koos@rissac.hu

RESEARCH IN THE FIELD OF SOIL BIOLOGY AND SOIL BIOCHEMISTRY

Quantitative and qualitative investigation of the biological properties of the soil and soil—plant system in natural and agro-ecological systems. Fundamental and applied research on the applicability of soil biological tools. Searching innovative solutions in the following main topics:

• Soil(bio)technological risk-eliminating methods and tools for environment conservation, for the reduction of environmental stress effects, and for the remediation of damaged, polluted areas.

Attila Anton, PhD, anton@rissac.hu

• Study and applicability of soil—plant—microbe interactions. Microbial inoculums and phytotechnologies in agriculture and environment protection. Alternative soil ameliorants, beneficial microbes and potential pathogens in the food chain.

Borbála Biró, DSc, biro@rissac.hu

• Study of the vegetation components of phytoremediation and phytostabilization, soil—vegetation interrelations, soil seed bank research, elaboration of seed ecological databases.

Péter Csontos, DSc, cspeter@rissac.hu

• Development of complex soil biological test methods for the assessment and monitoring of the soil biological status, and for the better understanding and interpretation of the environmental effect induced changes in soil quality. Potentials of soil restoration in natural ecosystems.

Tibor Szili-Kovács, PhD, szili_k@rissac.hu

• Seasonal and annual dynamics of soil—plant—microbe systems in salt-affected soils. The role of plant growth promoting microsymbionts in the stress tolerance of halophytes and in plant communities; periodical and regular state assessment; the establishment and interpretation of relationships with environmental factors.

Anna Füzy, PhD, fuzy@rissac.hu

• Taxonomy of Arbuscular mycorrhizal fungi (AMF); their role and occurrence in natural and agro-ecosystems. AM fungi and plant stress tolerance in heavy metal contaminated soils. AMF application on higher and woody plants.

Tünde Takács, PhD, takacs@rissac.hu

• Mikorrhiza fungi and carriers. Mycorrhiza technologies and their potential applicability.

Klára Pokovai, PhD, pokovai.klara@gmail.com

• Development and application of PCR-based molecular microbiological methods. Study and characterization of microbial communities helping the decomposition of organic contaminants in soils, and the influencing factors. Mechanisms of bacterial antibiotic resistance of environment origin.

Balázs Libisch, PhD, balazs.libisch@freemail.hu

RESEARCH IN THE FIELD OF AGROCHEMISTRY AND PLANT NUTRITION

Elaboration of the site-specific precision plant production system and its popularization for wide-spread practical use, as well as related soil heterogeneity, plant protection and agricultural engineering research. Precision farming.

Tamás Németh, Member of the Hungarian Academy of Sciences, nemeth@rissac.hu

• Recycling of organic matter originating from the crop production process into the natural nutrient cycle. Prevention of soil contamination, or its maintenance within certain tolerance limits. The processing and utilization of hazardous wastes of animal origin.

Imre Kádár, DSc, kadar@rissac.hu

• Development and testing of the new, cost- and environment-friendly fertilization advisory system. Mathematical descripton of the correlation between soil NPK nutrient supply and responses to NPK fertilization, on the basis of the Hungarian long-term field experiments dataset. The comprehensive evaluation of organic and mineral fertilizer experiments set up on the principle of NPK equivalency, based on the dataset of Hungarian long-term field experiments. Calculation of NPK nutrient balances.

Péter Csathó, DSc, csatho@rissac.hu

• Study of soil-plant-heavy metal relationships in long-term experiment on brown forest soil with different crops. Trends in heavy metal content of soil and plants. The effect of toxic elements on the vegetative development and yield of plants. The effect of animal waste compost on the yield of energy willow (Salix viminalis L.).

Lajos Szabó, PhD, szabo@rissac.hu

• Description of the movement of mineral nutrients in the root zone or in the rhizosphere. Delineation of the carbon and nitrogen cycle in irrigated vegetable production with great water, nitrogen and organic fertilizer input requirement, by the development of a yield simulation model.

Krisztina Rajkai - Végh, PhD, krvegh@rissac.hu

• Dynamic modelling of the water balance, nutrient balance and biological processes of the soil-plant-atmosphere system: 4M software package.

Nándor Fodor, PhD, fodornandor@rissac.hu

• Calculation method for farm gate nutrient balances.

Mariann Magyar, PhD, magyar@rissac.hu

• Study of quantitative and qualitative changes in the dissolved organic matter (DOM) fraction of soils as a function of soil quality, liming and different cultivation methods.

Tibor Filep, PhD, filept@rissac.hu

• Study of the acid-base buffering capacity and sensitivity of soils. Consideration of soil properties in the evaluation of soil contamination with toxic elements. Essential and toxic element content in the soil—plant system.

Márk Rékási, PhD, rekasi@rissac.hu

• Characterization and modelling of phosphorus balance on different soils with oilseed rape as test plant. Calculation of regional N, P and K balances with the OECD methodology.

Gabriella Máthé - Gáspár, PhD, ggabi@rissac.hu

• Soil fertility research. Study of the nutrient uptake of the main field crops. Analysis of the interrelationships of the climate—soil—plant system.

László Márton, PhD, marton@rissac.hu

CURRENT AND TERMINATING RESEARCH PROJECTS

• Increasing production quality and safety with up-to-date water management and irrigation
TECH-08-03/2-2008-0379, 2009 - 2012
Principal investigator: József Szabó

• Development of a joint water management and land use concept based on water retention, and its applicability in the Bodrogköz region INTERREG III/A HU-SK-UA, 2006 - 2008
Principal investigator: Zsuzsanna Flachner

• Water Scenarios for Europe and for Neighboring States (SCENES) FP 6. (036822) 2006 - 2010
Principal investigator: Zsuzsanna Flachner

• Elaboration of the development of competitive and environmentally-conscious agricultural practice and technology in order to protect waters from nitrate pollutionNKTH 6-051/2005, 2005 - 2008
Principal investigator: Tamás Németh

• Elaboration of a complex monitoring system for the analytical detection and biological evaluation of soil micropollutants for a sustainable environment (MONTABIO) Jedlik Ányos Program, NKFP-07-A4 (OM-00028/2008), 2008 - 2010
Principal investigator: Attila Anton

• Efficient and sustainable medium- and long-term management alternatives for extreme areal water resource risks (WATERISK)
NKTH (TECH-08-04/2-2008-0169), 2009 - 2011
Principal investigator: Zsuzsanna Flachner

• Up-to-date engineering implementations in support of Risk-based Environment management (MOKKA)
NKFP 3/020/2005, 2005—2008
Principal investigator: Attila Murányi

• Soil Contamination: Advanced integrated Characterisation and time lapse Monitoring (Soil-CAM)
EU-FP7-ENV 2007.3.1.2.2/212663, 2008—2011
Principal investigator: Borbála Biró

• Complex utilization possibilities of ashes from biomass-burning furnaces; Production of plant nutrients from hazardous wastes (BIO-HAM2) Hungarian Technological Program, TECH-08-A4 (OM-00375/2008), 2009—2010
Principal investigator: Attila Anton

• The development of the principles of state-of-the-art soil observation and information system to serve the conservation of soil resources of Hungary OTKA 73183 NK. 2008—2011
Principal investigator: József Szabó

• Development of a complex investment plan for flood control, water management and the revitalization of the “Borzsa and Bereg” river basin INTERREG HUSKUA/05/01/139, 2006 - 2008
Principal investigator: Zsuzsanna Flachner

• Integrated land development (ILD) in the frame of Tisza complex development project UNDP-GEF-ICPDR 2009 - 2011
Principal investigator: Zsuzsanna Flachner

• Future Approaches to Land Development
INTEREG 4W0160N, 2005 - 2008
Principal investigator: Zsuzsanna Flachner

• Preparations for Climate Change - environment, risk, society (KLIMAKKT) NKFP 6-00079/2005, 2006 - 2008
Principal investigator: György Várallyay

• Biotechnological research of renewable energy sources for introducing micorrhization technologies and new tree species for Hungarian soils (QUTAOMEL) Hungarian Technological Program, TECH-08-A4 (OM-00313/2009), 2009 - 2012
Principal investigator: Attila Anton

• Elaboration of GIS-based methods for the maximum exploiting and upgrading of the information content of map-based soil information OTKA K 60896, 2006- 2009
Principal investigator: László Pásztor

• Functional diversity and substrate utilization efficiency of soil microbial communities with different plants and cultivation methods
OTKA - NKTH (K 68636), 2007 - 2011
Principal investigator: Tibor Szili-Kovács

• Study of the state of environment in Hungary, with special regard to climate change MeH-MTA (MeH VI. 11. Project) 2008- 2010
Principal investigator: György Várallyay

• Interaction between natural and human influenced ecosystems: biodiversity, ecosystem functions of various soils and land use evaluation in the Hungarian Great Plain (soil MÉTA)
NKFP 6-00013/2005, 2006 - 2009
Principal investigator: József Szabó

• Alternative utilization of poor-productivity areas with biotechnological methods, and the initiation of wild fungus into production (MIKOQUAL) Jedlik Ányos Program, NKFP-06-A2 (OM-00056/2006), 2006 - 2009
Principal investigator: Attila Anton

• Elaboration of a method for supplying the saturated and saturation-near hydraulic conductivity of the main soil types in Hungary
OTKA K 67672, 2006—2010
Principal investigator: Fodor Nándor

• Assessment and strategic development of INSPIRE compliant Geodata-Services for European Soil Data Soil (GS Soil) eContentplus. (ECP 318004) 2009 - 2012
Principal investigator: László Pásztor
• Characterization and modelling of phosphorus content of different soils with oilseed rape test plant
OTKA (K 68884), 2007 - 2011
Principal investigator: Gabriella Máthé-Gáspár
• Horizontal standards on hygienic parameters for implementation of EU directives on sludge, soil and treated biowaste
HORIZONTAL - hyg (sspi 513660), 2004 - 2008
Principal investigator: Borbála Bíró
• Elaboration of the Soil Degradation Subsystem (TDR) of the Hungarian Environmental Information System (OKIR)
KEOP-7.6.3.0/1F-2008-2009-0013, 2008 - 2009
Principal investigator: József Szabó
• Carbon- and nitrogen cycle modelling in vegetation production
OTKA (K 62548), 2006 - 2009
Principal investigator: Krisztina Rajkai-Végh
• Development of principles and methods of plant nutrition
OTKA (T 049042), 2005 - 2008
Principal investigator: Imre Kádár
• Consideration of the readily mobilisable element fraction in the application of soil quality standards
OTKA (K 68665), 2006 - 2010
Principal investigator: Imre Kádár
• Development and testing of Practical Guidelines for the Assessment of Environmental and Resource Costs and Benefits in the WFD - AQUAMONEY, 2006- 2009
Principal investigator: Zsuzsanna Flachner
• Sustainable use of soil related to different agricultural practices - thematic strategy on soil
RAMSOIL (Risk Assessment Methodologies for SOIL threats), 2007 - 2008
Principal investigator: Tibor Tóth

• Analysis and conflict mapping of habitat fragmentation of protected amphibian, reptile and mammal species in Hungary
KIOP-3.1.2-2008-09-0002/1, 2008 - 2009
Principal investigator: László Pásztor
• The effect of different moisture conditions and nitrogen fertilization methods on the NOx and CO2 production, fertility and microbiological activity of soil in field and model experiments
OTKA (K 73768), 2008 - 2011
Principal investigator: Attila Anton
• The role of soil properties in the quantitative and qualitative change in water-soluble organic matter
OTKA (T 049552), 2005 - 2008
Principal investigator: Tibor Filep
• New Approaches to Adaptive Water Management under Uncertainty - Newater FP 6. 2005-2008
Principal investigator: Zsuzsanna Flachner
• TAPAS nutrient balance KSH, 2006 - 2009
Principal investigator: Péter Csathó
• Study of the long-term effect of soil cultivation and nutrient supply on weediness OTKA (K 6-0314), 2006 - 2009
Principal investigator: Tamás Németh
• Heavy metals from farm to fork (Protection of the food chain)
NKTH TéT. HR-22/2008, 2009 - 2011
Principal investigator: Imre Kádár
• Development and application of the Hungarian Detailed Soil Physical Database (MARTA) for the characterization of soil water management under extreme climate conditions
OTKA T 48302, 2005—2008
Principal investigator: Csilla Farkas
• Linking Hungarian soil profiles with the soil spots registered in the 1:1M scale European Soil Database, compiling the measured soil profile data into a harmonized database
SPADE-2 Project: The Soil Profile Analytical Database for Europe, 2006 - 2008
Principal investigator: György Várallyay
• The impact of soil chemical properties on heavy metals availability and concentrations in field crops
NKTH TéT. CRO-13/2006, 2007 - 2009
Principal investigator: Imre Kádár

EDUCATION/TEACHING

Graduate subjects

- Environmental sensitivity of soil. Soil degradation
- Environmental aspects of soil moisture regime
- Agricultural production and environment pollution
- Agrochemistry
- Integrated environmental models
- Environment management
- Environment economic models
- Environmental monitoring
- Plant nutrition
- Soil and environment
- Soil and plant production
- Soil conservation
- GIS and soil-environment related GIS applications

PhD Courses

- Ecological basis of seed bank
- Environmental aspects of soil moisture regime
- Soil, as life media
- Agrochemical research methods
- Environment and agriculture
- Plant production and environment
- Rhizobiology; rhizoecology
- Salt-affected soils
- Soil biology
- Spatial soil information systems
- Application of multivariable data processing in environmental sciences research

Specialized courses for engineers

- Environmental aspects of soil moisture regime
- Precision plant production
- Soil remediation
- Spatial soil information systems and digital soil mapping

International courses

- One week soil scientific study tours for foreign and Hungarian university students
- Summer school in soil science of the ESBN (European Soil Bureau Network)

RISSAC acts as the Satellite Departments of the following universities:

- Debrecen University, Centre for Agricultural and Technological Sciences
Faculty of Agricultural Sciences, Debrecen
- Károly Róbert College, Faculty of Agriculture and Rural Development, Gyöngyös
- Pannon University, Georgikon Faculty, Keszthely
- Szent István University, Faculty of Agricultural and Environmental Sciences, Gödöllő

INFRASTRUCTURE

General Infrastructure

Well-equipped Conference room for the accomodation of 80 persons.
Special library: technical books, conference proceedings and periodicals in the field of soil science, agrochemistry, soil biology and biochemistry in Hungarian and foreign languages, and as a national authority special library a collection of documents related to chemistry, physics, biology, geography, mineralogy, meteorology, hydrology and environment protection.

Laboratories, research and technologiai equipment and appliances

- Analytical chemical laboratory with plasma emission spectrometer (ICP-OES), ion chromatograph and sample preparation appliances for the analysis of element contents of soil, water and plant samples
- Organic chemistry laboratories with gas chromatograph and gas chromatograph spectrometer (GC-MS), rotary vacuum destillatory
- GIS laboratory with server-based GIS technological background, large-size plotter and scanner
- Microscopes: Olympus research microscope with fluorescens and microphotograph attachments, Olympus research stereomicroscope
- Soil physics laboratory with pF boxes, apparatus for the measurement of electrical conductivity and soil moisture
- Three climate chambers

Experimental stations

Nagyhörcsök (Mezőföld region): pseudomyceliar (calcareous) loamy chernozem soil
- 1967 - The effect and residual effect of fertilizers applied in different doses and rates
- 1973 - Relationships between the nutrient content and fertility of soil
- 1985 - Establishment of different N levels in soil
- 1989 - The fixation of K fertilizer in soil
- 1991 - The accumulation of heavy metals in the soil—plant—animal system
- 2003 - Testing the self-developed soil fertilization recommendation system

Őrbottyán (Duna-Tisza Interluve): calcareous sandy soils
- 1959 - The effect of fertilization on the yield and nutrient uptake in a rye monoculture
- 1970 - The effect of fertilization on the fertility of sandy soil
- 1985 - Establishment of different N levels in soil
- 1995 - Accumulation of heavy metals in the soil—plant—animal system

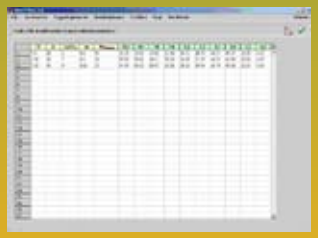
Nyírlugos (Nyírség region): Acidic, sandy brown forest soil with thin interstratified layers of colloid and sesquioxide accumulation
- 1962 - Liming and fertilization experiment

Instruments

- On-site water quality test kit
- On-site pH and EC test meters
- Soil moisture measuring instruments (TDR instruments and capacitance probes)
- Soil thermometers
- Precipitation, air temperature and humidity measuring instruments
- Tension infiltrometers (double ring and disc)
- Eijkelkamp soil and soil water sampling system
- GPS
- Electromagnetic conductivity instrument (EMRC-120)
- Inductively coupled plasma-atom emission spectrometer

PRODUCTS SERVICES AND PUBLICATIONS

Spatial soil information systems, profile-level databases, complex environmental information systems, thematic maps
Further information:
Environmental Informatics Group, gislab@rissac.hu



TALAJTANonc 1.0 soil physics estimation program
Further information:
Nándor Fodor, fodornandor@rissac.hu

4M simulation model, simulating the water balance and nutrient balance, soil - plant interrelationships, plant growth and development
Further information:
Nándor Fodor, fodornandor@rissac.hu

Cost- and environment-friendly fertilization advisory system and software (RISSAC — ARI) www.proplanta.hu
Péter Csathó, csatho@rissac.hu

Services

- Service of soil data
- GIS service
- Actual soil status assessment
- Organizing study tours with soil profile demonstrations
- In-situ demonstration of GIS based soil status assessment
- Assessment of soil and soil water environment status
- Compilation of advisory opinions and case studies related to environment protection
- Organization of conferences, scientific meetings

Kádár Imre. A szennyezett talajok vizsgálatáról. (Study of contaminated soils) Kármentesítési kézikönyv 2. Budapest. Környezetvédelmi Minisztérium. 1998. p. 151. ISBN: 963-04-5362-2

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