International Soil Congress
(ISC) on
"Natural Resource Management
for Sustainable Development"
June 7-10, 2004
Erzurum, Turkey

Abstract Book

Organized by
Soil Science Society of Turkey
&
Atatürk University

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PREFACE

World population has doubled in the past 40 years and may double again in the next century, approaching about 11 billion by the year 2100 (World Resources Institute, 1992). Most of this increase will take place in the developing countries. Asia and Africa will have populations of 4.9 billion and 1.6 billion, respectively, by the year 2025. In 1997, 4.8 billion of the world's 5.8 billion people (83 percent) were living in developing countries (FAO, 1997).

Of the 13.048 million ha total land area of the world; only 3.190 million ha are potentially arable, with 734 million ha in Africa, 628 million ha in Asia and 681 million ha in Latin America. Currently only 1.474 million ha or 46.2 percent of these arable lands are cultivated (of which 185 million ha in Africa, 451 million ha in Asia and 142 million ha in Latin America, FAO 1997). Worldwide, the area of arable land has increased by less than 6 percent in the last 25 years. However, per capita arable land has decreased from a worldwide average of 0.38 ha in 1970 and has progressively declined to 0.23 ha in 2000; with a forecast of 0.15 ha by 2050 and even lower to 0.14 ha by 2100.

Although large areas of new land could be brought under cultivation, unused land is not always available to people who need it most, and opening new areas remains an expensive means of increasing agriculture production. Also further expansion of agricultural land is constrained in many parts of developing countries, for example, shortage of water for irrigation in arid regions. Therefore, the only alternative is to optimize the production of existing arable land including salt-affected soils. The applications of techniques purpose of the improvement of these areas have some various effects on the environmental quality. Most studies of long-term experiments provide information only about biophysical impacts at the site of the experiment. There are also off-site environmental impacts of salinity development. These may be at least as important as those on-site. Chemical effects contribute because nutrients are leached from the soil during leaching processes of salt-affected soils and contaminate water supplies. Biological effects because of the loss of organic matter, which weaken the strength of soil aggregates, increase the loss of nutrients in run-off, and increase carbon dioxide and methane released to the atmosphere. Nutrient losses by leaching are most often observed where nitrogen fertilizers are being used injudiciously, and where organic manures are concentrated and the effluent arising is allowed to reach streams or rivers. The washing of nutrients and organic matter, and of nutrient-rich topsoil, into streams and rivers is a serious cause of eutrophication. The nutrients and organic matter cause a proliferation of water borne organisms, which use oxygen in the water and deplete it, at the expense of fish.

Soil biodiversity and agriculture interact in various ways. Soil organisms may be beneficial or detrimental to plant production. Agricultural practices usually induce some changes in the soil environment, resulting in significant modifications of the ratio and interactions of these organisms.

Integrated soil management considers these interactions, aiming to enhance the beneficial aspects of soil biota. It includes direct interventions on soil biota (inoculation) and/or interventions on the processes that control the activities of soil biota (mulching, tillage, irrigation, crop rotations). It has been shown that conventional agriculture relying on tillage and external inputs to enhance productivity may result in

greater ecological disturbance, and may be less sustainable in the long term compared to Low External Input Agricultural (LEIA) and/or zero tillage systems. There are many approaches to sustainable agriculture with the goal of reducing environmental degradation, through appropriate technologies or farming techniques. Among these, Organic agriculture and Conservation agriculture are being widely adopted and developed for commercial farming as well as for land reclamation or rehabilitation and food security purposes.

In the global scale of world natural resources are under a great pressures because of the over exploitation in related with non-sustainable extractions of the ecosystems services for the world trade. In addition the mismanagement of the world natural resources has resulted in the degradation of wide land areas and loss of the biodiversity with relevant habitats. From day to day to get difficult the maintain of the good quality water for the human consumption in the developing societies of the world.

Agriculture use very large areas for the production of the foods but the contribution to the national income budges not so important in many part of the world. Agricultural land occupies over 50 percent of the total land area in the OECD countries, with only a small reduction in area over the past decade. Economic forces shape the performance of the agricultural sector and its role in the national economy. Agriculture's contribution to gross domestic product is under 4 per cent for most OECD countries. The impacts of the agriculture on the environment and the achievement of sustainable agriculture are of major public concern in the context of agricultural policy reform and multilateral environmental agreements. But the growing world demand for food and industrial crops will continue to present a challenge to world agricultural production. But the future expansion in production may heighten the pressure on the environment through intensification and growth in farm output, particularly for exporting countries. The change of marginal farming land to other land uses has raised concerns related to the associated harmful environmental and socio-economic impacts in some countries but not in the developing countries.

The International Congress of Natural Resources Management for Sustainable Development will highlight the major role and services of the Natural Resources, and it will provide a discussion for presenting information in the management of ecosystems and it's compartments for sustainable development.

The Soil Science Society of Turkey (SSST) was founded by the leadership of late Prof. Dr. Kerim Ömer Çağlar in 1964. The SSST reached over 740 members and made 17 scientific meeting national and international scale biannially.

I have no doubt that the "International Soil Congress on Natural Resource management for Sustainable Development" would bring us new dimensions and approaches between the bio-physical and socio-economical factors of the environment and the endeavor for the sustainable development.

On the behalf of the Organizing Committee
Prof. Dr. Koray Haktanır
President of the SSST

Welcome Speech
Prof. Dr. Yaşar Sütbeyaz
President, Atatürk University

It is a great honor and pleasure for me to be here with you, and I am very pleased to welcome you to the International Soil Congress on "Natural Resource Management for Sustainable Development".

Natural resource management has vital importance since the sustainable future of natural resources including soil, water, native vegetation and biodiversity strongly depends on how we manage these resources and preserving the environment. For Turkey like many other countries around the world, agriculture serves as the driver force of economic growth. But, each of you here certainly know that there is no way to survive without reducing the pressure on natural resources, maintaining soil, water and air quality, and conserving biodiversity.

I am sure that you all here care about the natural resource management and sustainable development, and you are always being concerned with the environmental quality. I also believe that each of you has some experience to share with the others and you will all learn a great deal from each other. So, this Soil Congress is a great opportunity for everyone who wants to share the information and the experience, and to transfer new research results and technologies in sustainable use of natural resources.

Now, I would like to give brief information about my University for particularly those who may not be familiar with the Atatürk University.

Atatürk University is the fifth largest state university in Turkey. It plays a very important role not only in the educational progress, but also in the social and cultural life of the region. The university has over 40 000 students and nearly 2500 academic staff, 16 faculties, 15 vocational schools, three graduate schools, 6 different institutions and 10 research centers. One of our ultimate goals is to make Atatürk University a center of academic excellence by the growing network of collaborations we are developing with the other internationally recognized educational institutions both at home and abroad. It is also part of our objective to foster greater cooperation in both research and teaching with other universities and to expand our international out-reach by increasing our portfolio of exchange programs. Atatürk University is proud of its international connections. These range from the USA to European Universities with agreements for the ongoing exchange of staff and students. We know what we should do to enhance and complement the services we provide for the region and the country. We value our reputation for research and teaching in a broad range of disciplines. Here, I proudly have to mention that Atatürk University take place in the top 8 among the 77 universities in Turkey based upon the scientific publications. Atatürk University has much to offer its students and it is committed to provide an environment of academic freedom.

Before I finish, I would like to thank the Organizing Committee, and to wish you fruitful discussions in the next couple of days.
Thank you.

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WATER HARVESTING SYSTEMS IN DRYLAND FARMING

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ABSTRACT

In drylands the rainfall regime is known by its scarcity, its strong seasonal rainfall distribution and its torrential character and with the soil-water balance almost negative all the year around. In dryland farming systems the available water for crop growth should be conserved. One of the main criteria for the selection of water harvesting techniques is the type of plant to grow. Trees require a concentrated application of water in the plantpit, while annual crops benefit most from an equal distribution of water over the cultivated area. Three case studies will be discussed: 1.Rainfed farming is an important component of the agricultural production system in Southern Tunisia, where the effect of a jessr, a water harvesting system consisting of an impluvium and a terrace, at Amrich in the Oued Oum Zessar watershed, was evaluated for its ability to collect water on the terrace, this for improving the growth and productivity of olive trees. When the water balance of the terrace was assessed over a period of three successive years, it was found that the 'catchment to cropping ratio' (CCR) should be larger than 7.4 in order to provide a sufficient amount of water for cultivation of olive trees. 2. Much of the farmland in the dryland area of the loess plateau of North China is suffering from severe water erosion during the rainy season in summer and drought during the crop-growing season. A field study was carried out near Luoyang (Henan Province, P.R.China) to analyse and assess the different components of the soil water balance under different tillage practices after the harvest of the winter wheat in June: conventional tillage, direct drilling in the mulch, subsoiling, reduced tillage, and a two-crop rotation with peanuts. The preliminary results show that subsoiling resulted in the highest increase in moisture storage and lowest evaporation during the fallow period. Also, because of the presence of a wheat straw mulch, the direct drilling practice resulted in low evaporation and high storage of water at the start of the crop-growing season. As a result of this study a V-shaped 'deep soiler' was construced and applied on larger fields by the local farmer's community. 3. The water harvesting concept was applied in the afforestation project of the drought affected areas of Cape Verde, where half-moon shaped water collecting terraces and infiltration pits were constructed for planting Prosopis juliflora, this according to the expected runoff volumes. Runoff as flood discharges were analysed during three rain seasons in three rather small catchments (16 to 26 ha) in Santiago, one of the Cape Verde island .

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ANALYZING THE ROLE OF COVER CROPS FOR SUSTAINABLE NITROGEN MANAGEMENT IN VEGETABLE PRODUCTION

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ABSTRACT

Nitrogen is applied abundantly in commercial vegetable production to obtain high yields. Large amounts of applied nitrogen, however, remain in the soil after the vegetable crop is harvested. Additionally, a considerable portion of absorbed nitrogen is utilized in the formation of plant parts supporting harvestable organ and stay behind as crop residue. Both residual nitrogen pools pose environmental risk by affecting ground water quality through nitrate leaching and air quality through nitrous oxide emission. An obvious solution to this problem is the planting of a catch crop with the ability to scavenge left-over nitrogen. Canopy cover provided by such crops between the two vegetable seasons may also provide protection to bare soil and prevent erosion. Of late, the possible utilization of these cover crops to provide organic alternative to commercial nitrogen fertilization has attracted much research interest. The majority of studies used vetch (Vicia spp.) and clover (Trifolium spp.) to fix atmospheric nitrogen for use by the following vegetable crop. Results of these investigations have generally been encouraging but year-to-year variability in vegetable yields is of concern. Because of the high cost of commercial organic nitrogen fertilizers and cover crops being traditional component of organic farming, these results should reinforce the importance of legumes in providing nitrogen to organically produced vegetable crops. However, several research gaps remain before cover crops can attract serious attention from conventional growers. Studies reported thus far have been conducted on small experimental plots with practices difficult to translate into commercial methods. Determination of the rate of availability of nitrogen from different legume species and the effect of climate, soil and tillage practices on the breakdown of legume biomass and N mineralization is needed to ascertain whether nitrogen from a legume source is sufficient or requires external inputs to ensure optimum plant growth and development. Vegetables can be ready for harvest in accordance to market demand only if recommended planting schedule is strictly followed. Need remains to develop cover crop management practices that provide maximum nitrogen incorporation into the soil without interfering with vegetable production schedule. Weed control is considered a major problem in sustainable vegetable production. In the absence of effective and economical control measures, weeds in cover crop mulch compete with vegetable plants affecting yield. Plasticulture is widely used in commercial vegetable production. Commercial growers will be more inclined to use cover crops if it can be integrated into the plasticulture system. Prospects of cover crops will also brighten if the need for ground plastic cover diminishes as weed control in vegetables become more manageable with the availability of glyphosate-tolerant (Roundup ready) cultivars. Above all, acceptance of sustainable agricultural methods will increase as agricultural pollution laws are further tightened and more farmers become aware of the long-term damage done to soil productivity by conventional faming systems.

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SOIL WATER MANAGEMENT USING NUCLEAR TECHNIQUES

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ABSTRACT

Water scarcity is a major problem in many parts of the world; agriculture is one of the largest consumers of water resources, accounting for over 70 percent of the available water. Improving soil water management is critical to meet future food demand and economic development. Nuclear science has a crucial role to play in supporting research and development of sustainable farming systems and in providing technology for the implementation of better management practices such as optimal irrigation scheduling, improved water and fertilizer use efficiency while reducing nitrate leaching. This paper illustrates the application of isotope and nuclear techniques in various aspects of soil water management through the use of soil moisture neutron probe (SMNP), N-15 nitrogen labelled fertilizer, carbon-13 and oxygen-18 techniques. In a recent study, the IAEA together with eight Member States in the West Asia region implemented a regional project where nuclear techniques were used to identify improved water and fertilizer management practices. By using fertigation, which is the application of liquid fertilizer through drip irrigation systems allowing precise and regulated amounts of water and fertilizer to be applied, it was shown that on average 42% of irrigation water could be saved under drip irrigation in all the participating countries. A similar percentage increase in yield was also observed when compared with traditional fertilizer and water management practices. Similar results were obtained in an IAEA project in Uzbekistan on the optimization of water and fertilizer use for major crops (cotton and winter wheat) under different soil conditions in Uzbekistan. Measurements of soil water consumption of crops by the soil water balance method on winter wheat showed that the optimal scheduling of irrigation decreased the water requirement per unit of crop yield up to 25%; at the same time yield increased from 18 to 50%. The carbon isotope discrimination technique was found to be a useful tool in the water use efficiency study in coordinated research project on rainfed agriculture. Currently work is also progressing in the Sahel zone of Africa to quantify the contribution of hydraulic lifted water using the oxygen-18 technique. The contribution of such water is important to the sustainability of food production in the rain-fed agriculture of the countries in the Sahel while combating desertification.

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EXAMINATION OF IONIC SPECIES EFFECTS ON ZETA POTENTIAL FOR TWO SOIL CLAYS

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ABSTRACT

The effects of different flocculants and dispersants on electrophoretic mobility (EM)/zeta potential (zp) of clay particles were investigated. The soils taken from Japan (AS) and Kazakhstan (KS) were used for obtaining clay fraction. Pretreated Na-clays were dispersed in 0.01 M NaCl, NaHCO3, Na2CO3, and Na2SO4; and 0.5% NaHMP solutions. For EM determinations, clay suspensions were prepared at a concentration of 4 g-clay per 100 mL of electrolyte solution. The EM was measured using Burton apparatus of improved design and converted into zp. The results showed clearly that ionic species had similar effects on the EM and zp of AS-clay, except NaHMP. In other words, NaHMP caused a rapid increase in the negative mobility (EM =2.59x10-8 m2 s-1 V-1) and zeta potential (zp = -32.68 mV) of AS-clay. The lowest EM (2.00x10-8 m2 s-1 V-1) and zp (-25.24 mV) values were obtained in the Na2SO4-treated suspension. In contrast, ionic species showed a greater influence on the EM and zp of KS-clay. Chloride and sulfate behaved similarly as far as the EMs of this clay were concerned. The others had a more adverse effect. While Na2CO3 presented the highest negative EM (2.59x10-8 m2 s-1 V-1) and zp (-32.68 mV), Na2SO4 resulted in the lowest EM (1.42x10-8 m2 s-1 V-1) and zp (-17.92 mV).

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SOIL WATER DEFICIT EFFECTS ON GROWTH AND PHYSIOLOGY OF BERSEEM CLOVER

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ABSTRACT

Berseem clover is a leguminous crop well adapted to semi-arid conditions. However, little is known about the growth and physiological responses to dry soil of this species. Our objective was to investigate the sensitivity of growth and physiological mechanisms of plant to long-term soil water deficit. Measurements were carried out during spring and summer in Drama of Macedonia, Greece. Plants were grown in a greenhouse. All pots were irrigated by the same water quantity for one month from sowing date and after that they were subjected in two water regimes: irrigation until field capacity (irrigated treatment) and irrigation with half water quantity than the prior treatment (stressed treatment). In order to identify the effects of soil water deficit on berseem clover plants (Trifolium alexandrinum cv. pinias), we measured soil water content, plant height, above and below ground biomass accumulation, stomatal conductance and transpiration. The results of this study indicated that the plants, which were grown under soil water deficit, reduced water losses by reducing stomatal conductance and therefore the transpiration right after differentiation of irrigation. Although the growth parameters presented lower values as well as physiological parameters in stressed plants, they were significantly differentiated from the irrigated 30 days after they were exposed to soil water deficit. The root to shoot ratio increased as plants aged and it was higher in stressed than in irrigated plants. Thus we conclude that the berseem clover adapts to soil water deficit by reducing transpired water and by retaining efficient water uptake, as it reduces less the growth of the root than the shoot.

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DERIVING REPRESENTATIVE AND UNIQUE INFILTRATION PARAMETERS THROUGH A PROBABILISTIC APPROACH

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ABSTRACT

The aim of this study was three folds: (1) to derive Horton's infiltration equation, commonly used in hydrological surveys, in a small agricultural field, (2) to examine different distribution functions, characterising parameters of Horton's equation, and (3) to estimate basic (steady-state) infiltration rate based on a probabilistic approach. The work was conducted in an area of 0.144 da at the Research Farm of Department of Agricultural Structures and Irrigation, Faculty of Agriculture, University of Cukurova, Adana. Point infiltration measurements were done, using single-ring infiltrometer technique, at grid nodes of 3- by 3-m, at 16 locations. Final intake rate fc, maximum infiltration rate f0, and decreasing rate of infiltration capacity k, the parameters of the Horton's equation, were determined for each location. Coefficients of variations were about 75%, 43% and 54% for fc, f0, and k, respectively, indicating that the simple arithmetic mean of the parameters was not appropriate to characterize uniqueness of the sampled data. All the parameters showed a right-skewed distribution, implying higher mean values than the median values. The coefficient of kurtosis Ck for fc was 5.41, showing more peakedness compared to normal distribution. However, the coefficients of kurtosis for f0 and k were flatter than the normal distribution. The variability of the parameters could be represented with three-parameter log-normal frequency distribution for fc and two-parameter log-normal frequency distribution for f0 and k. Anderson Darling "goodness of fit" test was performed to control the linearity of the sets of observations, fitted to specific frequency distributions. Because of the skewness of the infiltration parameters, algebraic mean values could not represent the centroid of infiltration data, although the data were collected from rather small area. However, the estimated parameters, at 50% probability level, reflected the true population means. Not recognizing the pdf and probability level would cause the simple arithmetic means to be overestimated by about 9%, 39% and 16% for f0, fc, and k parameters, respectively. The results showed that the probabilistic approach, followed in this study, can easily be extended to larger and heterogeneous watersheds for hydrological studies, such as flood control, water reservoir operations, rainfall harvesting and the like.

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INVESTIGATION OF THE RELATIONSHIPS BETWEEN STOMA RESISTANCE AND SOIL WATER MATRIC POTENTIAL WITH OTHER ENVIRONMENTAL FACTORS IN THE RESPECT OF MATHEMATICAL MODELLING OF PLANT WATER CONSUMPTION

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ABSTRACT

The stoma resistance influences the determination of the transpiration, which is one of the main components of the water balance in the soil, and which is one of the morphological properties of the plants. Stoma in the plants control plant water consumption by the cells key doing the functions of disclosure and closure of the apertures through their original structures. In this respect, in the pot experiments which were carried out in a greenhouse conditions, the matric potential of the soil water and plant stoma resistance together along with the other environmental factors were investigated. In this study, using Seri-82 and Adana-99 wheat varieties the matric potential of the soil water as well as leaf heat, PAR, the meteorological parameters and the stoma resistance values at the field capacity and the low moisture levels were measured. In the study, it was observed that the plant stoma resistance was influenced rapidly by the matric potential of the soil water. Although the stoma resistance at the limits of soil water field capacity was found at the limits of 0.69-4.74 s cm-1, the stoma resistance showed increments at the intervals of 7.6-54.8 s cm-1 against the increasing soil water tension.

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EFFECT OF POLYVINYLALCOHOL (PVA) ON REDUCING SOIL COMPACTIBILITY AS AN INDICATION OF HYDRAULIC CONDUCTIVIT

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ABSTRACT

Polyvinyl alcohol is used as soil stabilizer because of its effect on structural stability. The objective of this study was to determine effect of PVA on compactibility of soils with different textures. The PVA was applied with a rate of 0.005 w/w on soil samples. Soil samples were placed within a column with a size of 7.5 cm in diameter and 11.2 cm in height, and compacted at different moisture contents (3, 6, 9, 12, 15, 18, 21, and 24 %) under 5, 10, 15, 20 and 25 hammer blows. Hydraulic conductivity of compacted samples was measured using the constant-head permeameter. Although hydraulic conductivity values decreased with increasing level of compaction, they were significantly higher than the samples untreated with the PVA. Effect of PVA on hydraulic conductivity was much clearer in loamy textured soil as compared to the sandy-loam textured soil.

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PLANT RESIDUE EFFECTS ON COMPACTIBILITY OF SOILS

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ABSTRACT

Plant residues reduce the effect of mechanical loads on soil. The objective of this study was to determine the effect of wheat straws left on soil surface or mixed with soil at different surface coverage rates on compactibility of two soils with different textures. Soil samples that equilibrated at optimum moisture content in where maximum dry bulk density is obtained were put into cylindrical metal columns (30 cm in height and 20 cm in radius) to a height of 20 cm. Wheat straws cut into 5 cm pieces were disturbed over the sample surfaces with the rates of 25, 50, 75, 100, and 200 % coverage percentages. In another set of the experiment, wheat straws cut into 1 cm pieces were mixed into soil samples with the rates of 0.25, 0.50, 0.75, 1.0, and 2 % w/w basis. Samples were compacted using the standard proctor hammer for 5, 10 and 15 blows. Bulk density and penetration resistance were measured on compacted samples and compared with the initial values. Results indicated that increased the amount of wheat straws left on surface or mixed with soil decreased the compactibility of soil.

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THE USE OF THE COMPOSTED BANANA PLANT WASTES AS A SOIL AMENDMENT MATERIAL

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ABSTRACT

Banana growers in Turkey tent to utilize the banana plant wastes occurred after the fruit harvest for plant nutrient supply. We evaluated the potential use of the composted banana plant wastes as a soil amendment material. Two main parts of the plant, leaves and shoot, composted for a period of one year, were applied to the loam soil at the rate of 0, 2, 4, and 8 % and incubated for 45 and 90 days at the constant temperature of 27 °C. The results showed that the saturated hydraulic conductivity of the soil did not significantly change with the application of both leaves and shoot wastes. Some changes occurred on soil properties after the application of banana waste, but these were statistically insignificant except for the available water content (AWC). It was also found that the role of the leaves and shoot wastes on the investigated parameters were certainly different. The aggregate stability (AS), field capacity (FC), permanent wilting point (PWP) and the micro pore volume increased with the application of the composted shoot waste while AWC, aeration porosity (AP) and macro pore volume increased with the application of the composted leaf waste ($P < 0.05$). As a conclusion, the composted banana plant wastes were not significantly effective on improving soil physical properties, at least for the selected mixing rates.

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TILLAGE-INDUCED DIFFERENCES IN SOME PROPERTIES OF AGGREGATES-SIZE FRACTIONS

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ABSTRACT

Tillage can modify the composition of soil aggregates. The objective of this study was to determine the effects of tillage application under the sunflower (Helianthus annuus L.)- barley (Hardem vulgare L.)–A mixture of Hungarian vetch (Vicia pannonica (L.) Crantz)+ triticale rotation on some characteristics of soil aggregates in a loam soil. Organic C, available P and extractable K contents of aggregate size fractions (>4.76, 4.76- 2.0, 2.0- 1.0, 1.0- 0.5, 0.5- 0.25, 0.25>, mm) were determined on soil samples collected in 0- 20 cm depth of soil from three tillage systems (Chisel plow, chisel plow+ disc, chisel plow+ combine harrow) that had been established in 2001. There were no detectable differences in organic C and available P contents of the aggregate size fractions among tillage treatments. There, however, were a significant difference in available P and extractable K contents of the aggregate size fractions. Extractable K contents of the aggregate size fractions showed a significant difference among tillage treatments

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DETERMINING SOIL SURFACE CO2 FLUX DURING WHEAT GROWTH UNDER NO-TILL AND CONVENTIONAL TILLAGE SISTEMS

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ABSTRACT

Soil surface CO2 flux is the second largest flux in terrestrial carbon budget after photosynthesis. Plant root and microbial respirations produce CO2 in soil, which are important component of global C cycle and atmospheric CO2. This study determined the amount of CO2 released during spring wheat (Triticum aestivum L.) growth under no-till (NT) and conventional tillage (CT) systems. This experiment was conducted on soil previously under continuous corn production with NT and CT for more than 10 years. In this study, surface CO2 flux and soil air CO2 concentration were measured weekly after wheat emergence. Surface CO2 flux was measured using a LI-COR 6200 (LI-COR Inc, Lincoln, NE, USA). Soil samples were also taken for determining microbial respiration under laboratory conditions. No-till generally had higher soil water content and greater microbial activity at the surface with decreasing from planting to harvest, while activity was constant in the deeper depths. The total amounts of CO2 released from CT and NT to the atmosphere were accounted for 233 g C m-2 and 192 g C m-2 during spring wheat growth. Conventional tillage released 20% more CO2 to the atmosphere compared to NT.

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THE EFFECT OF DIFFERENT TYPE OF SALTS AND SALINITY LEVELS ON VEGETATIVE GROWTH, WATER CONSUMTION AND SOIL SALINITY OF EGGPLANT (Solanum melongena, L.)

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ABSTRACT

This study was carried out to determine the effect of different type of salts and salinity levels on vegetative growth, water consumption and soil salinity of eggplant. NaCl, MgSO4, NaHCO3 and CaCl2 salts were used to obtain 2.5 and 5.0 dS/m salinity levels. The experiment was conducted in fully randomized design with 3 replications, and totally with 9 treatments in a green house. The experimental soils were sieved through 4 mm sieve and the pots were filled with 10 kg of air-dried soils. Irrigations were performed when 50% available water was extracted from the soil. The extraction rate of the water from the pots was observed by means of weighting the pots in 2-3 days intervals. Through the statistical analyzes the effects of both type and amount of salts on vegetative growth, biomass, length of the plants, total ash, Ca, Mg, K, Na, Cl and N contents in leaves, amount of irrigation water and soil salinity were found significantly important. The augmentation of salinity levels for each type of salts from 2.5 dS/m to 5 dS/m made these effects more severe. Soil salinity also increased with increasing the salinity levels. Total ash rate was found to be higher when main salt in irrigation water were NaCl or CaCl2.

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SOIL RESPIRATION IN YOUNG AND OLD ORIENTAL SPRUCE STANDS AND IN ADJACENT GRASSLANDS IN ARTVIN, TURKEY

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ABSTRACT

Soil respiration is a good indicator of soil quality. In this study, influence of species type and sampling time on soil respiration in young and old oriental spruce (Picea orientalis (L.) Link.) stands without understory and with Rhododendron ponticum L. understory and in adjacent grasslands were investigated in Genya Mountain, Artvin, Turkey. Soil respiration was measured approximately monthly from May to November using the soda-lime technique. Mean daily soil respiration across all sites ranged from 0.26-2.66 g C m-2 d-1. There were significant differences between grasslands and old forest sites, but there was no significant differences between young forest sites and grasslands. Seasonal changes in soil respiration were strongly related to temperature changes. Over all sites, soil temperature and soil moisture together accounted for 75 % of the seasonal variability in soil respiration. Mean soil respiration rates correlated strongly with fine root (<2 mm) biomass ($R = 0.91$, $P<0.001$), surface (0-15 cm) soil sand content ($R = 0.71$, $P<0.05$), surface soil silt content ($R = -0.69$, $P<0.05$), and subsurface (15-35 cm) soil pH ($R=0.60$, $P<0.05$).

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INFLUENCE OF CROP ROTATION ON SOIL QUALITY UNDER IRRIGATED AGRICULTURE IN THE HARRAN PLAIN IN SOUTHEASTERN TURKEY

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ABSTRACT

With the completion of the GAP project. about half of the 3.2 million ha of agricultural land (1.7 million ha) will be used for irrigated agriculture. New intensive agricultural systems are expected to change the soil quality in the region. It is, therefore, imperative to monitor the soil quality for sustainable use and management in the region. The objective of this research was to determine the effect of selected rotation systems on soil characteristics of the Harran series, currently under dryland agriculture. Soil samples were collected in fall season for two years, from the parcels under selected management systems. Among the 18 selected rotation systems, broad bean/wheat and barley/lentil crop rotation had higher bulk density and lower porosity than fallow/wheat, lentil/wheat, and continuous barley treatments in the first year. In the second year the values for the two groups were statistically not different from each other. Irrigation has caused an increase in soil porosity and decrease in bulk density. As expected, soils under irrigated agriculture had more moisture than under dryland agriculture.

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A MOISTURE CONTROL SYSTEM TO MAINTAIN CONSTANT SOIL WATER POTENTIAL IN GREENHOUSE AND LABORATORY EXPERIMENTS

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ABSTRACT

Maintaining a controlled soil water potential in laboratory and greenhouse experiments conducted on water and nutrient use efficiency may significantly decrease the error caused by the fluctuations in soil water potential during the experimentation. A soil moisture regulator system (SMR), which maintains constant soil water potential in the pots at a desired level during a long time of experimentation, was developed. The SMR is a combination of regulator, ceramic tips, and water suppliers. A pot experiment was carried out with four replicated pots to test the SMR. Each pot was filled with a loam (27% clay, 43% silt, and 30% sand), was saturated and then dried under −32 cbar and −45 cbar soil water pressures. A constant soil water pressure in the pots was reached after 36 days under −32 cbar and after 60 days under −45 cbar soil water pressure. Average volumetric soil water content was 0.236 cm3 cm-3 under −32 cbar and 0.205 cm3 cm-3 under −45 cbar. The SMR adequately controlled the soil water pressure after the constant soil water pressure was reached.

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EFFECT OF AGGREGATE SIZE ON SOIL COMPACTION

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ABSTRACT

The purpose of this study was to determine the effect of soil aggregate size distribution on soil compaction Three soil samples were taken from the 0-20 cm depth in Erzurum region. Six different aggregate combinations (12.7-6.4 mm; 6.4-4 mm; 4-2 mm; 2-0.84 mm 0.84-0.42mm and <0.42mm) were prepared by sieving. Aggregate fractions were compacted at different number of blows and moisture contents. Permeability, penetration resistance, water content and drying curve were obtained on compacted samples. Increase of aggregate size or increase of aggregate size within the aggregate fractions affected permeability, water content and shape of drying curve.

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THE EFFECT OF AGGREGATE SIZE DISTRUBUTION ON ROOT GROWTH OF PLANT AND PHYSICAL PROPERTIES OF SOIL

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ABSTRACT

The purposes of this study were to determine the effect of soil aggregate size distribution on root growth of plant using of some physical properties of soil. Three soil samples were taken from the 0-20 cm depth in Erzurum region. Five different aggregate combinations (25.4-12.7 mm; 12.7-6.4 mm; 6.4-4 mm; 4-2 mm; 2-0.84 mm and <0.84mm) were preperated and physical, mechanical and chemical properties of these samples were determined. As size of aggregates got larger the applied stress to crush the aggregate got higher but strength aggregates against crushing and modules of rupture were decreased. The relationship between soil moisture and time for drying indicated that moisture content of samples were significantly affected by aggregate size distribution. On the other hand, beans (Phaseolus vulgaris var. contender) were growth on pots with different aggregate size distribution, and the root and stem growth on these samples were investigated. It was obtained that aggregate size distribution had an significant effect in plant growth.

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EVALUATION OF SOIL CONSISTENCY LIMIT METHODS

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ABSTRACT

Liquid limit (LL), plastic limit (PL) and shrinkage limit are frequently used as indicators of the behavior of cohesive soils. Various methods for consistency limit are used in practice. The objective of this paper is to compare and to evaluate the values of consistency limit of soils from liquid, plastic and shrinkage limit test and to research relationships between values of consistency limit and physical and chemical properties of soil and to determine the optimal soil moisture content for tillage operations without causing any damage in soil structure. The liquid limit of soils were determined by Casagrande, cone, Casagrande one-point and one-point cone methods. Plastic limit was determined by standard method. At this study, 25 soils samples from each of 0-30 cm and 30-60 cm of soil profiles were collected. Physical and chemical properties of soil samples were determined.

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EFFECT OF DIFFERENT ROTATION SYSTEMS AND SOIL TILLAGE METHODS ON SOIL PROPERTIES

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ABSTRACT

The effects of different rotation systems (wheat-wheat, vetch-wheat, fallow-wheat, chemical fallow-wheat and vetch-fallow-wheat) and soil tillage methods (plough, chisel, Anatolian plough and no tillage) on soil characters were studied by using Split-Split Plot design with three replications. Although soil tillage methods had significant effect on soil moisture, volume weight, aggregate stability and organic matter at 1 %, they had no effected on soil porosity. Effects of rotation systems on soil moisture and aggregate stability and organic material content were statistically significant. But rotation systems had no effect on porosity and volume weight. The highest soil moisture, aggregate stability and organic matter were obtained from zero tillage in tillage methods and vetch-fallow-wheat and chemical fallow-wheat in rotation systems. Moreover, highest volume weight belonged to plough application. Results in this study showed that no tillage with vetch-fallow-wheat and chemical fallow-wheat were found to be the most effective combinations in improvement of soil.

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COMPARISON OF SOME SOIL PROPERTIES BETWEEN MAIZE CULTIVATION AREAS AND ADJACENT ALDER [(Alnus glutinosa (L.) Gaertner Subsp. barbata (C.A.Meyer) Yalt] STANDS IN KESIKKOPRU VILLAGE, PAZAR IN TURKEY

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ABSTRACT

The study area is located in Kesikkopru village which is 3 km far away from Pazar. In this study, a comparison of some soil properties between maize cultivation areas and adjacent alder [(Alnus glutinosa (L.) Gaertner subsp. barbata (C.A.Meyer) Yalt)] stands were investigated. For this purpose two experimental blocks on two different land use types (forestland and maize cultivation area) were established. After that, 9 soil pits were dug in each block, and 36 unit soil samples were taken from different depth steps for laboratory analysis. As a result of laboratory analysis, the highest ratio of sand, permeability, porosity, root ratio and soil organic matter was measured in top soils taken from alder stands, and the highest ratio of dispersion, erosion ratio, and bulk density was measured in top soil taken from maize cultivation areas. Significant differences were determined between alder stands and maize cultivation areas.

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CHANGES IN ATTERBERG LIMITS WITH DIFFERENT ORGANIC WASTE APPLICATIONS

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ABSTRACT

The objective of this study was to determine the effects of different organic wastes on Atterberg limits. Four different organic wastes, manure (M), hazelnut husk (HH), tea waste (TEW) and tobacco waste (TOW) were used in this field study. Organic wastes were incorporated to soil as four different rates (0, 2, 4, and 6 %) with three replications in a randomized block design for eight months. Organic waste applications increased liquid limit (LL) and plastic limit (PL) with increasing the application rates. According to control treatment, the highest increments for liquid and plastic limits were statistically determined with the highest application rates of hazelnut husk and manure, respectively. When organic waste treatments were compared each other regardless of different application rates, Atterberg limits increased with the application of organic wastes in the following orders: M<TOW<TEW<HH for LL and TEW<M<HH<TOW for PL. Liquid limit showed significant positive correlations with plasticity index ($r = 0.614^{**}$) and plastic limit ($r = 0.336^{*}$). Soil organic carbon (OC) and exchangeable Ca and Mg contents increased the both Atterberg limits. Plastic limit positively correlated with OC, Ca, Mg and K contents of the soil. Liquid limit positively correlated with OC and Mg contents. Exchangeable Na contents of soil decreased LL, PL and plasticity index (PI), and gave the significant negative correlations with LL ($r = -0.459^{**}$) and PI ($r = -0.472^{**}$). As a result, increments in the organic matter contents of soil increased the Atterberg limits. It indicates that addition of different organic wastes to soil allows for field operations in high moisture contents depends on organic matter characteristics.

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AN EVALUATION OF SOME PHYSICAL PROPERTIES ARISED FROM SOIL COMPACTION IN TWO COMMON SOIL SERIES IN GREATER MEANDROS BASIN

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ABSTRACT

Some physical, chemical and hydraulically properties arise from soil compaction in two common soil series in Greater Meandros Basin are analyzed. Total porosity, porosity largeness distribution, soil bulk density, saturated hydraulic conductivity values in compacted and non-compacted horizons are determined and relationship between these values and compaction are evaluated. The existence of compaction in profiles especially in the depth of 40-50 cm are determined and it is found that there is a decrease in the amount of macro porosity, while increase in soil bulk density. Some statistically significant correlations are found away the values obtained.

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THE USE OF SEWAGE-SLUDGE AND HUMIC ACID TO REMEDIATE ERODED SOILS UNDER SEVERE IMPACT OF WIND EROSION IN KARAPINAR-KONYA, TURKEY

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ABSTRACT

In the Great Konya Basin of Turkey, unfavorable climatic conditions, very weak and sparse vegetation coupled with over grazing and excessive cultivation caused severe wind erosion and sand dune appeared. In the past, Active soil erosion has threatened the Konya –Adana highway and caused traffic accidents, made the living conditions unbearable to the people in Karapinar, which is a sub-province of Konya, and then the habitants have started to move to safer places from the area. In soils, the primary particles tend to do themselves into structural units known as secondary particles or soil aggregates. Structural stability of soils against erosion is an important soil physical condition which is closely related to soil aggregation. The soil aggregation influences some soil erodibility indices such as, dispersion ratio (DR), erosion ratio (ER), erodibility factor (EF) and soil structural stability index (SSI).These indices have been developed to determine soil erosion susceptibility and used to assess sustainable soil use and management. The objectives of this work were: 1) To determine the humic acid contents of the low grade lignite samples collected from the sites of Ilgin, Ermenek and Beysehir around Konya, 2) To investigate the effects of different levels of some organic wastes (sewage-sludge, humic acid and lignite samples) on the aggregate stability and some soil erodibility indices such as dispersion ratio (DR), erosion ratio (ER), erodibility factor (EF) and soil structural stability index of a soil sample with a fine sandy loam textured collected from the vicinity of Karapinar town which has been continuously under the severe impact of wind erosion in the area. The results can be summarized as follows: 1) Organic amendments with the sewage-sludge, humic acid and lignite samples increased significantly ($P<0.01$) aggregate stability values while decreased the DR, ER, EF indices of the soil samples, 2) Negative and significant ($P<0.01$) relationships were found between the percentages of water stable aggregates and the DR, ER, EF indices of the soil samples, 3) Aggregate stability values of the soil samples were positively and significantly correlated with increasing in the levels of the organic amendments, 4) The erodibility indices such as DR, ER and EF were found negatively correlated with the increasing levels of the organic amendments with the sewage-sludge, humic acid and lignite samples, 5) It was concluded that, organic amendments with the increasing levels of the sewage-sludge, humic acid and lignite materials could help to remediate the eroded soil and thus to reduce some soil erodibility indices such as dispersion ratio, erosion ratio and the erodibility factor of the soil samples of Karapinar, in Konya.

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ENVIRONMENTAL IMPACTS OF LAND DEGRADATION DUE TO UNCONTROLLED URBANIZATION AND INDUSTRIALIZATION UPON THE SUSTAINABLE CONSERVATION AND MANAGEMENT OF SOIL AND WATER RESOURCES IN MERSIN PROVINCE, TURKEY

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ABSTRACT

Today, in spite of the developments in the industry and technology, the living standards which have increased parallel to these developments included the environmental problems that have caused a worry for future among the people and countries. As a result the, countries with the living organs, organizations related with environment and local managements have begun to make some decisions directed to the future. Even though, the countries are similar to each other in terms of the geography, physical structure, culture, religion and belief; they have made a common decision by joining into some organization. In last decade, the European Association, the European Custom Association, in which our country's membership is in question, are the examples for these organizations. Because of the uncontrolled urbanization, it is quite possible to live with the problems in a whole of the city such as cultural degeneration, visual pollution, psychological effect of city public, social confusion,-social lack of communication, arising from different settlements in every part of the city, spoiling of the natural ecological balance, functional disorder in the whole of the city, deficiencies of the substructure system, illegal building, development of shantytown due to the incorrect, land use without planning and, insufficiency in transportation services and so on. Up to dates, industrial foundations have been established on plain and productive lands because of their convenient establishment, transportation and sub structural potentials. It is quite possible to see these examples in Cukurova Region, especially along the main road of Mersin-Adana or at the shoreline between Mersin-Anamur. We must avoid urgently from this activities which create several kinds of pollution of the shore, sea, as quickly as possible. The major purpose of this work, was to enlighten the rates and the distribution of the agricultural land losses due to disorganized industrialization and misplanned urbanization in Mersin Province in the last three decades. It was aimed also to discuss all the interrelated factors and to make sound practical suggestions to minimize the environmental and ecological impacts of the widespread losses of the productive agricultural lands because of the uncontrolled urbanization and the irrational industrialization in the Province. The results of this work can be summarized as fallows; 1) It was calculated that nearly 86.43 % of the area that has been left for the city settlement has been covered by the most productive agricultural soils including the land use capability classes of I, II, III and IV. 2) It was also estimated that the settlement area of the city has increased nearly 3.9 times from 1960 to 1970 and extended 4.1 times from 1970 to 1980, 5.6 times from 1980 to 1990 and 16.3 times from 1963 to 2000 respectively. 3) It was suggested that the use of chemical fertilizers and pesticides to increase agricultural production should be controlled and minimized to a reliable extend. Instead, organic or/and ecological agricultural systems should be put forward in action as quickly as possible by using organic manures in the Region.

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THE EFFECTS AND USING OF VALEX PRODUCT RESIDUES TO WATER EROSION

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ABSTRACT

The different measures have been applied to decrease the soil losses from water erosion which is the most important problem of Turkey soils. One of these measures is the using of plant residues. In this research, the bagasse of valonia oak fruits which is using to obtain tanen in leather industry and produced a lot of amounts in every year was used to determine its effect on erosion. In this research, soil samples were placed in 30x45x15 cm sized plots and valonia oaks residues were disturbed with soil samples in 10 and 20 % ratios of soil weight. Rainfall with 70 mm/h intensity for one haur were applied on plots and runoff, soil loss and drained water from plots were determined. In the end of this research, total runoff were taken from 26.29-37.11 lt/m2 in control plot, 17.94-32.31 lt/m2 in 10% application, 10.14-32.32 lt/m2 in 20% application. Total soil losses were determined as 198. 30-659.16 g/m2 in control plot, 63.11-484.31 g/m2 in 10% plot and 13.90-301.48 g/m2 in 20% plot. Total drained water from plots were found as 2.06-15.64 lt/m2 in control, 2.65-17.05 lt/m2 in 10% plot and 3.49-20.58 lt/m2 in 20% plot. As a result, it was determined that the residue application of 20% was more effective than the others on erosion.

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BIO-RESTORATION AND EROSION CONTROL DEVICES FOR REINSTATEMENT OF STEEP SLOPES ON THE BAKU-TBILISI-CEYHAN CRUDE OIL PIPELINE PROJECT – LOT B

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ABSTRACT

A particular amount of erosion is natural or tolerable, but an exposed earthwork site can generate thousand times more erosion than an undisturbed site. In other words, on construction sites extremely erodible conditions exist during site preparation and construction periods when the soil is highly disturbed. For that reason, reinstatement practices are important on all sloping lands troubled by construction. The Reinstatement Plan (RP) for the Turkish Section of the Baku – Tbilisi – Ceyhan Crude Oil Pipeline Project involves the application of the Universal Soil Loss Equation (USLE) for calculating the soil loss and assessing the most adequate alternative for the erosion minimization on the steep slopes. To reduce the erosion of steep slopes, whose tolerable soil loss rates were found more than 5 tons ha-1 year-1, which was the required value by Special Area Reinstatement Method Statement (SARMS) for the pipeline, the bio-restoration was firstly proposed to reinstate the site to a sufficient extent in order to allow the disturbed slope to be returned to its pre-project use and productivity. Hydro-seeding and hydro-mulching (C = 0.12) were devised as a method of distributing and planting seed. The recommended seed types were selected for long-term growth, varied to satisfy local soil and climatic conditions, and reflected the variety and distribution pattern of the pre-construction flora. The support practice factor (P) of the USLE was only considered in the cases that C factor for the hydro-seeding and hydro-mulching was insufficient to reduce soil losses to the rates described in the RP. As well as employing the bio-restoration, the slope length needed to be reduced by diversion channels to attain the acceptable soil losses in these sites. The USLE calculated the interval and number of the channels to break the length of a given steep slope. The rational formula together with the highest rainfall intensity, which recurs every 100 years, was used to find the maximum design discharge, and consequently, the uniform flow equations determined the cross-sections of diversion channels. These options, use of the bio-restoration and diversion channels, aimed to effectively and efficiently reinstate the steep slopes of Lot B.

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ESTABLISHMENT OF EROSION MEASURES AS A PART OF THE SITE-SPECIFIC SPECIAL AREA REINSTATEMENT PLAN OF BAKU-TBILISI-CEYHAN CRUDE OIL PIPELINE PROJECT – LOT B

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ABSTRACT

Soil erosion can be particularly triggered on sites that are left bare by construction on steep slopes. Soil erosion both decreases land productivity and damages rural economies. Therefore, thorough construction together with the proper erosion controls should be carefully performed in order to reduce the soil erosion on construction sites. The Universal Soil Loss Equation (USLE) was used for estimating soil loss from the steep slopes experiencing disturbance during Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project – Lot B. The objective was to compare soil losses from a particular construction site with the tolerable soil loss rate, which was 5 tons ha-1 year-1 for the areas with the slope steepness between 25 - 30% and the slope length ≥ 100 meters. This was the required value by Special Area Reinstatement Method Statement (SARMS) for the pipeline. The rainfall erosivity factors (R) for the cities of Sivas, Erzincan and Erzurum, through which the pipeline passes in Lot B, were taken from the Isoerodent Map of Turkey. For a specific site where no rainfall data and R-value were available, an estimate of R was made based on the difference in elevation from the closest base location where the annual precipitation and R were known. The soil erodibility (K) nomograph was used to describe the vulnerability of the soils to the erosion. The nomograph solution needed calculating five soil parameters: percent modified silt (0.002 – 0.1 mm), percent modified sand (0.1 – 2 mm), percent organic matter, and classes for soil structure and permeability. Slope length and slope steepness for the topographic factor (LS) were calculated using the digital elevation maps (DEM). In assessing the crop management factor (C), only the percent rock cover was considered since the initial disturbance left the ground bare due to stripping vegetation. The USLE was then solved to predict soil loss rates from the sites marked out as the steep slopes after locating the pipeline on DEM. The estimated removal rates were compared with the soil loss tolerance rates, and recommendations were done for appropriate mitigation measures required meeting the soil loss tolerance rates. This course of action established all planned temporary and permanent erosion measures in the steep slopes of Lot B.

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SOIL EVALUATION IN EROSION RISK AREAS DETERMINED BY THE LEAM METHOD

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ABSTRACT

A Land Erodibility Assessment Methodology (LEAM) is being commonly used for assessing the potential erosion risk of lands using Soil Taxonomic information in developed countries. The objective of this study was to determine potential erosion risk areas in Erzurum province using the LEAM method that use slope hazard, rainfall erosivity, and soil erodibility parameters. Soil survey records and measured soil properties were used for soil taxonomy. Modified Fournier index value was obtained as 41.6 for the study area. Soil great groups and erosion risk areas were compared under consideration of topographical characteristics.

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SOIL EROSION OF THE SOUTHEAST ANATOLIA PROJECT (GAP) AREA AND ITS EFFECT ON NATURAL ECOSYSTEM COMPARED WITH TURKEY AND THE WORLD

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ABSTRACT

GAP region located in the southeast part of Turkey has a 7.4 mil ha area with about 6.6 million population. The Project area is located lower reaches of Euphrates and Tigris Rivers and the fertile plains lying between them. Average results of the studies have been done so far showed that total soil lose from the region is about 108 million tones by water erosion. While soil lost from the GAP region is 14.7 ton/ha/yr, the values from Turkey and the World are 6.4 and 1.5 ton/ha/yr, respectively. This indicates that soil lost per unit area from the GAP region is 2.3 times of Turkey and 9.8 times of the world. These results show the level of soil erosion from GAP area. As a result of the soil erosion, soil lost from the surface to the different depths depending on the erosion type and the level results in organic matter and plant nutrient deficiencies and filling of the dam reservoirs with the carrying sediments. Hence, economic life of the dams is shortened and occurring floods are threaten to the natural ecosystem and human life. With the erosion, soil structure is destroyed and natural flora and fauna are damaged. GAP region soil erosion costs annually about 2.2 billion dollar. So it is obvious that soil erosion of the region is very important to be considered as economical and agricultural standpoint. The only and the absolute solution of the soil erosion in the GAP region and overall Turkey is to activate the soil conservation act policies (e.g. soil conservation Law by TBMM) and implementation of them by related agencies and people. Soil capability classes I-IV must be used only for agricultural production, but not allowed to be used for settlement of the people and the industrial purposes. Uncultivated arable lands should be much more less or none and the uncultivatable lands with more than 12 % steepness must be covered by vegetation (trees an/or grasses) as possible as much.

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EVALUATION OF SOIL EROSION TREND IN IRAN

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ABSTRACT

The rapid erosion of soil by wind and water has been a problem ever since land was first cultivated. Asia has much higher levels of erosion and larger area of eroded land and is absolute terms it has the highest rates of erosive earth transport of all the continents. Very extreme conditions prevail in Iran which forms a gigantic closed basin surrounded by mountain ranges. Here salt is washed out of Miocene layers in great quantities, given origin to a large salt desert which includes the Dashti-e-Kavir, Dashti-e-Lut and other desert areas. Erosion reaches serious levels in the mountains and on both the borders and central areas of the plateau. In addition, there is considerable underground erosion and wind erosion, the latter occurring even on loamy soils. On the basis of Jihad-Agriculture ministry watershed management report, soil erosion in Iran is threefold of universal permissible limit. It seems, expanding populations and their demand for land-based resources has led to rapid conversion of forest and grassland to rural, urban, industrial, and other uses. Such change commonly removes the soils that slowly develop.

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SOIL EROSION AND PREVENTING IN ESKISEHIR

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ABSTRACT

Eskisehir which is placed in upper Sakarya region shows typically middle Anatolian climatic conditions. Half terrestrial and semiarid climatic conditions are present. The average temperature during the year is 10.9 0C. The warmest month is July (-0,4 0C) and the coldest is January (-0,4 0C) .Average rainfall is 374.1 mm during the year. The total area is 1368248 ha. There are eight soil groups determined. Brown soil (%44,80), brown forest (%26,36), brown forest without limestone (%12,70) are 83,36 % of the whole area. There are different kind of erosion intensities which are the %76 of the area in Eskisehir.(about 1031514 ha). %83,86 of the soil in Eskisehir belongs to the brown soil, brown forest and brown forest without limestone groups. These areas show different erosional intensities which are about 853314 ha which is also the %82,72 of Eskisehir whole erosion area. 350936 ha of the whole agricultural area (totally 589914 ha) shows middle severe and severe erosion. 682540 ha of the area which is not suitable for agriculture (about 763373) shows middle, severe and very severe erosion. This area is the %89,41 of the area which is not suitable for agriculture. There are many factors which have roles on erosion. But the main factor is human behavior. Besides, forest fevers, excessive pasture and misuse of land can also be said. This research stated the combating of soil erosion so far in Eskisehir and the facilities of TEMA in Eskisehir branch.

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EFFECTS OF DIFFERENT FOREST FORMATION TYPES ON SOIL ERODIBILITY RELATED TO HYDROLOGICAL SOIL PROPERTIES IN COGLA CREEK WATERSHED IN ARTVIN.

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ABSTRACT

This study was carried out in Cogla Creek watershed in Artvin. The main objective was to investigate the effects of different forest formation types on soil erodibility related to hydrological soil properties in Cogla Creek watershed. Five different forest formation types growing on different physiographical conditions and at various altitudes were selected namely: Pseudomaki formation (F1), Deciduous forest formation (F2), Deciduous-Coniferous mixed forest formation (F3), Coniferous forest formation (F4) and Bushwood formation (F5). Representative soil profiles from each formation were dug (total 60 profiles) and then soil samples from each profile were collected according to soil depths (0-15 and 15-30 cm). The soil samples were analyzed for soil pH, larger structural aggregates (>2mm), loss on ignition, bulk density, soil particle density, porosity, texture, water contents (field capacity, wilting point, plant-available water and water holding capacity) and permeability. Ratios of dispersion, colloid/ moisture equivalent and erosion were then calculated. For all formations, the results of erodibility index used as dispersion ratio were found much higher than the suggested limiting values of 15. Pseudomaki formation had the lowest dispersion ratio (67.3) followed by Deciduous forest formation (74,5), Coniferous forest formation (85.7), Bushwood formation (87.2) and Deciduous -Coniferous mixed forest formation (88.6). It can be therefore concluded that the soils from the five different formations in Cogla Creek watershed are more likely susceptible to erosion. Of 17 soil properties, 12 properties for top-soil and 10 properties for sub-soil were found statistically significant between formations. This means that the top-soil properties are mostly affected by the differences between the five different formations. The socio-economic life of people living in this area should be boosted. This will reduce the pressure on the forest and soil uses. During the field work for this study it was noted that the forest in these areas was being used as fire wood and animal food by the people. Hence, this would increase the risk of mass movement, flood and erosion on these areas in the future and our study scientifically shows that those soils are already susceptible to erosion.

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THE AREA OF WIND EROSION IN IGDIR-ARALIK

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ABSTRACT

The Igdir Plain is one of the subsidence plains stretching along the Aras River like the Pasinler, Horasan and Kagizman Plains. This plain has three parts; The Eastern Igdir Plain, The Western Igdir Plain and The Dil Plain. It stretches from the lava currents near the Tasburun village, the Eastern Igdir Plain where there is the area of wind erosion in Igdir-Aralik to the Ates Hill in the Kâzim Karabekir Agriculture Center. The vicinity is under the pressure of nature due to the wind erosion that has been worked on for ages. The problematic area is known as the area of wind erosion in Igdir-Aralik. It stretches from the villages of Kulukent and Karahacili in the west of Aralik to Kâzim Karabekir Agriculture Center. The total space of the area which is 25 km in the Eastern-Western direction and 6 km in the Northern-Southern direction is 135 420 da (one-tenth of one hectare). It is very important that the area should be blanketed with the plants, the Ebucehil bushes should be protected and tightened in order to prevent wind erosion.

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EFFECT OF SOME ORGANIC RESIDUES ON ERODIBILITY OF SOILS

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ABSTRACT

The main purpose of this experimental work is to investigate the effects of some organic residues, such as, manure and vetch residues on the structural stability and erodibility of some surface soils. In this laboratory research, three soil samples collected from different region, two various kinds of organic residues and three application levels were used. At the end of the incubation period, structural stability and erodibility of controls and admixtures were determined by means of structural stability index, dispersion ratio, erosion ratio, permeability ratio, aggregate stability and erodibility factor of USLE. As a result, the organic residues applied into the soils, improved the structural stability and, to some extent, decreased the erodibility of soils studied. There were no significant differences between the application levels of 5% and 10%.

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GLOBAL ATTENTION TO TURKEY DUE TO DESERTIFICATION

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ABSTRACT

Desertification has recognized as an environmental problem by many international organizations such as UN, NATO and FAO. The UN has been studying about the desertification control since the early seventies because of high world population, unbalanced food production and its negative effects on the economy. In 1992, Rio de Janeiro Environment Conference, the UN pointed the desertification of many countries, such as Turkey. The UN has been studying the desertification control and, actually, it has focused on Africa because it is the most likely place to be desert. The term of desertification often misunderstood. Desertification is a broader concept that not only place is like "desert creep" and "encroachment of the Sahara" but also is a global issue covering climate change, loss of biodiversity and epidemic diseases, wind and water erosion, overgrazing, unsustainable farming practices and urbanization. Desertification in Turkey is generally caused by incorrect landuse, excessive grazing, forest fires and uncontrolled wild type plants picking. Spatial and temporal variations of precipitation aridity index series of Turkey, for the period 1930 and 1993 showed that total annual and winter precipitation have decreased, in 1973, 1977, 1984, 1989 and 1990, severe and widespread dry conditions occurred, due to depletion of winter precipitation, affecting degradation of soil moisture, caused reduction ground water level. For total CO2 emissions, Turkey is ranked 23rd when compared with other countries. Soil erosion is also significant land degradation factor due to topographical conditions. Salt problem has occurred in 4.49% of Turkish agricultural soils. Urbanization and soil sealing also has become a serious problem on the fertile agricultural lands. Due to anthropogenic destruction of forest, steppe flora gradually became dominant in Anatolia. In terms of biodiversity, Turkey has a significant importance in Europe and Middle East. Nine thousands plant species naturally grown in Turkey, one third of them are endemic. Also, endemic species of vertebrates, thrive in the lakes and marshy areas. The studies of modeling simulation of vegetation on the effects of Mediterranean climate during the Roman Classical period by using vegetation history (the pollen method) showed that , in 2000 years BP, Mediterranean countries were more humid than today. Turkey has a special place on the global concern in terms of desertification because of biodiversity, agricultural potential, high population, social and economical structure, topographical factors and strategic regional location. Communication between scientists, decision makers and international non-profit organizations must be improved.

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EVALUATION OF NATURAL VEGETATION FOR SOIL EROSION PROTECTION IN THE TORTUM WATERSHED

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ABSTRACT

Restoration of eco-system has great importance in combating soil erosion. Tortum cathment is one of the most severely eroded areas in the region because of heavy pressure on natural plant cover. The objective of this study was to evaluate soil erosion in the Tortum cathment under the factors affecting erosion and to discuss the significance of biological, technique, educational and economical inputs on reducing soil losses in the study area. A special importance was given in restoration of natural cover by defining ecologically sensitive areas and using erosion-resistant local plant species in combating soil erosion.

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COMPARISON OF SOME RANGELAND CANOPY COVERAGE METHODS

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ABSTRACT

Canopy coverage of rangeland vegetations are an important characteristics showed protecting their soils against accelerated erosion. More coverage provides more protection. There are several methods that determine coverage of rangeland vegetation. But every method applied same rangeland vegetation estimate different canopy coverage ratio due to differences of their working and sampling area characteristics. The aim of this study was to compare some methods used commonly in Turkey. Four rangeland vegetation sampling methods, line intercept, loop, wheel point and modified wheel point, were applied on sheep fescue (Festuca ovina) dominated rangeland vegetation on the rangelands of Ataturk University, Erzurum in 2002. While line intercept method estimated lowest canopy coverage ratio (45.02%), wheel point method estimated the highest canopy coverage ratio (86.85%). The estimations of loop (75.32%) and modified wheel point (70.43%) methods were belonged to moderate group according to statistical comparison. The line intercept methods give more real estimation ratio than the other methods since its sampling area (1 cm2) is the minimal among the all methods. Therefore, line intercept methods can be considered as a standard method when compared to the other methods. The correlation coefficient between line intercept and the other methods values showed strong relations with respect to canopy coverage estimation. The estimated coverage ratio by the other methods can be translated into line intercept coverage value use by evaluated regression formulas in this study. By this way, real canopy coverage ratios obtained from different methods, used in this study, on similar vegetation can be used to calculate to compare of the results. These comparisons can help making more precise decision on management plans and erosion control measurement in the rangelands.

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EFFECTS OF RANGELAND DEGRADATION ON THE LIFE, OUTBURSTAND SPREAD OF SOUN PEST (EURYGASTER INTEGRICEPS)

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ABSTRACT

In arid and semi-arid areas as Iran, rangelands are the shield of natural disasters. They conserve soil and water; control the floods and support some pests on their plants. Therefore, rangelands are valuable supporter of agriculture. Unfortunately, this valuable resource is degraded in all parts of Iran. Rangeland degradation causes reduction in animal function; increase in wind and water erosion, utilization; and pest's outburst such as soun pest (EURYGASTER INTEGRICEPS). This species is one of the most important problems of Iranian agriculture. This study showed that the primary and major habitats of the species are rangeland and highland. In rangeland, the species feeds and lives on range plants such as wheat-grass (Agropyrum sp.), goat's-thorn (Astragalus sp.), Eremopyrum sp. and etc. The pest has no desire for removing to plains and farmlands without human interference. Therefore the pest has a sedentary life in the rangeland. The results of study show that the sedentary pests in rangeland have low power for fertilization and they have considerable little spawning. Therefore the population of pest will remain little; and rangeland can provide their feeding requirements. After human interference and rangeland degradation will disappear the primary and major habitat of the species. Thus the pest has to migrate towards other resources such as wheat and barely dry farming lands. These migrated pests to new habitats will have high fertilization power because of feeding of wheat and barley. The amount of their spawning is approximately twice a sedentary species. They will endure unfavorable condition well, because of feeding of nutritious resources. They will able to fly long distance. The above mentioned factors cause more outburst and spread of soun pest. The final result of study shows that rangeland degradation has direct effects on outburst of pest in farmlands. Also it reduces output of farmland and increases farmer's financial losses.

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THE ATTRİBUTES OF VİLLAGERS AND FARMS AFFECTİNG DEPENDENCE ON FOREST RESOURCES İN CORUH RİVER CATCHMENT

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ABSTRACT

It is well known that being dependent on forest resources increases deforestation that causes flooding, soil erosion, soil sliding, if necessary measures are not taken. All these land degradations causes villager to have poor soil, poor range lands and thus unproductive agricultural activities resulting unsustainable agriculture in the region where land is very limited. The objective of this study is to determine what attributes of villagers and farms affect the dependence on forest resources so that precautions can be taken to well organize or decrease the dependence on forest resources. The study area in Coruh Catchment includes 30 forest villages from the districts of Bayburt, Uzundere, Ispir, Oltu, Yusufeli and Savsat. The material of the study was collected by a survey study of 600 households. Dependence of villagers on forest resources was presented by the variable that was created by the question of "from where do you provide fuel wood you use up?" If the answer was from nearby forest and forestry office then the villager was considered to have dependence on forest resources. Otherwise the villager was not considered to be depended on forest resources. The variable was formed as dependent variable coded 1 and 0. Independent variables that affect the dependence on forest resources were related to the attributes of the villagers and farms. Limited dependent variable econometric model was solved using probit estimation procedure in Limdep Econometric Computer Program. According to the results of regression analysis, the attributes affecting forest dependence positively are; being a district with more forest resources, the need for wood and lumber, having an outside work of farm, using woods as fuel for heating. On the other hand, age of villager, education level of villager, number of fruit trees per farm, farmers who utilize extension services and the number of cattle per farm negatively affected dependence on forest resources. In order to well organize or decrease the dependence on forest resources, coal subsidies to the villagers who live in sever winter conditions should be provided, an energy forest with fast growing trees on a designated land near village must be established, alternative income generating activities should be implemented, the percentage of villagers who utilize agricultural extension activities related to livelihood and protection of natural resources should be increased, basic education to the younger in the villages needs to be provided.

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LAND DEGRADATION IN TURKEY

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ABSTRACT

Turkey is one of the countries to have been subjected to the land degradation in the World. Main causes of the land degradation are the sloppy lands in the mountainous areas, misuse of land, deforestation, over grazing in the meadows and rangelands, negative effects of some parent material and dispersed rural settlement. The slope having more than 40 % in the mountainous areas extending in the northern and in the southern Anatolian is the important factor the erosion and transportation process. In these areas erosion actively continues where natural equilibrium has been deteriorated. Some parts of the mountainous areas being VI and VII land capability class have been converted into agricultural lands. 6 millions hectare agricultural land is found on the mountainous areas or unsuitable areas for cultivation. This situation is one of the main responsible for the erosion. Namely the rural population living in the mountainous areas obtain all cereals from the land on which opened on the sloppy area. Deforestation depends on two factors. One is to obtain agricultural area and second is to over exploitation and/ or excess utilization. The forest covering 70-75 % of total land of Turkey has been decreased 26 %, most of which is unproductive. Over-grazing having been continued all part of the meadows, rangelands have led to decrease of the herb productivity and widespread bitter and spiny cushion plants that are not eaten by animals. Some parent materials such as salty and high alkaline evaporitic deposits and ultra basic rocks, which are outcropped as the result of soil erosion and especially destruction of forest prevents considerable the growth of forest trees and agricultural activities. These areas are in bare appearance or deserted areas. Degraded lands account for at least one-forth Turkey's total land.

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MONITORING SOME LAND DEGREDATION PARAMETERS IN SOILS OF BALA AGRICULTURAL ENTERPRISE

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ABSTRACT

Due to mismanagement of the land, some of the main degradation type in Turkey are erosion by water or wind, soil salinization and alkalisation, soil structure destruction and compaction, biological degradation and soil pollution. Due to climatic and topographic condition soil erosion is the biggest problem in Turkey and approximately 86 % of land is suffering from some degree of erosion. There is no sufficient information on land degradation based on field studies and monitoring in Turkey. So, to understand status of degradation in Bala this study was handled. In order to have some updated parameters of degradation, soil samples were collected from the reference soil profiles in Bala on the horizonation basis and analyzed for comparison, assessment and interpretation. It is assumed that a basement to be established in such a way will lead to periodical checking and a database for the monitoring of degradation process. Reference data being used as parameter affecting land quality are a set of horizon data of the typical soil profiles (18), once obtained from the detailed soil survey of the area conducted in early 1989. In this study likelihood changes, either negative or positive, occurred in the years between 1989 and 2002 are intended to monitor by comparing the existing data of 1989 with those obtained in 2002. To this end, 1/16 000 scale soil map of 1989 was digitized and a soil database was generated. Following a series of in queries, salt-alkali, drainage, boron, P2O5, lime, gypsum and organic matter status were displayed in map format. Results of sampling and analyses conducted in 2002 were incorporated into the database. Because of topographic character of the study area which is apt to erosion, textural compositions (relative distribution of fractions in texture) of top layers have changed and organic matter contents have decreased within 13 years.

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SOIL AND LAND USE OPTIMIZATION IN RIVER LANDSCAPE IN RELATION TO PROTECTION AGAINST FLOOD (MORAVA – CZECH REPUBLIC CASE STUDY)

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ABSTRACT

Soil is one of the necessary conditions for the existence of ecosystems in the river landscape. The prevalent soil type of these areas is fluvisol developed on alluvial sediments. They delimitate the inundation areas with a high potential for production. In relation to other soil types fluvisols are relatively young and have been strongly influenced by human activities. In the last century they have also been influenced by the development of the waterworks infrastructure which has led to contemporary changes in the soil moisture regime. Man strikes the natural soil development in both forest and meadows by constructing dikes against floods. In this technical way year inundation was dispensed with in these areas and it was possible to accelerate agricultural land use. the river landscape became a significant production area with a reduction in meadow and forest localities, an on the whole, a disturbed ecological continuum. Changes in land use have also influenced soil properties. The level of subsurface water important for meadows and forest ecosystems in these areas was especially affected. In addition, research results show a higher level of contaminants in fluvisols in relation to other soil types as a result of the water quality in the rivers. Changes in the river landscape after the installation of technical protection against floods have series shadow aspects. There are problems are with the high denaturalisation of land and also with the failure of technical dikes during strong floods. That is why new land use alternatives and protection systems against flood are being considered. In this context, our department has elaborated the ecological aapect in both the protection against flood and the revitalization of the river landscape. Attention must also be devoted to soil with the aim of reinforcing the non-productive functions of the river landscape, the restoration of the ecological continuum, the risk of contamination from heavy metals, etc.

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DETERMINATION OF SURFACE WATER QUALITY OF KARASU PLAIN

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ABSTRACT

The assessment of water quality has vital importance for agricultural production soil and water management, and sustainable use of natural resources. One of the most important natural resources is surface water in a palin and watershed. The Objective of this study was to determine some surface water quality of soil of about 16 000 ha Karasu plain that will he opened for irrigation in near future. The water samples were collected from surface water, spring, water, creek water, reservoirs and Karasu. River. Water analysis were done in Soil and Water Laboratory of State Hydraulics Works (DSI). As a result of the study, it was found that all samples collected from some surface water, Karasu river and creek water were suitable for irrigation. But, water quality of spring and reservoirs were between C3S1-C4S3 in Karasu plain. This water can be used only 1imited conditions in irrigated areas, otherwise this salina water will cause salinity problems in soils and soil degradation.

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ASSESSMENT OF SOME SOIL QUALITY PARAMETERS FOR DAPHAN PLAIN SOILS

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ABSTRACT

Rapid increase in human population increased the stress on natural resources including soil. This stress is primary indicator for soil degradation. Soil degradation impact on agricultural production and adversely effect on other natural resources. It is possible to provide sustainable use of soil resources by determining soil quality trends within specific periods. Therefore, reliable and practical indicators of soil quality are needed to evaluate soil degradation, The objective of this study was to determine quality of soil Erzurum-Daphan plain that has a size of nearly 34 000 ha. By evaluating physical and chemical properties and some land characteristics, it was found that study area has 2-grade soil sources.

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ASSESSMENT OF SUSTAINABLE AGRICULTURE AND POLICY

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ABSTRACT

Sustainable agricultural is the management and conservation of the natural resource base, and the orientation of technological and institutional change, in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations development conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically- appropriate, economically viable and socially acceptable. Sustainable agriculture is a way of practicing agriculture which seeks to optimize skills and technology to achieve long-term stability of the agricultural enterprise, environmental protection, and consumer safety. It is achieved through management strategies which help the producer select hybrids and varieties, soil conserving cultural practices, soil fertility programs, and pest management programs. The goal of sustainable agriculture is to minimize adverse impacts to the immediate and off-farm environments while providing a sustained level of production and profit. Sound resource conservation is an integral part of the means to achieve sustainable agriculture. Worldwide efforts are focusing on this new topic in the environmental discussion: quantifying and valuation of impacts of agricultural practice on the animated and unanimated environment to draw conclusions for agricultural policy. Improvements in the sustainability of agricultural systems are possible with existing technologies, but such improvements must be fostered by consistent farm and environmental policies. Agricultural policies to promote sustainable soil management must begin by identifying which aspects should be assisted or can be influenced.

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SOIL PHYSICAL AND CHEMICAL PROPERTIES AND THE RANGE QUALITY DEGREE OF ERZURUM-PASINLER RANGELANDS

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ABSTRACT

This study was conducted to determine the soil characteristics of the grasslands in Erzurum-Pasinler environs, to evaluate the relationships amongst the soil characteristics with special consideration on structural sensitivity of the soil, and also to determine the change between soil characteristics by range quality degrees. Soils samples were collected from soil depth 0-20 cm and 20-40cm. Physical and chemical analysis of the disturbed soil samples were done and quality degrees of these areas were determined. In statistical analysis, cation change capacity, Ca+Mg, sand, clay, silt+clay, organic matter and lime contents of the soils were taken as independent variables while aggregate stability, density, erosion factor, dispersion, percolation and erosion rates, hydraulic conductivity, field capacity, wilting point, useful moisture content were taken as dependent variables. According to variance analysis results variation between range quality degree and organic content, field capacity, wilting point and useful moisture content were found to be significant. Also it was found that 85 percent of the rangelands in the study area were feeble against erosion.

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A LOOK AT TWENTY - FIRST CENTURY WATER RESOURCES, DEVELOPMENT

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ABSTRACT

Fructration over the failure to meet basic needs for water for all people in the last Century has led to a rethinking of national and international water Pricrities and policies. Water resources management approaches around the world are changing dramatically. This changing water paradigm, has many components, Including a shift away from sole, or even primary, rellance on finding new sources of supply to address perceived new demands, a growing, emphasis on incorporating ecological values into water policy, a re-emphasis on meeting basic human needs for water services, and a conscious breaking of the ties between economic growth and water use. A reliance on physical solutions continues to dominate traditional planning approaches, but these solutions are facing increasing opposition. At the same time, new methods are being developed to meet the demands of growing populations without requiring major mew construction or new large-sca1e water transfers from one region to another. More and more water suppliers and planning agencies are beginning to explore efficiency improvements, implement options for managing demand, and reallocating water among users to reduce projected gaps and meet future needs. The connections between water and food are receiving increasing attention as the concerns of food. experts begin to encompass the realities of water availability. These shifts have not come easily; they have met strong internal opposition. They are still not universally accepted, and they may not be permanent. Nevertheless, these changes represent a real shift in the way humans think about water use. At the dawn of 21st century, the water profession has only two choices: to continue as before with a business-as-usual policy which is unlikely to contribute significantly to poverty alleviation and equitable development; of to continue in eamest to develop new policies which could improve the quality of life of people and satisfy their aspiration and expectations. This paper summarizes the components of this ongoing shift and looks at the new paths being explored. It evaluates the major reasons for the change in approach and discusses the applicability of these new concepts in different parts of the world.

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ROLE of The MICRO IRRIGATION on SUSTAINABILITY of SOIL and WATER RESOURCES

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ABSTRACT

Irrigation plays a critical role in providing food and fibre for increasing population. The main water consumer in the world is agriculture accounting for about 70 % of total consumption. On the other hand, most common environmental impacts of on-farm irrigation are: soil salinization and water logging due to over irrigation and use of saline water, nitrate and pesticide contamination of the groundwater (and surface water) due to excessive use of chemicals in intensive agricultural production and/or to over irrigation, soil degradation and deterioration of the soil structure from use of the inappropriate irrigation methods. In order to reduce or eliminate these negative impacts of the irrigation on soil and water resources, the one of the ways is to convert to the modern irrigation technologies such as micro irrigation which includes all methods of frequent water application, in small flow rates, on or below the soil surface. The major advantages of the micro irrigation are water savings, higher yield, smaller flow rates, application of chemicals, water sources with high salt content, improved quality of the crop, adaptation to any topography. The results from many countries show that farmers who switched from conventional irrigation (surface and sprinkler) to drip systems have reduced their water use by 30-60 %. It is expressed more crop per drop of irrigation water by FAO since decreasing and polluting water and soil resources. The use of modern/micro irrigation is not panacea but it is very important for the future and sustainability of soil and water resources. In this paper, it is discussed and evaluated the impacts of the micro irrigation systems in terms of higher yield, water saving, water and fertilizer use efficiency for various crops.

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INVESTIGATION IN TERMS OF BORON OF SOME UNDERGROUND AND SURFACE WATER SOURCES IN VICINITY OF YALOVA-TURKEY

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ABSTRACT

All plants need to boron as less quantity for their growing. There is very narrow limit between useful quantity with poison quantity of boron for plants. And this limit changes as variety and kind of plants. In this study; five different underground water and six different surface water which are selected in Altinova, Ciftlikkoy and Taskopru towns of Yalova were examined in terms of boron. Samples were collected in period of June 1999-September 2000. One replicate was taken from each of the resources in every month. The sampling was done as twice repetitive in summer months. The samples, each of 2 liters, were collected in glass bottles according to Standard Method (APHA, 1985). Results of analysis were evaluated as take into consideration classification system of Wilcox and Magistad (1943). Besides, graphics were drawn of variation of analysis results over 15 monthly period. According to the results of analysis, three underground water resources were classified as first class in terms of boron and three surface water resources were found boron as 0.0 mg L-1 . The other surface water resources were found boron respectively 0.3-0.55 and 0.4 mg L1. According to these, four surface water resources were classified first class in terms of boron and one surface water resources were classified second class as depend on irrigation water quality. In this paper; results of analysis neither were discussed suitable nor unsuitable using as irrigation water and will be use which kind of plants' in growing as relation to soil structure of research area in terms of boron of water resources which were examined. Besides, in the results of analysis were evaluated effect of geological activities in the research area.

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FARMER PROBLEMS AND THE FACTORS LIMITING AGRICULTURAL PRO DUCTION IN NORTHEAST ANATOLIA

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ABSTRACT

Having a weak linkage between agricultural research and extension activities is an important problem in Turkey. Agricultural researches determine their subject of research without knowing the exact problems of farmers, thus the results of research do not have their clients. On the other hand, extension people do not have a good connection to the results of research that has been conducted. This study aimed to determine the factors limiting agricultural production and the problems of farmers in Erzurum, Kars, Agri and Ardahan provinces of Northeast Anatolia. Determining the problem of farmers would help the researches and extension people to plan their activities in a correct direction in line with the problems faced by the farmers in the region. Farmer conversation meetings were held in total of 147 villages chosen from four type of villages (mountain, plain, mountain-plain passage and valley) in 41 districts for informal survey in 1998. At these meetings, farmers were asked about the problems they faced during agricultural production activities. Questionnaires for formal survey were prepared a ccording to the results of the first survey. Stratified random sampling method was used to determine sample size of villages and farms. Formal survey study was conducted between March and July 1999 resulting in 1116 questionnaires through face to face farmer interviews in 76 villages in Northeast Anatolia. The results of the survey revealed that the problems related to agronomy, animal health, animal diseases, insufficient production factors and socio-economic structure were ranked the first priority respectively. Problems were also classified according to the responsible institutions. It was determined that 24, 37 and 39 percent of the problems could be solved by conducting research, correct policy implementations and extension services, respectively. According to the results of the study, the first step in solving the problems of farmers should be acceleration of the technology transfer studies. There have been a lot of research studies on the shelves waiting to be conveyed to the farmers. Therefore special emphasis should be given to extension while structural deficiencies of the farms and agricultural organizations should be eliminated.

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WATER-BORNE FLUORIDE CONTENT OF SOILS AND PLANTS FROM TWO DIFFERENT AN ENDEMIC AREAS OF TURKEY: AN OVERVIEW

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ABSTRACT

In author's previous studies it was reported that the natural water samples, which have been used for drinking and irrigation, collected from the Northern (Dogubayazit) and Southern (Caldiran) part of the Tendurek Volcano had high fluoride concentrations varying from 6.5 to 12.5 ppm. and from 2.0 to 7.5 ppm. respectively. And the natural water samples also used for drinking and irrigation purposes in Kizilcaoren Village of Beylikova-Eskisehir contained high amounts of fluoride ranging between 2.1 and 8.5 ppm. Those concentrations are above the permissible level of (1.5 ppm.) standard set by the Institute of Turkish Standards. Dental and skeletal fluorosis caused by high fluoride drinking waters have already been investigated by many research workers in these endemic areas in the last decades. It was also indicated that a positive correlation was found between the water soluble fluoride levels of the soil and the plant samples which were collected around the Tendurek Volcano. So, it was concluded that in addition to the high uptake of fluoride from drinking waters, livestock grazing in these areas, ingest some fluoride from the soils and plants. On the other hand, it was suggested by the other investigators that high fluoride irrigation water did not pose any hazard to the crops grown in the Kizilcaoren Village where a small dam is being under construction to collect high fluoride waters for irrigation. Accept Caldiran Area, good quality waters have supplied to the Villages of Dogubayazit Area and the Kizilcaoren Village for drinking purposes. Dilution of fluoride rich natural waters with other suitable waters was recommended to avoid the contamination of the soils and pastures in these areas. At the same time, the some of soil factors such as pH, texture, organic matter content which are known to influence water-soluble fluorides are also discussed for sustainable use of natural resources in high water-borne fluoride areas.

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MONITORING LOSS OF AMIK LAKE AND SUSTAINABLE ECOSYSTEM MANAGEMENT IN AMIK PLAIN, TURKEY

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ABSTRACT

Increases in population, water use intensity, and droughts are putting water resources under pressure and calling for sustainable and adaptive ecosystem management strategies if escalating land use conflicts are to be avoided and environmental degradation is to be reversed. In the early 1960s, a large-scale campaign aimed at increasing the area of croplands and crop production in Amik plain of the southeastern Mediterranean region of Turkey was launched by discharging of Amik lake into Orontes river at the expense of the irreversible losses of the lake and its associated ecosystem goods and services. This study examines the causes, dynamics, and ecological consequences of this tragedy, based on the analysis of historical remotely sensed data regarding the natural history and the land-use history of the study area. Satellite images of Landsat-MSS in 1972 and Landsat-ETM 7 in 2001 are compared to determine changes in land use and land cover (LULC) through remote sensing and geographic information system (GIS). The study helps to quantify changes in LULC and their environmental impacts on ecosystems in the study area. The prospects for halting the environmental degradation and destruction, rehabilitating damaged ecosystems, and developing sustainable ecosystem management practices are explored in light of the institutional and economic constraints facing Turkey.

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USING SOIL AND WATER RESOURCES WITHOUT A PLAN AND THE PROBLEMS THIS CAUSES IN PAZAR

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ABSTRACT

Conservation and management of soil and water resources are the most important subjects in watershed management. In addition, fast-growing technology and accelerated population growth has put an increasing demand on these resources, suggesting that planning is the key to ensure the sustainability of these resources. But, there is no current plan for preserving and using of natural resources in Pazar watershed creek, which is located in the northeast of blacksea region in Turkey. Lack of plan many environmental problems in Pazar. In this paper, it was tried to determined so environmental problems (e.g: erosion, water pollution, household churn, and garbage, etc...) which appear unplanned using of water and soil resources in Pazar.

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PLACE OF THE ARABLE LAND POTENTIAL OF SOUTHEAST ANATOLIA PROJECT (GAP) IN TURKEY AND WORLD

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ABSTRACT

Southeast Anatolia Project (GAP) area is one of the richest districts in respect to natural sources in Turkey. According to the recent indicator, it involves 73,863 square km2 with 6,6 million people. As today, 20 % of I. and II. class soil is economically irrigitable and 11.8 % is cultivable (I-IV. class soil) In general, GAP soils shows some differences in respect to physical, chemical, and biological characteristics as compared to other parts of Turkey soils. Research studies showed that the area of soils is mainly unsalty, loamy, clay loamy, neutral or slightly alkaline and rich in lime contents. In considerable amount of the area, nitrogen, available phosphorus, zinc and iron deficiency are common. According to the data obtained in 2000 3,8, 5,3 and 4,7 da cultivable soil (I-IV. class) is available per head in Turkey, worldwide and GAP, respectively. Unlike the idea that has been accepted so far, 13 % less arable land (I-IV. class soil) is available per head in GAP when it compared with worldwide average. Therefore, soils of GAP should be used professionally for its purpose and characteristics. Mainly, nitrogen, phosphorus, zinc and iron should be applied with suitable fertilizers to the soil where the deficiencies become prevalent.

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EFFECTS OF LAND USE ON BIODIVERSITY IN THE EASTERN BLACK SEA REGION OF TURKEY

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ABSTRACT

The biodiversity of Turkey is deteriorating due to rapid human population growth and associated intensive or unwise utilization of natural resources and habitats. Cultivation, forestry practices and heavy grazing are some of the main reasons of decreasing biodiversity in the East Black Sea Region of Turkey. Endemism is high in this region and 386 plants are endemic to the region. Eight of the endemics are in critically endangered list of IUCN while 55 are in endangered list. Most of these critically endangered and endangered species were found in grasslands and forest openings. Also, influence of land use on biodiversity was evaluated in the region, and possible effects of conversion of the forests into cultivation on biodiversity were discussed in this paper.

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EVALUATION OF WETLANDS ALONG THE BIRD-ROADS IN NORTHEASTERN ANATOLIA

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ABSTRACT

Turkey is in the first place among the European and Middle Eastern Countries, except the Independent States Association, regarding with wetlands. Eastern Anatolia region has special importance in wetlands because of its high potential around the country. A great amount of significant bird areas is wetlands. The objective of this study was to evaluate 38 wetlands along the bird roads in the Northeastern Anatolia, in respect to size of wetland, present bird species, positive and negative effects on the local environment.

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SIGNIFICANCE OF WETLANDS IN THE CONSERVATION OF BIODIVERSITY

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ABSTRACT

The wetlands have been considered as useless, defected and unhealthy places for a considerably long time. These areas were diminished by filling up and drying for industrial improvement and urban settlement instead of using for aqua or agricultural production. The necessity of conservation of wetlands to maintain the biological sustainability and keeping was understood in the recent years. The wetlands are important areas by their rare or endemic plant species and specific animal species. In the recent years the importance of the wetlands is understood all over the world and several precautions were made and management plans were prepared besides which several international protocols were prepared and legal arrangements were made. Turkey is rich in its wetlands. According to a study made by the Ministry of Environment, Turkey has 250 wetlands with total area of 1.000.000 ha. According to international criteria a total of 18 of these wetlands are the type A and 45 of them are the type B. The wetlands of Turkey have international significance based on the geographical location. There are two main bird migration ways in Turkey. The first one is northeast-south path which comes from East Black Sea and extends to south, and the second one is northwest-south path which comes from Thrace and extends to Anatolia passing through Bosporus. The wetlands which are located on these migration routes, forms shelters and life media for birds. The environmental problems which threaten the wetlands of Turkey are; drying for agricultural activities and urban settlements, chemical pollution based on agricultural activities, tourism facilities, illegal hunting and uncontrolled cutting of rushes. In this paper, the role of the wetlands in conservation of ecological balances is referred, the problems of Turkey's wetlands are determined and alternative solutions for these problems are presented for sustainable development of wetlands.

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BASES FOR SUSTAINABLE DEVELOPMENT IN ALCANIZ, SPAIN.

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ABSTRACT

The aim of this study is to prepare a development plan of achieving sustainability in the county of Alcaniz, which is the administrative centre of the county of Bajo Aragon of Northeast Spain. The maintenance of natural heritages; lack of environmental awareness, and the alternation of the dynamics of several ecosystems are of special importance in the area. The climate is Mediterranean with a clear continental influence, characterized by scarce precipitation and low winter temperatures. The soils show varying levels of salinizations resulting from the geology and geomorphology of the area. In the Alcaniz, the active group of population is between 20 to 64 ages, which has given rise to a service economy. Agriculture continues to its important role thanks to irrigation and the quality of production assurance labels. After actual land use units were determined to put forward the problem and land production potentials, social and environmental suggestions for sustainable management of natural recourses were made for Alcaniz in this study.

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EXCESSIVE SNOW FALLS OCCURED IN ERZURUM BETWEEN 28-29 OCTOBER 2003 AND THE PROBLEMS CAUSED

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ABSTRACT

There is no doubt that snow fall and other meteorological events are beneficial for the environment and the human beings if they happen in normal dimensions and also in their expected seasons. However, excessive or less snow falls may cause some unexpected natural disasters. As well known, snow fall in October in Northern Anatolia region is a normal case. However, the rain fall started in the Tuesday of 28th October 2003 at about 13 00 and then turned into snow fall towards to the evening continued about 24 hours and the snow height reached about 15 cm in places. It was determined that 53 kg of precipitation has fallen to per square meter during this time, while average precipitation to per square meter is 37 kg per months according to the 61 years of statistics recorded from 1929-90. As it could be understood from this statistics, the precipitation occurred in Erzurum during these two days is well above the averages. This caused several problems in Erzurum and surroundings such as power cuts, closing of the roads, problems in water supply and communications and the fall of trees and the pillars (masts) of power supply lines. All these problems, which could be called as a natural disaster, caused to death of three citizens, and also about three trillions TL of economic loss. This study investigates this disaster in detail.

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FARMERS PARTICIPATORY SOIL FERTILITY MAPPING AND NUTRIENT MANAGEMENT FOR RICE

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ABSTRACT

Food security in Bangladesh is largely dependent upon the land productivity of the smallholders who face difficult challenges in maintaining the fertility of their soils. The introduction of high yielding varieties and increasing cropping intensity increased nutrient mining from soil. Poor understanding of soil fertility levels in the farmers' fields limits fertilizer management decision. Because of tremendous variation in small holders' plots, appropriate fertilizer recommendation often not possible based on soil test results. The study was conducted in twelve villages of Habiganj and Moulvibazar districts in Bangladesh for soil fertility mapping and . In each village, twenty farmers were selected for participatory rural appraisal with the emphasis on soil fertility mapping and nutrient management purposes. Soil samples were collected from each village with the active participation of the villagers following the soil fertility map prepared by the farmers. Improved fertilizer package (IP), was demonstrated based on soil fertility maps in 12 villages under 3 thanas. The IP was decided based on soil test values and farmers' opinion, which was compared with the farmers' practice (FP) in 8-10 farmers' fields in each test villages. Plant growth was monitored regularly, plant height, tiller/hill was measured at every 15 days from transplanting to maturity. The soil test results for organic carbon and total N agreed very well with the farmers' soil fertility perception, however, available P and exchangeable K in some cases deviated from the farmers' fertility gradients. The application of IP fertilizer doses increased rice yield significantly.

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THE EFFECTS OF THE GENETICALLY MODIFIED ORGANISIMS ON THE ENVIRONMENT

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ABSTRACT

GMO's, "organisms that have been modified by the insertion of DNA by human, intention have several negative effects on the environment. These are mainly decrease in the biodiversity, corruption of plant species sociology depend on the gene flow from GMO crops to wild types. Appear of the superweeds related with pollunation from GMO's exacerbating the effects of existing pests through hybridization with related GE plants or animals,harm to non-target species (such as soil organisms, non-pest insects, birds and other animals), disruptive effects on biotic communities, irreparable loss or changes in species diversity and genetic diversity within a species, to accumulate of the GMO's genes in the soil and aquatic ecosystems and risks in the human and animal health.The DNA can be from a foreign organism, from the same organism or it may be a sequence synthesized in a laboratory. GMOs are "made with techniques that alter the moleculer or cell biology of an organism by means that are not possible under natural conditions or processes. "GMO's used in the agricultural biotechnology, medicine and bioremediation for the cleaning of polluted ecosystem. The large biotechnology companies are the ones who benefit from the production of GE crops, and have a vested interest in selling their products to the world. They are taking steps to make farmers more dependent on their seeds and chemicals through such developments as Terminator and Traitor technologies. Terminator technology renders crops sterile after one growing season. Traitor technology makes crops "commit suicide" unless the farmer sprays a particular chemical on them. Certainly the developers of these products are not putting farmers first. Also, there are many uncertainties over long-term ecological consequences of using genetic engineering in agriculture. Little is known about the impacts of transgenic plants and micro-organisms on soil biota and processes, despite the large number of field releases of transgenic crops. Despite difficulties with the interpretation of experimental results, the occurrence of some ecological perturbations induced by GMOs suggests that until methods and theories for establishing ecological significance are developed and verified, the potential ecological impacts of GMOs released into the environment will need to be evaluated on a case by case basis. The frequency of reports of detectable changes in soil biota is perhaps somewhat unexpected, given that research into this area has only recently begun. The long-term implications of these changes in soil must be assessed.

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EFFECTS OF THREE FUNGICIDES ON SOIL MICROBIAL ACTIVITY AND NITROGEN DYNAMICS

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ABSTRACT

The use of fungicides in agriculture, to protect plants from soil borne pathogens is a common practice. However there is a dearth of information on the side effects of fungicides on key soil ecological process. We investigated the effects of three fungicides Captan, Quintozene, Propamocarb Hydrocloride on soil microbial activity (urease, catalase, net mineralization and soil respiration) in laboratory experiment. In each laboratory batch incubation, soil was treated with a fungicide at approximately recommended field application rates and as a fould and incubated at 27oC for 40 days at a moisture level of field capacity. The fungicides inhibited net mineralization and nitrification at generally 4th and 8th days of incubation period. Soil respiration showed fluctuations with change in the dose and kind of fungicides added. Effect of the fungicides on catalase activity was not found statistically significant during incubation. Urease activity was significantly affected from the fungicides ($p<0.05$).

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ISOLATION OF PUTATIVE ANTAGONIST BACTERIAL AND YEAST ISOLATES FROM THE SOILS OF AMIK PLAIN AND IN VITRO SCREENING FOR ANTAGONISTIC POTENTIALS AGAINST FUNGAL PLANT PATHOGENS

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ABSTRACT

By use of selective media, putative antagonist bacterial and yeast isolates were isolated from 29 rhizosphere-associated soils sampled collected from different parts of Amik Plain, located in the Eastern Mediterranean region of Turkey. The number of bacterial and yeast isolates varied according the soil characteristics. Potential antagonists were selected randomly from the single colony present on different agar plates such that representative organisms from all colony and morphological types present. Isolates to be tested were chosen in approximate proportion to their abundance on the plates. Selected 131 bacterial and yeast isolates were screened for in vitro antagonism towards two important soilborne root infecting plant pathogens, Sclerotinia sclerotiorum and Rhizoctonia solani by using dual culture test. From this test, significant numbers of bacterial isolates, but not the yeast, were found to produce inhibition zones by inhibiting the hyphal growth of fungal pathogens to a varying degree. On the basis of the result obtained from the preliminary screening test, isolates belonging to Bacillus spp, Pseudomonas spp found to be highly efficient against fungal pathogens used in the experiment. This study indicates that selected bacterial strain have potential for controlling of soilborne disease agents. Further studies are in progress with the aims of identification of most active isolates into species level, the mechanism(s) involved in fungal growth suppression in vitro conditions and their possible use in greenhouse and/or field conditions.

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EFFECTS OF LAND DEGRADATION ON SOIL MICROBIAL BIOMASS IN A HILLY AREA OF SOUTH SUMATRA, INDONESIA

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ABSTRACT

We investigated the impact of land-use changes on the soil biomass at several soil sites in Indonesia under different types of land-use (primary forest, secondary forest, coffee plantation, traditional orchard and deforested area), located within a small geographical area with similar parent material and climatic conditions. Various parameters of soil microbial biomass, (biomass C, biomass N, content of anthrone-reactive carbohydrate carbon and soil ergosterol content) were examined. Our results suggested that the removal of the natural plant cover did not cause any appreciable decrease in the amount of microbial biomass; on the contrary it led to a short-time increase in the amount of microbial biomass which may be due to the availability of readily decomposable dead roots and higher sensitivity to the decomposition of residual litter in recently deforested soils. However, the amount of microbial biomass tended to decrease in proportion to the duration of the land history in coffee plantation soils. This may be ascribed to the effect of the loss of available substrates associated with soil erosion in the long term. Lower ergosterol contents in recently deforested areas reflected a reduction in the amount of fungal biomass which may be due to the destruction of the hyphal network by the slash and burn practice. On the other hand, the higher soil ergosterol content at the sites under bush regrowth indicated that microbial biomass was able to recover rapidly with the occurrence of a new plant cover.

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EFFECT OF CADMIUM, ZINC, COPPER AND FLUORANTHENE ON SOIL BACTERIA

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ABSTRACT

Negative effects of heavy metals on soil microorganisms have been proven in many investigations but until now, no studies have been published that have investigated the combination effects of heavy metals and polyaromatic hydrocarbons in soil. In this study, the effects of (1) cadmium (Cd), Copper (Cu), Zinc (Zn), and flouranthene (FLA), separately applied, and (2) combinations of one of these heavy metals with FLA on the growth of soil bacteria were assessed in a 90-day soil incubation experiment. The total bacterial population was significantly ($P<0.05$) lower with the addition of 50 and 150 mg Cd l-1, Zn, and Cu alone and combination with 75 and 150 mg FLA l-1 than in the control during the incubation period. When 50 mg l-1 Cd, Zn, and Cu was added with alone and in combination with FLA reduced the number of bacterial colonies. Combinations of 50 mg Cd l-1, 50 mg Znl-1, and 50 mg Cul-1 with 75 and 150 mg FLA l-1 reduced the number of bacterial colonies despite separate of pollutants being ineffective. Significant reductions of bacterial growth were also obtained for the combinations of 150 mg Cd l-1, 150 mg Znl-1, and 150 mg Cul-1 with 75 and 150 mg FLA l-1 until the 45 days of experiment. However, the reduction of bacterial growth was not enhanced by FLA after application of higher concentrations (150 mg l-1) of heavy metals in the second period of incubation. It can be concluded from our incubation experiment that FLA may enhance the toxicity of low concentrations of heavy metals (50 mg l-1) to soil bacteria. Considering the low solubility of most PAHs and their strong adsorption to organic material, it seems that deleterious effects of heavy metals will be enhanced by the presence of PAHs in soil.

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THE VARIATIONS OF ENZYME ACTIVITIES AND MICROBIAL POPULA TIONS OF SOIL BY CRUDE OIL SPILLAGE

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ABSTRACT

A field experiment lasting 90 days including the amendment of crued oil with and without manure was carried out in the soils of Gumuskonak Area, Eskisehir. The aim of our study was to monitor the effects of oil pollution on culturable bacteria and actinomycetes and some soil enzymes as well. Crude oil in different doses was applied to 12 experimental plots designed with and without manure amendments. In the first, second and third months of the field experiment, numbers of bacteria and actinomycetes, urease, alkaline-phosphatase, b-glucosidase, aryl-sulphatase, and catalase enzyme activities were determined in the soil samples collected from different plots under different amendments. Our results indicated that ninety days after the crude oil amendment, the total number of culturable bacteria cfu/g in the oil amended soils was higher than in the control soil. The numbers of actinomycetes decreased in control soils and low doses of oil with and without manure through the time. But the number of actinomycetes increased at the addition of the last three doses (P3, P4 and P5) in the oil amended soil with and without manure during 90 days ($P>0.05$). Although urease activity decreased with increasing loading rates in the oil amended soils during 90 days ($P>0.05$), urease activity in the oil amended soils was higher than in the control soils. Alkaline phosphatase activity in the presence of manure was much lower than in the oil amended soils at the end of the field experiment even though it was much higher during the first two months. b-glucosidase activity increased with increasing loading rates in the oil amended soils during 60 days. However, it was decreased with increasing loading rates in the oil amended soils in 90 days. Aryl-sulphates activity decreased in the highest dose of oil in 30 days however, at the end of the field experiment there were no significant differences between control and all of the doses. Catalase activity decreased with increasing loading rates in the oil amended soils with and without manure during 60 days ($P>0.05$). At the end of the field experiment catalase activity was low at the high oil contents but stimulated with decreasing oil content.

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THE EFFECT OF SOME COMMERCIAL ORGANIC PREPARATIONS ON SOIL MICROBIAL POPULATION UNDER ORGANICALLY GROWN TOMATO AND CUCUMBER

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ABSTRACT

Different commercial organic preparations are available in the market to improve soil fertility in organic farming systems. The objective of this work was to determine whether the preparations of E2001 and Allgrow Bioplasma affect the soil microbial population in tomato and cucumber crops managed by organic practices under greenhouse conditions. The research was conducted as an on-farm trial during autumn and spring seasons of 2000-2001. Four organic fertilizer applications were composted of farmyard manure, 30 tons.ha-1 + E2001 + Allgrow Bioplasma; farmyard manure, 50 tons.ha-1; chicken manure, 30 tons.ha-1 + E2001 + Allgrow Bioplasma; chicken manure, 50 tons.ha-1. Soil samples were taken on at least three dates during the growing seasons of both crops. According to the results; in autumn season organic preparations negatively affected the counts of bacteria, fungi and Azotobacter in the soil grown tomato. In spring season, bacterial population was stimulated by organic preparation applications, but increases were not determined neither in azotobacter counts nor in fungus.

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THE EFFECTS OF FLOTATION WASTE APPLICATIONS ON MICROBIOLOGICAL ACTIVITY CRITERIA, FUNGI AND AZOTOBACTER NUMBERS OF SOILS

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ABSTRACT

In this study, in trial fields of Agricultural Faculty of Akdeniz University in Antalya Area, four different flotation waste doses were applied to soils (A1=12 kg, A2=24 kg, A3=36 kg, A4=60 kg flotation waste / parcel) and effects of flotation waste applications on microbiological activity criteria such as microbial biomass, CO2- production, dehydrogenase enzyme activity , fungi and azotobacter numbers of soils were examined. Soil samples were taken in three different periods (5. week, 10. week and 38. week) during experiment and then physical, chemical, microbiological and biochemical analyses were done in laboratory conditions and depend on finding values results were estimated. According to the results, four different flotation doses didn't negatively effect azotobacter and fungi numbers in soils. However, one of the microbiological activity criteria, microbial biomass increased only in fifty weeks but decreased in 10. and 38. weeks compared to control. When 3 periods result compared with control, a certain decrease is determined on DHG- enzym activity values.

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DETERMINATION OF DIFFERENT GROWTH MEDIA AND VARIOUS MYCORRHIZAE SPECIES ON CITRUS GROWTH IN THE MEDITERRANEAN COAST

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ABSTRACT

Citrus cultivation is expected to expand in the Cukurova Region (East Mediterranean coast of Turkey). Nevertheless, the soils of the region are low in available P, Zn, Fe and Mn, due to the high levels of clay, lime and pH. However, with increasing fertilizer use, soils lose are increasing and their production potential is decreasing each year, both human health and natural life are affected negatively by this situation. Plants in this context are inoculated with mycorrhizae to increase the availability of plant nutritions. Citrus plants have shown different responses with different mycorrhizae species. Citrus plants depend on mycorrhizae infections that have been determined by experiments. It is essential to inoculate citrus seedling with mycorrhizae before sowing. The aim of this work was to screen and select the most suitable arbuscular mycorrhizae (AM) in several growth materials for enhancing citrus growth by improving nutrient uptake. The studies were carried out in a glasshouse at the Department of Soil Science, Cukurova University, Adana, Turkey. Three separate experiments were done in this work. In first experiment, several mycorrhizal species were tested with several level of compost and rock phosphate. It has been found that mycorrhizal inoculation significantly increased plant growth. In another group of experiments, several growth medias were tested with several mycorrhizal species and their interaction. In one experiment (Experiment I-1998) two different growth media were used and seven mycorrhizae species and their interactions were tested. Generally, mycorrhizae species and their interactions have shown different reactions. However, some of the mycorrhizae species are most effective than the other species. In the GM1 (Growth Media 1), it has been found that G.(Glomus) mosseae * G. clarium interaction and in the GM2 (Growth Media 2) is the best inoculation and growth medium. Also it has been shown that in the GM1, citrus plant growths are much better than in the GM2. In another experiment (Experiment II-2000), four different growth media have been tested with ten mycorrhizae species. The results revealed that the GMC (Andezite tuff + Peat + Compost) was the most effective and suitable for citrus seedling growth. Generally, it has been observed that various mycorrhizae species have indicated different responses in all growth media, also it has been observed that G. clarium, G. margarita and Dr. Kindom are the best mycorrhizae species for citrus seedling growth. In another experiment effect of rock phosphate and several mycorrhizae species were tested in order to determine the best mycorrhizae species for common soil series in Mediterranean area. It has been concluded that G. clarium is one of the best spores for citrus plants in coastal area of the Mediterranean.

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EFFECTS of INOCULATION WITH PURE and MIXED CULTURE ISOLATES on DRY MATTER and PROTEIN CONTENTS of BEANS (Phaseolus vulgaris)

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ABSTRACT

The objective of this study was to determine the effects of inoculation with pure and mixed culture isolates on dry matter and protein contents of beans (Phaseolus vulgaris) in greenhouse conditions. Soil samples taken from 0-20 cm depth were sterilized and put in pots. Six kgda-1 P2O5 (TSP; 40-46 % P2O5), and 5 kgda-1 K2O (K2SO4; 50-53 % K2O) were applied to all pots and additionally 5 kgda-1 N (urea; 45 % N) was added to nitrogen application. Soils in pots were inoculated by microbial fertilizer (Rhizobium leguminosarum Ciat 899, and Azotobacter sp. isolates) and different doses of nitrogen (0, 5 kg da-1 N, Ure fertilizer) fertilizer on non inoculation, inoculation and nitrogen application. During the growing period, soil moisture content was kept on field capacity. After two months, crops were harvested, dried and analyzed for dry matter, total nitrogen and protein contents of plants. Results indicated that amount of dry matter, total nitrogen and protein contents of plants increased with microbial inoculation. Furthermore, dry matter and protein content of plants had been observed high level in inoculation with mixed culture isolates than pure culture isolates.

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EFFECTS OF PHOSPHORUS SOLUBILIZING BACTERIA (Bacillus M-13) AND GROWING MEADIA ON GROWING PERFORMANCE AND MINERAL CONTENTS OF CORN PLANT (Zea Mays L.)

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ABSTRACT

This study was undertaken to effect of added phosphor solubilizing bacteria on the solubilization of phosphate solubilizing ability and its interaction with different growth media growing performance and mineral contents of on corn plant (Zea Mays L.). Growth media volume (100%, 75%, 50% and 25%) was consisting of soil, peat, perlite, sand and zeolite. Plants growth performance and mineral contents was affected by phosphor solubilizing bacteria and growth media.

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THE EFFECT OF INDIGENOUS AND SELECTED MYCORRHIZAL INOCULATION ON WHEAT GROWTH AND NUTRIENT UPTAKE UNDER METIL BROMID DISINFECTED AND NON-DISINFECTED FIELD SOIL CONDITIONS

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ABSTRACT

Since pasturing soil have high number of indigenous mycorrhizae spores, it has been hypothesized that mycorrhizae spores rich soil inoculation can significantly contribute to the plant growth. In order to test this hypothesis a field experiment was conducted for two years. Methyl bromide disinfected and non-disinfected field soils were inoculated with and without indigenous and selected mycorrhizal inoculation.The experiment was conducted on the Arik soil series which is located in the research farm of Soil Science Department, Faculty of Agriculture, University of Cukurova (Eastern Mediterranean Region, Turkey) in the years of 1999 and 2000. Soil plots also received phosphorus (0 and 50 kg P2O5/ha) as TSP. All the plots were also fertilized with nitrogen as NH4NO3 (160 kg N/ha). According to number of spores in the natural soil 3000 kg/ha pasturing soil were applied to the indigenous soil plots. For selected mycorrhizae also cocktail mycorrhizae was used on mycorrhizal plots. The results have revealed that in first year experiment the wheat yield under fumigated plots were better than in non-fumigated plots. Also mycorrhizae application increased wheat yield. In the second year experiment selected cocktail mycorrhizae inoculation increased the yield. For both years shoot and seed nutrient contents were determined for P and Zn and it has been found that mycorrhizae can contribute to the nutrient uptake.

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IMPACT OF ORGANIC AND CONVENTIONAL FARMING SYSTEMS ON SOIL MICROBIAL BIOMASS AND ACTIVITY

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ABSTRACT

Microbial biomass and activity were compared in a vineyard managed by organic and conventional farming systems. The experiment was carried out on the soils from the plots of a long-term vineyard at Salihli, that was started in 2000 to compare different agricultural systems regarding yield, product quality and soil properties. One parcel was managed in an organic system and the adjacent in a conventional. Soil samples were taken at the depths of 0-20 cm and 20-40 cm in May and September for 3 years (2000, 2001 and 2002) corresponding to the beginning of the growth period and the harvest. Results showed that soil respiration, microbial biomass, N-mineralization and the activities of protease, urease and phosphatase were significantly higher in the organic system. In this system, soil respiration, microbial biomass and enzyme activity at 0-20 cm soil depth increased during 3 years but decreased in conventional system. In 2002, all the microbiological parameters studied at 0-20 cm soil depth increased over 100 % in organic system compared to conventional system. Correlation analyses indicated significant positive relationships between soil organic matter (SOM) and soil respiration, microbial biomass, N-mineralization and the enzyme activities. Our results revealed that organic management in vineyard significantly increased biological activity in three years.

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EFFECTS on ORGANIC AND CHEMICAL FERTILIZERS on YIELD AND YIELD PARAMETERS of BEANS (Phaseolus vulgaris) (Aras 98, Yakutiye 98)

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ABSTRACT

The objective of this study was to determine the effects of organic (farmyard manure and M3 phosphorus bacteria) and chemical fertilizers (DAP, TSP) on yield and yield parameters of beans (Phaseolus vulgaris) (Aras 98, Yakutiye 98) in field conditions. Farmyard manure as DAP (46% P2O5) and TSP (44% P2O5) were applied with ratio of 3-6 kgda-1 P2O5, farmyard manure ratio of 3-5 kgda-1 N and M3 bacteria with ratio of 1,2 x 10 7cell/ml to the parcels with a size of 4 m x 2.4 m. Five kgda-1 K2O (K2SO4; 50-53 % K2O) and 5 kgda-1 N (urea; 45 % N) were applied to all parcel as basis manure. During the growing periods plants were irrigated three times (at the beginning of flowering, at the middle of flowering and at the end of flowering). During the vegetation period yield parameters including emergence time, %50 flowering day period (anthesis), length of the plant, number of brash per plant, number of legume per plant, maturation time were obtained. After the harvest, yielding at the parcel and weight of the 100 grain were also obtained. Results indicated that farmyard manure application increased yield on compared to the chemical and microbial fertilizers (M3). Significant relationships were determined between fertilizer variety and yield parameters measured.

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GENESIS AND TAXONOMIC CLASSIFICATION OF YENICAGA - BOLU ORGANIC SOILS

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ABSTRACT

The objective of this research was to investigate the morphology, genesis and classification of Histosols formed on depression and flat land around Lake Yenicaga, affected by tectonic and karstic occurrences, in the West Black Sea Region. The study selected area is located between Bolu Plain and Gerede Town with altitude of 991 m above mean sea level and it's deepest point is 10 m. In the study area, the climate is cold and rainy. The average annual precipitation and temperature are 538 mm and 10.2 oC, respectively. Organic soils in the study area are formed in eutrophic conditions. After a topographic study and land observations which were done with random grid method and auger, four profiles were located and excavated in the study area. Organic soil samples were taken from the different horizons from each profile for laboratory analyses. According to laboratory and taken into account the Soil Taxonomy (1999), the organic soils were classified as Hemic medifibrist, Typic medifibrist and Hydric medifibrist.

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THE EFFECTS OF THE SOME PARENT MATERIALS ON PEDOGENESIS

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ABSTRACT

The objective of this study was to investigate the effects of the different parent materials on the morphology, genetic ratios, and active CaCO3 contents of soils. Three soil pedons of the each serpentine, limestone, and basalt parent materials formed under the similar climate, topography, and vegetation were studied. All soils had A, B, and C horizons. The soils developed on the basalt parent material had the deepest soil, whereas the soils developed on the limestone and serpentine parent materials had moderate and the shallowest soil depth, respectively. The total CaCO3 of the soils developed on the serpentine and basalt parent materials were found to be in the active CaCO3 forms, while the active CaCO3 content was 50% of the total CaCO3 in the limestone parent material. According to the results of the total chemical analyses, the silica accumulation was not significant in the soil profiles. No differences were found for the activity and solubility of silica, aluminum, and iron among the limestone, serpentine, and basalt parent materials. The soil developed on the limestone had the lowest b and bII leaching factors, whereas the soils developed on the basalt had moderate b and highest bII, and serpentine had the moderate bII and the highest b values. The activities of alkali elements in the soil profiles were found to be significantly different among the three parent materials. Overall, the morphology, genetic ratios and the active CaCO3 properties of soils were significantly different among the three parent materials under dry climatic conditions.

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CLASSIFICATION OF SOILS OF SANLIURFA IN SOIL TAXONOMY, FAO/UNESCO AND WRB CLASSIFICATION SYSTEMS

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ABSTRACT

Soils of Sanliurfa city were classified in Soil Taxonomy, WRB, and FAO/UNESCO classification systems using geographic information system (GIS). Sanliurfa city situated in the Southeastern East Anatolia Region (GAP) with area of 19615 square km. In order to form database for classification, the soil map of Sanliurfa, scaled in 1:100,000, was scanned and digitized. The soils map of Sanliurfa city, published in 1995, had not prepared in series level, however, map contains some information such as soil mapping unit (SMU), soil typological unit (STU) and other attributes can be evaluate to classify soils in different classification systems. Information was analyzed in GIS media to classify soils of Sanliurfa in Soil Taxonomy, WRB, and FAO/UNESCO classification systems. Soils of Sanliurfa were classified as Entisols, Inceptisols, Aridisols and Vertisols in Soil Taxonomy; Fluvisols, Leptosols, Cambisols, Calcisols, Vertisols, Solonchak in WRB; Fluvisols, Leptosols, Cambisols, Calcisols, Vertisols and Solonchak in FAO/UNESCO classification systems.

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GENESIS AND CLASSIFICATION OF VERTISOLS AFFECTED BY ANTHRIC SATURATION IN THE COASTAL PLAIN OF MID-BLACK SEA REGION, TURKEY

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ABSTRACT

Vertisols are among the best rice growing soils as they are easily puddled due to having high swelling clay content. Vertisols under intensive human activity are not addressed and classified by Soil Taxonomy. We studied Vertisols in the coastal plain of mid-Black Sea region, Turkey, in order to (i) characterize morphological, chemical, physical and mineralogical properties of Etyemezler series (fine, smectitic, active, mesic Ustic Epiaquerts), (ii) investigate the effects of Anthric saturation on the genesis of Vertisols, and (iii) discuss the classification of Aquerts with anthric saturation. Three pedons, affected by rice cultivation, were described and characterized. The soils studied were deep, calcareous, clayey, and dark grey to greyish brown in colour, and met the criteria for Aquert suborder of Vertisols in Soil Taxonomy. Due to the very high clay content of upper sola and intensive agricultural practices which caused the saturation of soils approximately 5 consecutive months, soil profiles were reduced and coloured grey. Slickensides were observed at 40 cm depth and extend to the depth of sandy textured marine deposits. Due to change in parent material, texture abruptly changed in the sola. Depth to carbonate occurred quite similar to the depth of the abrupt textural change in all the pedons studied. Clay fractions were dominated by smectite especially in the upper of the soil profile. Soils had a coefficient of linear extensibility (COLE) greater than 0.07 cm cm-1 in the sola. Results indicated that anthric saturation played an important role on the formation of Etyemezler series. Therefore, we suggest that Anthric saturation needs to be considered in the classification of aquic Vertisols by Soil Taxonomy.

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PROFILE DEVELOPMENTS AND SOME PROPERTIES OF VERTISOLS FORMED ON DIFFERENT PHYSIOGRAPHIC UNITS

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ABSTRACT

Vertisols are described by Glossary of Soil Science Terms as "mineral soils that have 30% or more clay, deep wide cracks when dry, and either gilgai microrelief, intersecting slickenside or wedge-shaped structural aggregates tilted at an angle from the horizon. It was added as an order in the US system of soil taxonomy. Vertisols cover about 3.16 million km2 in the world and, 1.650.893 hectare areas (2.21%) in Turkey. In this research properties of Vertisols that were formed on different physiographic units and different parent materials, were investigated. In this research two different soil profiles, were investigated. The first one has been formed on delta plain and the second one on lake terrace in Canakkale. Thickness of A horizons were 56 cm, 70 cm; clay contents were between 63-71% and 42-47 %; and soil organic carbon (SOC) contents were between 2.88-0.18 % and 1.35-0.38% in profiles 1 and 2 respectively. The profile formed on delta (pofile 1) was classified as Aquic Haploxererts and other profile (2) was classified as Typic Haploxererts.

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ANDIC SOIL PROPERTIES OF SELECTIVE SOILS IN TURKEY DERIVED FROM VOLCANIC ASH

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ABSTRACT

In this study, Andic soil properties of soils derived from volcanic ash in Turkey were investigated. Seven soil profiles (3 from Nevsehir and 1 from Kayseri located in Central Anatolia Region; 2 from Nemrut in Eastern Anatolia Region and 1 from Delihalil in Mediterranean Region) were defined and samples were collected according to horizons distribution. Physical, chemical and mineralogical analyses were under taken. The results showed that, amount of sand and coarse silt (2-0,02 mm) fractions is higher than 30% and amount of volcanic glass is also higher than 30% for all samples. The bulk density is 0,89 gr/cm3 in C1 horizon only for Nevsehir1 profile, but it is higher than 0,90 gr/cm3 for all other profiles. Phosphate retention is higher than 85% for the all other horizons for Nevsehir1, 2, 3, Kayseri and Nemrut1 profile. On the other hand, phosphate retention is higher than 25% for Nemrut2 and Delihalil profile. The Al+1/2Fe percentages (by ammonium oxalate) is 0,4% or higher in BC horizon of Kayseri profile when content of volcanic glass is 30% or over. The Al+1/2Fe percentages (by ammonium oxalate) is 0,4% or higher in AB, Bw1 and Bw2 horizons of Delihalil profile when content of volcanic glass is 5% or higher.

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DETERMINING URBANIZATION DEVELOPMENT AND ITS ADVERS EFFECT ON SOILS OF THE ALLUVIAL PLAINS AT THE BURSA PROVINCE USING MULTI-DATE SATELLITE DATA

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ABSTRACT

Rapid population growth and urbanization due to industrialization have been caused to destruction of the fertile agricultural soil in the alluvial plains of the Bursa Province. In such way, using types of thousands hectare of the fertile agricultural lands changed into irreversible form and went out to agriculture in the last 25 years. That's why, determination of the urbanization development and its negative effect on agricultural lands due to settlement and industry has been chosen for the subject of the study at the alluvial plains of the Bursa province. The main objective was to investigate multi-temporal urbanization development and agricultural land losses using by remote sensing and geographic information system. Landsat-5 TM (in 1984) and Landsat-5 TM (in 1998) remotely sensed data, soil maps and topographical maps were used for this aim. The sub scenes covering the urbanized area of the alluvial plains which are namely Bursa, Mustafakemalpasa, Karacabey, Yenisehir and Inegol plains of the Bursa Province were extracted from the full frame images. Geometric correction, image enhancement were applied for the better visual interpretation and exact image on map overlay. Boundary of the built-up areas in the alluvial plains was produced from visually interpreted images by on-screen digitizing procedure. The results reveal that the development of the urbanized areas in the alluvial plains of the Bursa Province have been mainly occurred in most productive agricultural lands which have land capability classes I and II.

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SOILS OF THE ULUDAG UNIVERSITY CAMPUS AREA, THEIR GENESIS AND CLASSIFICATION

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ABSTRACT

Most of the soils of the Uludag University (U.U.) Campus area are formed on neogene clays, lime deposits and some is formed on quaternary alluvium. In the research area, 25 soil series formed on 4 different physiographic units, were identified and sampled based on horizon base. 114 disturbed and 41 undisturbed soil samples were taken to investigate for their physical and chemical properties at the laboratory. Problems related to salinity and alkalinity were not found in the study area. The cation exchange capacity was very high and ranged from 4.83 to 65.02 cmol.kg-1. The base saturation percentage was high, often close to 100 percent, with the Ca++ and Mg++ occupying more than 90 percent of the exchange sites. The soil reaction varied from weak acid to weak alkaline and pH values ranged from 6.20 to 7.94. The CaCO3 equivalent increased with the depth from 0.15 % for the surface horizon of the Dikilitas series to 79.45 % for the subsurface horizon of the Gorukle series. Organic matter contents were generally low, decreased with the depth, and varied between 0.12 % and 2.76 %. On the basis of morphological physicochemical analysis, soil profiles were classified as Entisol, Inceptisol, Mollisol and Vertisol according to Soil Taxonomy (Soil Survey Staff, 1975 and 1999) and in the units of Eutric Vertisol, Eutric Leptosol, Calcaric Regesol, Calcaric Fluvisol, Eutric Cambisol, Calcaric Cambisol and Calcaric Phaeozem according to FAO/Unesco (1974 and 1990) classification systems. The agricultural potential of the soils were found to be limited due to high clay and CaCO3 contents, steep slopes and shallowness of the subsurface horizon.

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SOME PROPERTIES OF RED-REDISH COLORED SOILS AND NEIGHBOR SOIL ASSOCIATIONS IN ISPARTA-TURKEY

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ABSTRACT

The aims of this study were (i) to determine some physical and chemical properties of red-reddish colored soils and neighbor soil associations, and (ii) to describe relationships between soil color and soil properties. In this study, eighty soil samples collected from A and B horizons in agricultural lands in Isparta-Turkey were used. Sampled soils were red-reddish colored or their neighbor soil associations. Soil samples were analyzed for lime, organic matter, free iron oxide, pH, CEC, particle size distribution. In addition, color properties of soil samples were determined. The dominate hue, is 2.5YR or 5YR on more stabile and older geomorphic surface and under more oxidized drainage conditions and, is 7.5YR on erosion and transportation surfaces. The hue of 10YR was observed on all landscape positions and under all drainage conditions. It were found that there were significant differences in relation to redness rating, free iron oxides and lime contents of soils that have different hue. Meaningful differences were not obtained for CEC, organic matter, clay, and silt and sand contents of soils. In addition these results, the significant correlation coefficients were obtained between RR and free iron oxide as 0.76**, hue and free iron oxide as -0.68** and, lime and dry value as 0.68**.

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COMPARISION OF SOIL PROPERTIES IN SOILS FORMED FROM SAME PARENT MATERIAL ON DIFFERENT PHYSIOGRAPHIC LAND GROUPS

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ABSTRACT

The objective of this study was to compare some physical, chemical and morphological properties of soils formed from the same parent material on different physiographic land groups. Soils formed on volcanic and limestone parent material were separated into summit, middle slope and bottom slope areas. Four soil profiles were opened in every physiographic position, and sampled for evaluation. Results indicated that degree of soil formation varied depending on parent material and topographic features.

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CHANGES IN SOIL POPERTIES WITH ALTITUTE IN SEMI-ARID CLIMATES

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ABSTRACT

This study was undertaken to investigate differences in soil properties depending on altitude under semi-arid climate conditions. Climatic parameters especially snow cover changed with altitude in the study area. Soil physical, chemical and morphological properties were compared on profiles opened in different altitudes with similar topographic characteristics. Results indicated that measured properties are highly dependent on altitude.

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PHYSICAL LAND EVALUATION OF SALIHLI RIGHT COAST IRRIGATION AREA

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ABSTRACT

In this research, physical land evaluation of the Salihli right cost irrigation area was studied. All of the study area soils, totally 10.714,7 ha, formed on alluvial parent material, deposited by Gediz River. On these alluvial units, 18 different soil series, belong to Inceptisols and Entisols were determined and described. ILSEN computer program was used for land evaluation study. Study area soils were evaluated for 21 different land use types, which were grouped into 5 major land use groups as crop plants (6), orchards and wine yards (7), vegetables (4), forage crops (3) and pasture (1). As a result of land use evaluation, Potential Land Use Planning and Agricultural Land Use Suitability maps were generated. Suitability Map for Agricultural Uses results showed that 10.0% of the study area soils was not suitable for agricultural uses. Distribution of the relatively good agricultural lands, problematic agricultural lands, and restricted agricultural lands were 9.2%, 22.9%, and 57.9% respectively. Because of the plant growth limiting soil factors such as salinity, alkalinity, shallow soil depth, heavy or very coarse sub soil texture classes, etc., first class agricultural lands were not determined in the study area.

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THE EFFECTS OF CULTIVATION ON THE SOIL GENESIS FROM A TRANSITION CLIMATE OF TURKEY

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ABSTRACT

Intensive tillage practices for crop production have great influence on soils formation and differentiation. Four soil profiles, uncultivated and cultivated land located in Kazova Plain of Tokat, Turkey, were examined in this study to determine the effect of soil management practices on soil physical, chemical, morphological features. Soils were developed in an alluvium over lacustrine material. The locations of pits studied were selected based on the distance from the coasts of ancient lake and profiles were excavated two from native pasture (never been cultivated) and the other two from cultivated field. Soil profiles located closer to the coast had a gleyic horizon nearer to the surfaces as compared to that of further profiles. All soils studied exhibited redoximorphic features throughout the soil profiles. Soil moisture contents of cultivated lands were higher than that of pasture field soils. Soluble salts content is increased at about 90 cm depth in cultivated land while in pastures high soluble salt content close to surface (about 50 cm depth). Calcium carbonate nodules and masses were described at around 60 cm of the soil surface. The morphological features and the textures of soil profiles studied revealed that the ancient bed of Yesilirmak River was parallel to the coasts of the ancient lake. Based on the existence of the mollic horizons, all soils profiles were classified within Mollisol order of Soil Taxonomy.

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THE EFFECTS ORGANIC AMENDMENTS ON SOIL NITROGEN MINERALIZATION AND SOIL BIOLOGICAL ACTIVITY UNDER WHEAT CULTIVATION

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ABSTRACT

In this study, the effects of organic residue additions on soil biological activity (CO2 production and DHG-activity) and soil nitrogen content under wheat cultivation were investigated. Industrial tobacco dust (ITD) at two rates, rice husks (RH) and farmyard manure (FM) were used as organic residue sources. Application rates of organic residues were: 1.5 and 3.0 Mg ha-1 for ITD, 1.2 Mg ha-1 for RH and 30 Mg ha-1 for FM. 10 (N1) and 20 (N2) kg N as (NH4)2SO4 for each Mg dry rice husks ha-1 were incorporated to reduce high C:N ratio and accelerate the mineralization processes. In order to determine the effects of the organic residues on grain yield, wheat was cultivated in the plots. Surface layers of the soil (0-20 cm) were sampled 5 times starting from the 7th day after residues incorporation until the harvest; the rest of the 4 samplings at different critical stage of plant growth. 250 kg ha-1 of calcium ammonium nitrate (CAN) was applied to the plots before tillering. The results showed that various sources of organic residues used in this research differently influenced the soil biological activity, nitrogen content of soil and grain yield. The effects of treatments on soil measured soil properties in descending order as: ITD2 > ITD1 > FM > RH+N2 > RH+N1 > Control for CO2 production; ITD1 > ITD2 > Control > RH+N2 > FM > RH+N1 for DHG-activity; and ITD1> RH+N1 > FM > ITD2 > RH+N1 > Control for soil nitrogen content and ITD1 > ITD2 > RH+N1 > RH+N2 > FM > Control for grain yield. Therefore, it may be concluded that organic residues can be used for wheat cultivation as additional nitrogen supply.

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THE EFFECT OF ORGANIC RESIDUES AMENDMENT ON DOWNWARD MOVEMENT OF NITROGEN UNDER WHEAT CULTIVATION

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ABSTRACT

Abstract: An experiment was set up to measure nitrogen-leaching loss from application of two plant residues and farmyard manure during growing season of wheat under Samsun ecological conditions. Application rates of organic residues were 1.2 Mg rice husk (RH) along with 10 (N1) and 20 (N2) kg N per Mg straw ha-1, 1.5 and 3.0 Mg ha-1 tobacco industry dust (TID) and 30 Mg ha-1 farmyard manure (FM). Soil samplings from 0-20, 20-40 and 40-60 cm depths were made at five different critical growing stages of wheat that started 7 days after incorporation of residues and ended at harvest. NH4+-N and NO3--N content of collected samples were determined. After the treatments, mineral nitrogen content of surface layer (0-20 cm) increased 2.10-4.02 folds in comparison to the control. Accordingly, mineral nitrogen contents of deeper layers were also increased. This trend has continued on more than two months after incorporation of organic residues. The average amount of leached nitrogen was similar in farmyard manure, tobacco industry dust-I and -II, and rice husk + N2 treatments. It can be concluded that even though organic residues with low C: N applied to soils as nitrogen source, it may significantly contribute to nitrogen leaching in soils through fast mineralization rate.

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EFFECTS OF DIFFERENT NITROGENOUS FERTILIZERS ON YIELD AND YIELD COMPONENTS OF PROCESSING TOMATO

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ABSTRACT

The aim of this study was to determine the effect of nitrogenous fertilizer applications on yield and yield components, such as paste output, fruit weight, fruit penetration value, brix, ascorbic acid, pH and stem diameter in fruits of processing tomato (Lycopersicon esculentum Mill cv. H 2274) under climatic conditions of Konya. Three different nitrogenous fertilizers (ammonium nitrate, ammonium sulfate and urea) were applied at the doses of 0, 40, 80, 160 and 320 kg N ha-1 into the soil with slightly alkaline, low soluble salt, low organic matter, very high lime and clay content. The nitrogenous fertilizers were split into two. The 2/3 of fertilizers was applied in the seedling time and the rest was given at 1/3 in flowering period. The experiment (45 parcels; 3x5x3; fertilizers x doses x replications) was conducted as three replications in the randomized blocks factorial experimental design under field conditions. There were 32 tomato plants per replicate group. According to the results, fruit yield and paste output were significantly affected by both fertilizers and doses, statistically ($p<0.01$). The highest tomato (106.70 ton ha-1) and paste output yield (22.25 ton ha-1) were obtained by the 160 kg N ha-1 dose of ammonium sulfate. In addition, the lowest tomato yield (51.90 ton ha-1) in the control treatment (0 kg N ha-1) and paste output yield (11.70 ton ha-1) were found at a rate of 80 kg N ha-1 of urea application. In general, other parameters were not influenced depending on applications, statistically.

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A STUDY ON PHOSPHOROUS ADSORPTION IN SOME GREAT SOIL GROUPS OF SEMI-ARID REGION OF TURKEY

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ABSTRACT

In this research phosphorous adsorption characteristics of different soil groups of a semiarid area were determined by using the linear form of the Langmuir adsorption isotherm. Soil samples taken from two different depths were equilibrated with phosphorous solution having ten different concentrations. The experimental data confirmed the Langmuir adsorption isotherm in two concentration ranges (region 1 and region 2). The result revealed that Langmuir adsorption isotherms could be applied to determine the capacity of soils to adsorb P and bonding energy. The adsorption capacity was greater for region 1 while bonding energy higher for region 2 sites. The adsorption maxima (b1) of the low concentration range (region 1) varied between 625 µg/ml (Typic xeropsamments) and 1250 µg/ml (Calcic Haploxerepts) and adsorption energy coefficient k1 ranged between 0.159 ml/µg (Calcic Haploxerepts) and 0.800 ml/µg (typic xeropsamment). The calculated b and k values of high concentration range (region 2) were not treated as real adsorption parameters, because as the concentration increased, the extent of confirmation to Langmuir isotherm in the high concentrations decreased. This revealed the fact of Langmuir isotherm can be applied to phosphorous adsorption in soils and soil materials at a limited extent. Adsorption capacities for P was found to be greater for soils and horizons high in CaCO3, clay and CEC. The relationships between phosphorous adsorption characteristics and physical, chemical and mineralogical properties of the soils were also evaluated. Statistically significant positive relationship were found between adsorption capacities and CaCO3, clay, CEC and loam respectively and important negative relationships were found between adsorption capacity and organic matter, sand, Fe2O3, Al2O3 respectively. It can also be suggested that the type of clay, its cristalinity are important factors affecting phosphorus adsorption in these soils.

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PHOSPHORIC STATUS IN CALCAREOUS SOILS OF SEMI–ARIDIC AREAS (CONSTANTINE, ALGERIA)

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ABSTRACT

Fertility phosphorus has a great importance especially in calcareous soils because of the unfavorable edaphic conditions, so, the phosphorus becomes inaccessible by plant. For that purpose, a better knowledge of the phosphorus status was the aim of our study , also, the determination of the different mineral fractions of the phosphorus bound (Fe, Al, Ca) to revealed which phase responsible for the supply of the soil solution in phosphorus and consequently the nutrition of vegetables. To estimate the available phosphorus, a chemical method applied in calcareous soils; was used it called: jorêt –Hebert. Besides, fractionation was made by Chang and Jackson method. Obtained data, reveal that, the phosphorus remains after the water and the nitrogen a factor limiting of the production cereal, this it is showed for all studied soils. That is why the future should be turned towards, techniques which would allow approaching the parameters of mobility of phosphorus, to be able to release potentiality of a transfer in systems: soils- solution- fertilizer- plants, for reasoning of the phosphoric fertilization in calcareous soils.

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Ca and Mg LEVELS OF GRAPE (Vitis vinifera L.) and PISTACIA (Pistachia vera L.) VARIETIES GROWN ON CALEROUS SOILS

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ABSTRACT

This research was conducted to determine Ca and Mg levels of grape (Vitis vinifera L.) growing mainly Sanliurfa city center, and pistacia (Pistachia vera L.) trees growing on calcerous soils in Birecik Province. According to chemical analyses lime, total Ca+2 and exchangeable Ca+2 contents of soils, where pistachia and grape varieties grown, were found as 35.0-86.8 %, 0.70-1.30 % and 32.0-43.4 Cmolc/kg ; 9.5-79.3 %, % 0.35-1.37 and 32.3-42.2 Cmolc/kg, respectively. Whole leaf samples showed Mg deficiency. Additionally, grape and pistacia leaves were determined 64 %, and 86 %, deficient in Ca, respectively. Preference of acid character fertilizer, soil irrigation, and supporting research of Ca and Mg applications, supplying water requirement during flowering and fruit stage of plant will help to ameliorate the Ca and Mg deficiency in the region.

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THE EFFECTS OF VARYING APPLICATIONS OF NITROJEN, PHOSPHORUS AND POTASSIUM ON THE SIZE OF CYCLAMEN HEDERIFOLIUM CORMS GROWN IN PEAT MEDIUM

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ABSTRACT

The purpose of this study was to show that the Cyclamen hederifolium plant could be cultivated by producers in Turkey so that its depletion in the wild could be prevented and to determine how to produce export-sized corms of at least 10 cm circumference in the shortest possible time. The growing medium was peat and various doses of ammonium sulphate, triple super phosphate and potassium sulphate fertilizers were applied. During the study, 80 different applications were carried out, the seeds were sown on 14th October 2001 and the corms were gathered on 17th May 2003. Taking into account all the corms in the study, in 12 of the 80 applications the corms reached an average circumference size of 10 cm or more. With ammonium sulphate applications of 150 kg/da and 200 kg/da none of the corms had a circumference of more than 10 cm. It was determined that all three fertilizers together had an effect on the size, with the N2P3K2 application producing the longest circumference and the N0P2K0 application producing the largest number of corms. On the other hand, 74 of the 80 applications having a circumference size of 10 cm or more, met the corms export criterium, that corm size should be at least 10 cm. The application of N1P3K1 produced the longest circumference while the largest number of exportable corms was produced by the application of N1P3K3. Taking into consideration all the corms obtained from the experiment, the heaviest corm was produced with an application of N1P3K1. When the dosage of ammonium sulphate fertilizer was either more or less than 100 kg/da, the weight of the corms decreased. In the case of triple super phosphate, it was determined that larger dosages led to an increase in the weight of corms. The average height of two-year corms varied between 0.88 - 2.03 cm, with the height approximately equal to half the diameter. An application of N2P3K2 was found to have the most effect on the height. In conclusion, when fertilized for two years after sowing with the same type and dosage of fertilizer, it was observed that the Cyclamen hederifolium plant was negatively affected by excessive nitrogen, that, statistically, potassium alone produced little effect, but that phosphorus had a positive effect.

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THE FERTILITY PROBLEMS OF FARMING SOIL IN CENTRAL SOUTHERN ANATOLIA

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ABSTRACT

In this search, the nutritional element content of the soil in Central Southern Anatolia was investigated. For analysis, 898 soil samples represent the region best are selected and analyzed. According to the result of the analysis, the reaction of the soils range between (pH) 5.90 and 9.40. 2.70% of the soil has high alkali, 77.60% of it has alkaline and 14.50% of it has neutral reaction. Electrical conductivity values vary between 47-3340 _S/cm. according to the E.C. values 39.9% has low, 46.6% has average, 7.10% has high and 6.40% of soil has very high salinity. Lime (CaCO3) inclusion varies between 0.17%-69.10%. And 86.4% of soil is limy and 13.6% has no lime. Phosphorus inclusion of the soil that is suitable for the plants is between 1ppm-222.60 ppm; potassium inclusion is between 0.03-18.20 me/100 g; magnesium inclusion is between 0.27-18.20 me/100 g. These results show that potassium inclusion of the soil is adequate for the whole region, in 50.10% of the soil, phosphorus inclusion is high and in 28.3% it is inadequate. In 27.8% of the soil magnesium inclusion is inadequate and in 72.2% it is at the high levels. When the farming soil of the region is investigated regarding micro nutrition element, it is revealed that the Fe amount of the soil that can be used by the plant varies between 0.02 ppm-93.60 ppm; Zn amount varies between 0.01 ppm-5.24 ppm; Cu amount ranges between 0.03 ppm-210.80 ppm. In all samples of the soil, Cu inclusion of the soil is adequate; in 86.3% of it Fe is inadequate level, in 60.90% of the soil Zn inclusion is insufficient and in 5% of it Mn inclusion is adequate. The B amount of the soil that is convenient for the plant ranges between 0.01 ppm and 63.90 ppm and in 26.6% of the soil, B inclusion is insufficient; in 3.6% it is toxic for and in 18% of the soil includes toxic levels of B for cereals. At the end of search, some problematic areas are detected regarding plant nutrition element and to solve these problems, the detection of the necessary research topics is enabled.

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THE EFFECT OF DIFFERENT ZINC SOURCES ON YIELD AND NUTRIENT CONTENTS OF BREAD AND DURUM WHEAT

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ABSTRACT

This study was aimed to determine the effect of various zinc fertilizer forms on bread wheat (Triticum aestivum,cvs.Dagdas) and durum wheat (Triticum durum, cvs.Kiziltan) in dry conditions between 1998-1999 and 1999-2000 in Konya. The study was arranged as randomized block experimental design in three replications. In the experiment, five different organic and inorganic forms of zinc (Zn-Pyruvate,Zn-Gluconate,ZnSO4, ZnO, Zn-EDTA) with three doses (0-0.75-1.50 kg Zn/da) were applied in the stage of plant with of 3-4 leaves (GS 13). The average grain yield was between 191,17-283,7 kg/da for Kiziltan and 132,1-267,9 kg/da for Dagdas in both experiment years. Zinc applications resulted in higher grain yield in comparison with that of control treatments. It was found statistically significant ($P<0.01$ and $P<0.05$) difference between zinc and potassium contents of leaves and between zinc contents of grain, depending on the zinc forms applied on Kiziltan durum wheat in the first year of study. As for the second year of the study, it was found statistically ($P<0.05$) significant difference between zinc contents of leaves; and phosphorus and potassium contents of grain; and significant ($P<0.01$) difference between potassium contents of leaves, depending on the zinc forms. There was statistically significant difference ($P<0.01$) between potassium contents of leaves and between zinc contents of grain, depending on the zinc forms applied on Dagdas bread wheat in the first year of the study. There was also significant ($P<0.05$) difference between zinc contents of leaves, and significant difference ($P<0.01$) between phosphorus contents and potassium contents of grain, depending on the zinc forms applied on Dagdas bread wheat in the second year of study.

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EFFECTS OF SOME ORGANIC AND MINERAL FERTILISERS ON YIELD AND QUALITY OF SUGAR BEET

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ABSTRACT

This investigation was carried out under field conditions and designed as randomly blocks with four replications. Chicken manure compost (CMC), urban waste compost (UWC), leonardite (L) and humic-fulvic acid (HFA) (70 % humic acid+ 15 % fulvic acid) were used as organic fertilizers. Ammonium nitrate, triple super phosphate and potassium sulphate were applied at three doses as N- P2O5 and K2O, respectively. Neither organic nor mineral fertilizers were applied to control plots (C). Mineral fertilizers, 80-40 and 50 kg ha-1 respectively as N- P2O5 and K2O (NPK), were applied to the plots added organic fertilizers. Three years of trials under field condition showed that mineral and organic fertilizers significantly affected yield and yield component of sugar beet. The highest (74.93t ha-1) and the lowest (65.70 t ha-1) root yield were obtained with the application rate of UWC 10 tonnes per hectare and control plots, respectively. The highest (19.48 %) and the lowest (16.94 %) sugar content were obtained with the application rate of L 800 kg per hectare and CMC 30 tonnes per hectare, respectively. The highest (17.59 %) and the lowest (13.34 %) white sugar content were obtained with the application rate of L 800 kg per hectare and CMC 30 tonnes per hectare, respectively. The highest (12.71 t ha-1) and the lowest (9.23 t ha-1) white sugar yield were obtained with the application rate of UWC 10 tonnes per hectare and CMC 30 tonnes per hectare, respectively.

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EFFECTS OF DIFFERENT ORGANICS MANURE ON SOIL PROPERTIES AND YIELD-YIELD COMPONENT OF CARROT

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ABSTRACT

The aim of this study was to determine the effects of urban waste compost (UWC), cattle manure (CM), chicken manure (CHM) and leonardite (L) with or without NPK on the yield- yield components of carrot under greenhouse conditions. In both applications, with and without NPK, UWC, CHM, L at rates of 5-10 t ha-1 and CM at rates of 10-20 t ha-1 were mixed with a sandy clay loam. Mineral fertilizers as N- P2O5 and K2O at rates of 0.1-0.05-0.15 t ha-1 were applied pots with organic fertilizers. Neither organic nor mineral fertilizers applied control pots. According to the research results, the types and dose of the organic manures affected soil properties and yield-yield components of carrot. The highest (16.66 %) soil aggregate stability value was obtained with the application rate of UCW 10 tonnes per hectare and +NPK 0.1-0.05-0.15 t ha-1. The highest (23.21 g pot-1) root dry weight was obtained with the application rate of CM 10 tonnes per hectare. The highest contents of K, Ca, Mg, Na, P, Fe, Cu and Zn measured in the roots were 36499, 6316, 3953, 4209, 3354, 166.6, 6.09 and 28.18 mg kg-1, respectively.

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CALIBRATION OF NITROGEN WITH FIELD EXPERIMENTS BY GROWING CORN

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ABSTRACT

The aim of this study was to calibrate soil organic matter content and water soluble nitrate method used to determine soils nitrogen statues with field experiments by growing corn and to determine application amounts of nitrogen fertilizer to corn plant by using soil analysis results in Bafra and Carsamba Plain. Eleven field experiments at different locations, 4 in 1997, 3 in 2000 and 4 locations in 2001 were conducted to determine nitrogen fertilizer requirement of corn plant in randomized plot design in Bafra and Carsamba Plains of Samsun. Application doses of nitrogen fertilizers were 0, 5, 10, 15, 20 and 25 kg N da-1. At the end of the field studies, application amounts of nitrogen fertilizer for corn growth in these plains were determined according to soil organic matter and water soluble NO-3 contents. In order to determine application amount of fertilizer depending upon nitrogen values of soils determined by the chemical methods, parabolic multiple regression equations among the relative grain yield (y), nitrogen contents of soils by the chemical methods (x1) and applied nitrogen doses (x2) were calculated as y=57.4+5.56x1+3.42x2+0.79x12–0.059x22–0.47x1.x2 (R2=0.590**) with organic matter calibration and y=87.9-2.24x1+2.39x2+0.16x12-0.054x22-0.007x1.x2 (R2=0.343*) with water soluble nitrate method calibration. Critical nitrogen content values of soils by organic matter (OM) content and water soluble nitrate tests were obtained as 7.0 % OM and 32.0 kg NO3 da-1 respectively. Nitrogen fertilizer application was recommended to soils including less than these critical values. According to organic matter and water soluble nitrate contents, amounts of nitrogen fertilizer suggestion were 20-25, 15-20, 7-15, 1-5 and 0 kg N da-1 for low, medium, high, very high and excess categories, respectively. Nitrogen fertilization was not suggested to soils having relative grain yields higher than 95 % without nitrogen fertilization.

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SOIL ORGANIC MATTER, SOIL pH AND SOIL NUTRIENT DYNAMICS IN FOREST STANDS AFTER FIRE

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ABSTRACT

Fires burn, spread and release energy. The process of burning not only helps increase the decomposition of organic matters but also causes the plant nutrients bound to vegetation and organic dead material to get into soil and inflicts changes on the physical and chemical properties of soil. Changes taken place in soils and their status over time are extremely important for the success of the vegetation that will establish on the site after fire. This study presents the results of a study conducted to monitor the changes in plant nutrients and soil's chemical properties. In the study, soil organic matter, soil reaction (pH), salinity and soil nutrients were measured. Soil reaction, N and K slightly increased after fire and decreased gradually thereafter. Other nutrients gradually decreased after fire throughout the study period. As a result, it can be said that the effect of fires on soils in areas having little or no dead surface fuels are limited, yet important.

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THE FUNDAMENTALS OF HYDROPONIC SISTEMS IN PLANT GROWING

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ABSTRACT

Hydrofonic gardening is way of the future for environmental controlled agriculture. By carefully controlling nutrient levels, light and temperature, by eliminating soil - borne pests and diseases, while maximizing water and nutrient uptake by the plant, phenominal yields can be achieved in a relatively small space. There are 6 basic types of hydroponic systems. Wick system, Water culture, Ebb and flow, Flood-Drain, Nutrient film technique, and aeroponic system. There are hundreds of variations on these basic types of systems, but all hydroponic methods are a variation or combination of these six.

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RESPONSE OF DIFFERENT TOMATO CULTIVARS (Lycopersicon Esculentum) TO INCREASING NACL SALINITY IN NUTRIENT CULTURE AND EFFECT OF SALINITY STRESS ON DRY MATTER YIELD AND MINERAL CONTENTS

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ABSTRACT

The aim of this study was to investigate plant shoot and root dry matter yield and mineral content of three tomato cultivars in saline culture media at three growth periods. Seedlings from three cultivars (Kaya F1, Sencan9, and Inuictius lot. 335) were transferred to Arnon nutrient solution; containing various amounts of NaCl (EC0=1,34, EC1=3, EC2=7, EC3=14 mmhos cm-1) in different growth stages (1. Immediately after germination, 2.Three weeks after germination, 3. Six weeks after germination). Tomato plants were harvested just before flowering for dry weight measurement and analyzed for mineral content. Dry matter yield decreased with increasing NaCl concentration in solution, Na and Cl contents increased in contrast to K and NO3 contents decreased in all cultivars and applications, at high contain of NaCl in solute.

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RELATIONSHIPS BETWEEN MINERAL NUTRITION AND PLANT DISEASES AND PESTS

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ABSTRACT

Mineral nutrition may also exist secondary, often unpredicted influences on the growth and yield of crop plants; By effecting changes in growth pattern, plant morphology and anatomy and particularly chemical composition, mineral nutrients may either increase or decrease the resistance of plants to pathogens and pests. Although resistance is genetically controlled, it is considerably influenced by environmental factors. Mineral nutrition is an environmental factor that can be manipulated relatively easily. In order to complement disease and pest control methods by the manipulation of mineral nutrition, one must have a detailed knowledge of the means by which mineral nutrients increase or decrease plant resistance.

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RELATIONSHIPS BETWEEN PLANT GROWTH AND SALINITY STRESS

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ABSTRACT

Existing guiddines for salinity and sodicity as well as related man. Plants growing in saline soils face two problems: High salt concentrations in the soil solution (i, e, high osmotic Pressure and corres pondingly low soil water potential) and high concentrations of potentially toxic ions such as Cl- and Na+ or unfavorable combinations of salt ions. (e.g, high Na+ / Ca+2 ratio)Plant species differ greatly in their growth response to salinity.(Halophytes, salt - tolerant crop species, salt- sensitive crop species.

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RESPONSE OF TOMATO (Lycopersicon L. esculentum L.kaya f1) AND CORN (Zea mays. L.TMP.1 Akpinar) PLANTS GROWN IN NUTRIENT CULTURE TO INCREASE CD LEVEL

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ABSTRACT

The aim of this study was to determine plant dry matter , mineral content and plant tolerance of tomato and maize grown in nutrient culture until flowering in relation to the increasing levels of cadmium (0, 0.05, 0.1, 1, 2,5,10 and 20 ppm Cd). Tomato and maize seedlings were transferred to the Arnon (1938) nutrient culture and applied with Cd solution a week after.1 week after were transferred to the nutrient culture and applied with Cd solutients. Growth differences were evaluated 3 weeks after 0.1 Cd applications. Growth sharply in tomato especially, after 0.1 ppm Cd but more gradually in maize. The results shoved that growth in tomato, decreased faster than maze. Statistical analysis of data showed that there was a significant relationships between dry matter and mineral content of tomato and maize at $p< 0.001$.

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HEAVY METAL STRESS AND TOLERANCE OF PLANTS

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ABSTRACT

Plants and animals depend on some metals as micronutrients. However, certain forms of some metals can also be toxic, even in relatively small amounts, and therefore pose a risk to health of animals and people. Major heavy metals are mercury, cadmium and lead. All three can be toxic at levels that are only moderately above background levels. Plant species that are naturally high in heavy metals developed a strategy to tolerate the heavy metals by unrestricted absorbtion and, as a result, accumulate high concentrations of the heavy metal in the plant tissue. Since heavy metals are damaging to most plants at relatively low concentrations, the hyper accumulation strategy requires some mechanism (s) to detoxify the metals.

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RESPONSE OF DIFFERENT TOMATO CULTIVARS GROWN IN NUTRIENT CULTURE TO INCREASING PB LEVELS

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ABSTRACT

The aim of this study was to determine plant dry matter and mineral content of tomato cultivars (Lycopersican Esculentum. L. inuictus lot 335 and rio grande) grown in nutrient culture until flowering in relation to increasing Pb levels (0, 0.5, 1, 2, 5, 10, 20, 50, 100 ppm Pb/pot). In this study using Arnon nutrient culture, tomato seedlings 1 week after were transferred to the nutrient solution and applied with Pb solutions. We found significant variation in tomato cultivars in accumulation and tolerance of Pb.

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THE INFLUENCE OF FOSSILIFEROUS LIMESTONE ON PLANT GROWN IN OLTU DISTRICT SOILS

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ABSTRACT

Fossiliferous biochemical limestone is formed principally of the accumulations of the calcareous skeletons of organisms with carbonates within water. They could be classified according to contents of the fossils variety. Their compositions also change in a wide range. The aim of this study was to determine effect of fossiliferous limestone on growth and dry matter yield of plants grown in Oltu District soil. Biochemical fossiliferous limestone was applied to Oltu district soils (20% lime stone mixed with the experimental soils) as natural fertilizer. As a result, tomato plant couldn't grow in pure limestone media, corn, barley and wheat could grow in pure limestone media. Dry matter yield of wheat, barley and corn plants increased in a little amount with addition of limestone.

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THE INFLUENCE OF HUMIC ACID APLICATION IN HIGH NITROGEN LEVELS ON THE YIELD, NITRATE AND NUTRIENT CONTENTS IN LETTUCE

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ABSTRACT

Nitrogen is the most important fertilizer nutrient in lettuce. However, because of excessive nitrogen fertilization in lettuce, nitrate accumulation at leaves is serious problem for human health. In this research, the effects of various humic acid applications in high nitrogen doses on the yield, yield components, nitrate and nutrient content of lettuce were investigated. For this purpose, greenhouse experiment was conducted with Yedikule lettuce cultivar at Faculty of Agriculture, University of Yuzuncu Yil. The experiment was performed using randomized complete block design with three replicates. Three different doses of nitrogen (0, 250, and 500 kg N/ha) and humic acid (0, 125 and 250 kg HA/ha) were used. Nitrate, nitrogen, phosphorus, potassium, magnesium, calcium, iron, manganese, zinc and copper content were determined after harvest. Research results showed that nitrogen application significantly increased yield, leaf number, head height, head circle, nitrate, nitrogen, phosphorus, iron, manganese and copper contents of lettuce leaves. Head weight rose from 196.2 to 206.5 g due to humic acid effect. But the effect of humic acid on the increase in head weight of lettuce was not statistically significant. Humic acid doses also affected above-mentioned criteria, but it was not important.

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COMPARISON OF ROOT IMAGE PROCESSING PROGRAMS FOR QUANTIFYING PLANT ROOT PARAMETERS

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ABSTRACT

The aim of this study was to evaluate and compare two different web-based root image processing programs. Artificial roots from wires and drawn lines with known actual lengths and diameters were scanned and digitized using a flatbed scanner. Two web-based image processing programs, the MSU-Root Image Processing Laboratory (RIPL) and Scion 4.02 for Windows, were used to determine artificial lengths and areas of artificial standards and wheat root lengths and areas. Comparisons required flatbed scanning at similar dpi for both web-based image processors. Results showed a very close relationship between dpi of scanned materials, computer software and size of objects measured. These studies revealed that more accurate length and diameter estimates of roots were achieved by the MSU-Root Image Processing Laboratory (RIPL) than the Scion 4.02 for Windows. In addition to length and diameter, the RIPL web-based root image processing facility offers total volume dimensions for root diameters ranging from 0.127 to at least 10 mm as well as the removal of non-root debris from images.

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THE CHEMICAL AND PHYSICAL PROPERTIES OF PUMICE AND ZEOLITE SAMPLES THAT MIXED WITH DIFFERENT PERCENTAGES

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ABSTRACT

This study was carried out to determine the some physical and chemical characteristics of zeolite and pumice mixed in different ratio and to evaluate them considering with the soilless culture. Zeolite in two different particle size were mixed with the light colour pumice sample obtained from Nevsehir and the basaltic pumice sample obtained from Ceyhan (Adana) in various ratios (0%, 10%, 25%, 50%, 75%, 100% by volume). pH, cation exchange capacity, exchangeable Na+, K+, Ca+2, Mg+2 and water soluble ion concentration, were increased with the increasing rate of the zeolite mixture. These increases were more considerable in samples containing smaller particle size zeolite than the others. It was considered that to keep the pH value in the medium around optimum levels would be a problem because of the high pH level in samples containing higher ratios of the zeolite, which has high buffering capacity.

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EFFECTS OF BIOSTUMULANTS AND MINERAL FERTILIZATION ON SOME WHEAT SPECIES

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ABSTRACT

Wheat is a very important crop of cereals. High yield obtained necessitates use of wheat varieties. The purpose of this study was to determine the effects of two biostimulants (humic acid and seaweed extract) on seed germination, mineral contents of spring habit wheat genotypes (Kirik, Bezostiya) and winter habit wheat genotypes (Palandoken-97, Dogu-88). Plants were treated with two biostimulants and four fertilisation doses (0, 50, 100, and 200 mg / kg). Fertiliser type and doses affected all of the seed germination and nutrient balance of plants.

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INFLUENCE OF APPLICATION TIME AND DOSES OF UREA AND (NH4)2SO4 ON YIELD OF WHEAT IN FIELD CONDITION

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ABSTRACT

Application rate and time of nitrogenous fertilizer in Cukurova region is not well defined. Urea (U) and ammonium sulfate (AS) are the major nitrogen sources in the region, however, farmers are criticizing that they are not efficiently used urea nitrogen in some years. Due to the availability of urea fertilizer is directly related climate and so photosynthesis, in the case of insufficient temperature and sunlight (e.g. long period of precipitation) urea may cause toxicity in the plant. To determine the effect of urea and ammonium sulfate mixtures combination of 100% U, 75% U+25% AS, 50% U+50% AS, 25% U+75% AS and 100% AS were used. Experiment was carried out on Menzilat soil series, which located in experimental farm of Cukurova University, Agricultural Faculty, Soil Science Department. Two different application times as early and late were used. In early application, the doses were split two half and one was applied by sowing and other in tillering stages. In late application the doses were also divide two and half were applied in tillering and the other at steam elangation stages. Results revealed that application of nitrogen fertilizer increased the yield significantly, however, wheat yield was not affected by the application of different mixture rate of U and AS. Early nitrogen application was increased yield considerably when compared the late application. Seed nitrogen contents were effected by the mixture rate of U and AS and the highest N% values were determined in the 160 kg ha-1 U and 120 kg ha-1 U+40 kg ha-1 AS applications (2.12 N%). The seed nitrogen contents were not affected by application time. Researched other parameters were also not effected by nitrogen mixture rate.

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EFFECT OF PYRITE APPLICATION ON WHEAT AND MAIZE GROWN UNDER THE FIELD CONDITIONS

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ABSTRACT

The experiment was carried out on Menzilat soil series (Cukurova region) for observing pyrite's effect on wheat and corn yield under field conditions, wheat-corn-wheat-corn rotation of seven years. The experiment was set up in 1996 and since than the experiment is continuing. In the first field experiment pyrite application (1000, 2000, 3000, 4000 kg/ha) significantly increased wheat grain yield upto 27%, In second field experiment in the same plots maize yield were not obtained because of failure of pollination due to high temperatures in summer. Still there is a little effect of pyrite on yield since 1998. In the third field experiment, there were no differences between the treatments of the wheat plant. But in last field experiment increasing pyrite application in the same plots maize grain yield increased upto 36%. In all field experiments P and Zn concentration in plant leaf of pyrite-applied plant were significantly higher than control plants. During the field experiment, at certain intervals, soil samples were taken from the depths 0-20 and 20-40 cm for measuring soil pH, plant available P, Zn, Fe, Cu and Mn. After pyrite application to the field, in first year, soil pH decreased along with significant increase in plant available P and Zn. Later on, since soil buffer capacity were so high that there were no pyrite effects on soil pH. After the last field experiment soil samples were again analysed and it has been found that still applied pyrite has significant influence on extractable P and Zn Fe, Cu concentration, whereas it has no effect on soil pH. Thus, it is suggested that pyrite can be used as a fertilizer and a soil amendment material. Since it is not well clarified how long the effect of pyrite will be on soil any interpretation on it seems very difficult. But at least not less than three years interval 1000 kg ha-1 pyrite can be applied to the calcareous soils.

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WHEAT RESPONSES TO PHOSPHORUS FERTILIZER APPLICATION ON CALCAREOUS SOILS UNDER GREENHOUSE CONDITIONS

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ABSTRACT

Phosphorus (P) is an essential macronutrient for plant growth and development, and its deficiency is a common limiting factor under many climatic conditions and clay and calcareous soils of the Southern Turkey because of it's low availability despite frequent phosphate applications. Southeastern part of Turkey (the GAP) is going to be under intensive agriculture following with irrigation by the Ataturk dam. Thus, management of fertilizer use and cultivation of efficient plant genotypes need to be developed and verified soon. The pot experiment was carried out to select P-efficient wheat genotypes grown on calcareous soils of GAP and Cukurova Regions. Wheat genotypes were screened for their ability to utilize phosphorus in a greenhouse experiment in Adana, Turkey, and locally-common ten wheat genotypes were grown on 6 soil series for eight weeks. The five rates of phosphorus (0, 25, 50, 100 and 200 mg.kg-1) were used as treatments, other nutrients in the same rates were mixed to the soil prior to the seeding. After harvest, tissue dry matter and P content in tissue were determined. Effect of P on dry matter and plant P uptake were found statistically significant, and these parameters were increased by the P rates. In addition, wheat genotypes acted differently to P rates. Ceyhan-99 and Fuat Bey found as inefficient-nonresponsive genotypes, whereas Firat-93 was efficient-responsive. These findings are important for the regions, and need to be verified for the local-field P fertilizer trials.

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INFLUENCE OF FIELD BINDWEED LEAF EXTRACT AND SALINITY ON SEEDLING GROWTH OF WHEAT PLANT

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ABSTRACT

Aqueous leaf extract of field bindweed (Convolvulus arvensis L.) was evaluated alone and in combination with NaCl for its effect on germination and shoot and root growth of wheat plant (Triticum aestivum L.). There was no effect of salinity or the leaf extract on seed germination. Leaf extract alone also did not have any effect on shoot growth, but salinity alone or in combination with leaf extract decreased. However, the differences in the effects of 0.2% NaCl+ extract, 0.4% NaCl+extract and 0.6% NaCl+extract were entirely attributable to the difference in NaCl concentration. Root growth was decreased by both salinity and leaf extract. The reduction due to salinity was more under 0.6% than 0.4% and 0.2% treatment, and leaf extract caused a reduction of about 50% irrespective of whether it was applied separately or in combination.

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CHEMICAL CHARACTERIZATION OF HUMIC AND FULVIC ACIDS EXTRACTED FROM GYTTJA

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ABSTRACT

Gyttja materials obtained from Afsin- Elbistan region have been investigated to determine their agricultural values. For this purpose four different gyttja samples- humus, coal, clay and carbonate gyttjas- and a lignite sample were collected based on their dominant components. Humic acids and fulvic acids were extracted from the raw samples. Since Gyttja samples differed considerably in their chemical properties, humic substances content varied.. The results showed that, HA and FA contents were the highest in the coal gyttja and the lowest in the carbonate gyttja. Further chemical and physical analysis's were done on HA and FA samples to compare each other and determine their properties exactly.

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QUALITY PROPERTIES OF SOME PISTACIO CULTIVARS GROWN IN AYDIN-TURKEY

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ABSTRACT

Pistachio (Pistachia Vera L.) production has become widespread in Aydin in the last few decades. The province is one of the most important area with approximately 347 605 pistachio trees of Aegean Region. Recently, new pistachio orchards have been planted by using cvs. Siirt, Uzun and Ohadi. However, these cultivars show important differences in terms of yield per tree. Probable reason of this situation is different alternance characteristics of the cultivars. In this study, nutrient contents of fruit, some quality properties, some pomologic parameters and fatty acid contents of the cultivars were investigated. According to results, cv Uzun was determined as the most appropriate cultivar which might be grown in the region and cvs Ohadi and Siirt followed this cultivar. However, cvs. Ohadi and Siirt gave better results cv point of some quality parameters of fatty acids and protein than cv. Uzun.

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EFFECTS OF ASPECT AND SLOPE POSITION ON DECOMPOSITION OF Picea orientalis NEEDLE LITTER GROWN IN ARTVIN REGION

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ABSTRACT

Effects of aspect and slope position on decomposition rates of spruce (Picea orientalis) needle litters was studied for two years. Litterbags (20 x 20 cm mesh bags with a mesh size of less than 1 mm2) containing 2 g of needles were placed on a north, south, east and west facing sites and at three slope positions (top, middle and bottom) on each site. Three litterbags from each site were sampled at 6, 12, 18 and 24 months and decomposition rates were calculated. Decomposition rates of spruce needle litters from different slope positions were significantly different from each other for all sampling intervals. There were also significant differences in mass losses between aspects for the bottom and middle slope positions, but showed contrasting patterns. Mass losses at the bottom slope for the north- and east-facing sites were higher than for the south- and west-facing sites. However, in the middle slope final mass losses for the north- and east-facing sites were lower than for the south-and west-facing sites. The top slope position, however, didn't show significant differences. Differences in the decay rates of needle litters between aspects, and between the slope positions illustrate the important point that a number of physical climate variables (e.g. temperature and moisture) may define the potential rates of microbial decomposition and hence the nutrient cycling processes.

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SOME PROPERTIES AND UTILIZATION OF TURF DEPOSITS IN ERZURUM

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ABSTRACT

The objective of this study was to determine some properties of turf deposits, and to obtain mixing rates of turf into soil and N, P, K levels into turf material. Results indicated that turf material used in this study had insufficient amounts of N, P, and K, and needed about 200 mg lt-1 N, P, K application for reaching standards. Turf material mixed with different amounts into sand produced the best plant growth and dry matter with a mixing rate of 1 unit turf + 1 units sand on dry weight basis. Nitrogen, P and K content of plants increased with increasing rates of N, P, K application into turf and mixing rates of turf into soil. Amounts of other plant nutrients in plant tissues decreased with increasing concentration of N, P and K.

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EFFECT OF ORGANIC AND CHEMICAL FERTILIZERS ON MINERAL COMPOSITION AND GROWTH OF CORN AND BEANS

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ABSTRACT

The most important factor in plant production is the amount of plant nutrients and their availability. In this study, the effect of organic and chemical fertilizers applied with different doses on growth and mineral composition of corn and beans. Amounts of plant dry matter generally increased with increasing doses of both types of fertilizers. But, dry matter content decreased at the maximum application dose (400 t ha-1) of organic fertilizer. Amount of dry matter was higher in samples with chemical fertilizers than organic. This may indicate that plants uptake N in chemical fertilizers easily, and organic fertilizers may not provide sufficient amount of N for plants. N contents of plants increased with increasing applications doses of both fertilizers, but increasing rates were clearer in samples with chemical fertilizers. On the other hand, P content decreased, but other elements showed unstable variation with fertilizer application.

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NUTRITIONAL STATUS OF SOILS GROWN SWEET CHERRY (Prunus avium L.) IN ISPARTA PROVINCE

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ABSTRACT

Sweet cherry (Prunus avium L.) is one of the most important fruit in Isparta Province. Nutritional status of soils is an important factor that effect yield and fruit quality. In this study, some physical and chemical properties of soil samples that were brought from soils grown cherry in Isparta Region (Uluborlu and Senirkent) between 1994-2003 to the Soil and Plant Analysis Laboratory of West Mediterranean Agricultural Research Institute, were investigated. Organic matter, pH, CaCO3, EC, texture, available P, exchangeable K, Ca, Mg of soil samples were determined and compared to standard limits given for soils. The most of the soil samples were highly calcareous, low in organic matter contents. There was no salinity problem. The pH of soil samples were alkaline and slightly alkaline. Available P, exchangeable K and Mg were found generally in high level. Also exchangeable Ca level were found medium and high.

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YIELD AND N, P, MG CONTENTS OF GERBERA GROWN IN DIFFERENT SUBSTRATES

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ABSTRACT

The study was set up to investigate the yield, yield parameters and N, P, Mg concentrations of leaves, flowers and the uptake amounts of these elements by the flowers when the gerbera plants were 16, 17, 18 months of age. The Ameretto, Yanara and Red Bull cultivars were grown in pots filled with different substrates. The substrates were zeolit, volcanic tuff, pumice, coco peat, cork waste compost+pumice, municipal waste compost+pumice, coco peat+pumice. The nutrient solution was prepared as N:156, P:26, K:212, Mg:33, Ca:158, Fe:4, Mn:2.5, Zn:0.26, Cu:0.07, Mo:0.1 ppm. Average of leaf N, P, Mg concentrations were 2.20, 0.39 and 0.33 % and of flowers 1.82, 0.46, and 0.19 % respectively. The data were studied to find out the relations between the parameters and differences in substrate and cultivars.

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THE EFFECT OF ZEOLITE ON SOIL- LEAF PROPERTIES AND GRAPE YIELD OF ORGANIC VINES

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ABSTRACT

Enhanced rates of zeolite (0 – 0.5 – 1.0 – 2.0 – 4.0 kg m2) were incorporated into the farmyard manured rows of a 5 year old Thompson seedless vineyard. To examine the nutrient status of the vineyard at the start of the experimentation, soils were sampled from the distinct horizons of a profile and through a mixed sample taken from 0 – 20 cm depth. The experiment was set up in Randomized Block Design with 6 replications. Immediately after the zeolite applications first soil samples and in the following days of the harvest second soil samples were taken from 0 – 20 cm depth from all the parcels. Leaves were sampled during the early ripening and yield was measured for each treatment. Soil K, Ca and Fe contents were measured high after the application of zeolite. As for the leaf nutrient elements only Fe was affected from the treatments. The highest yield was obtained in the treatments that received the highest doses of zeolite.

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THE STABILITY OF ORGANO-METALLIC COMPLEXES OF Zn AND Cu IN CALCAREOUS SOILS

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ABSTRACT

The objective of this study was to evaluate the stability of Organo-metallic complexes formed upon the interaction of metal of Zn and Cu with humic compounds in 4 calcareous soils. Zinc and Cu available for plant in soils of arid region are usually low to very low. This low level may be attributed to high pH and high calcium carbonates. Stability with time of the Organo-metallic complexes, as a products of humic acid (HA) and fulvic acid (FA) metal interaction, was illustrated by incubating the complexes individually for 40 days in the soils used. DTPA-metal chalets and metal alone were used for comparison. The result indicated that Zn remained in solution after one day of reaction as an average of the four soils, when Zn-HA, Zn-FA and ZN-DTPA used as source of Zn was 8.6, 5.2 and 14.5 times that when ZnSO4 used as a source of Zn . Also the results revealed that the amount of Cu remained in solution after one-day reaction was 45.5 and 20.3% of the total added when Cu-HA and Cu-FA were the source of Cu respectively. Rate of reaction of Cu-HA was -0.34 and that of Cu-FA was -0.11 indicating the high stability of these complexes.

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THE EFFECTS of SOME PLANT GROWTH REGULATORS on CHANGES of ELEMENT CONTENTS in VEGETATIVE ORGANS of BEAN (Phaseolus vulgaris L. CV TERZIBABA 1998) at CHILLING TEMPERATURES.

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ABSTRACT

The effects of some plant growth regulators (PGRs: ABA, BA, GA and IBA) on changes of element contents (Ca, K, Mg, Cu, Zn, Fe and Mn) and chilling hardiness of bean seedlings (Phaseolus vulgaris c.v. Terzi Baba) were investigated by controlled chilling tests. The seedlings were growth in sand culture, and the PGRs were applied by mixing with irrigation water of the seedlings. Cold treatment was carried out in a growth chamber. The element contents of the seedlings were separately determined by atomic absorbtion method in the root, the stem and the leaf. Relative dry weights and lengths of organs were measured. As conclusion, treated cold and the PGRs statistically induced increasing/decreasing of the elements contents in the organs. Relative dry weights were increased by the cold treatment in all organs. However, treated the PGRs caused to more increasing of the relative dry weights. It was observed that ABA (10 M), and interestingly high concentrations of GA (10 M) and IBA (10 M) increased chilling hardiness in bean seedlings. BA caused to permanently dwarfishness. The seedlings which were treated with GA and IBA lengthened faster than control and normal condition seedlings after 14-days post stressed period.

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EFFECT OF ELEMENTAL SULPHUR ON MICROELEMENT NUTRITION OF CUCUMBER GROWN IN A CALCAREOUS SOIL

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ABSTRACT

In this study, pot experiment was carried out according to two factorial completely randomized design with 3 replicates. Elemental sulphur (0, 100, 200, 400 kg/da) and microelement fertilizer (0, 3 kg/da) were applied to extremely calcareous soil. As experimental plant, cucumber (Cucumis sativus L.) was grown. The application materials were mixed with the soil and after 10 days cucumber seedlings were planted and after 2 months the plants were harvested for determination of dry matter (g/pot). The plant samples taken were analysed for determination of P, Fe, Zn, Mn and Cu concentrations in shoot. Also, at the end of the experiment, the soil samples were taken and soil pH and EC were determined. According to results soil pH were decreased, soil EC was increased by the sulphur applications. Effects of elemental sulphur and microlement applications to soil for P, Zn, Mn concentrations in shoot were not significant. SulphurXmicroelement fertilizer interactions were significant for Fe, Cu concentrations in shoot and dry matter yield. While Fe concentrations in shoot was increased, Cu concentrations and dry matter yield were decreased.

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DIATOMITE: A NEW SUBSTRATE FOR HYDROPONICS

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ABSTRACT

Many different substrates are used for plant support in hydroponic culture, but one of the unique requirements for research is that the media be easily separated from the roots. Peat, perlite, and vermiculite are good substrates but roots and root hairs grow into these substrates, so they are unsuitable for studies of root size and morphology.Sand can easily be removed from roots, but roots grown in sand are shorter and thicker than hydroponic roots because the sand particles are so dense. Diatomite particules was the medium of choice for research hydroponics for many years because it can easily be removed from roots.

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COMPOSTING OF ORGANIC RESIDUES AND COMPOSTING METHODS

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ABSTRACTS

Compost is called as an organic material resulted from organic wastes, animal excretes, and other organic materials which exposed to aerobic decomposition at high temperatures (40- 65 °C). Each waste or residue is a food of another living being in nature. When we consider sustainable agriculture and environment, resources should be used realistically for supporting human life quality. In this paper, different methods used for composting of organic residues was evaluated.

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MEASURING SOIL HETEROGENEITY IN TWO FIELD EXPERIMENTS CONDUCTED IN KAHRAMANMARAS-TURKEY

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ABSTRACT

Classical statistics such as analysis of variance are widely used to evaluate treatment effects. This approach is sufficient when soil and plant properties show no spatial variability. The classical assumption of independence of plots will be violated if soil and plant parameters have significant specially correlated trends. If this is the case, the analysis of variance may yield no significant treatment differences. This study was carried out to determine whether there is any significant trend or spatial correlation within the two experimental fields established in the Kahramanmaras Agricultural Research Institute. In order to test our hypothesis, soil samples were collected based on grid sampling from the two experimental fields and were analyzed for ammonium acetate extractable K, Ca, Mg, and Na, and DTPA extractable Fe, Zn, Mn, and Cu. Semivariance analysis indicated that the majority of the measured soil attributes were not randomly distributed within the experimental fields and had spatial variability. The distribution of soil attributes were fitted to isotropic spherical, exponential, and linear models. Since measured soil parameters were not randomly distributed within the experimental areas and spatial variability was not unidirectional, blocking alone would not be useful to decrease experimental error. In order to analyze the data obtained from these experimental areas by using classical statistics, a researcher must first attempt to remove the trend by using an appropriate technique.

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SPATIAL VARIABILITY OF SOME MEASURED SOIL PROPERTIES WITHIN A FIELD

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ABSTRACT

Soil properties usually vary in nonrandom fashion. If soil properties have spatial variability, it is necessary to determine the variability to manage soils effectively. Semivariance analysis which is one of the geostatistical tools can be used to measure the nature of soil variability. This study was carried out to measure within field variability for eight plant nutrients in a cotton field in the Narli Plain of Kahramanmaras. The measured soil properties were ammonium acetate extractable K, Ca, and Mg, Olsen phosphorous, and DTPA extractable Fe, Zn, Mn, and Cu. The measured soil attributes showed low and moderate within field variability (cv 8,07-31,9 %), and semivariance analyses indicated that the variability of the measured soil parameters were not random. One of the spherical, linear, and exponential models (r2=0,675-0,989) explained the distribution of the eight plant nutrients within the field. Spatial dependence of soil samples ranged from 42,6 m to 162,4 m depending on the measured soil parameters.

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THE SPATIAL VARIABILITY OF SOIL DEHYDROGENASE ACTIVITY: A STUDY IN PASTURE SOILS

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ABSTRACT

Knowledge on soil enzyme activities used to determine soil microbiological properties are very important for soil quality and productivity. These enzyme activities may be evaluated statistically due to application of geostatistical methods to soil science. The objective of this study was to assess the spatial variability of soil dehydrogenase activity (DHA) within surface pasture soils using the geostatistical techniques The soil dehydrogenase activity at the same transect of three landscape positions (summit, backslope and terrace) positions in 1.35 ha pasture of Samsun-Karakoy State Farm was determined using some soil properties. Seventy-seven surface soil samples (0-20 cm in depth) were collected and analyzed. The soil dehydrogenase activity varied from 188.9-397.6 (g TPF g-1 dry soil respectively. A linear model was the best fitted semivariogram model for DHA. Semivariograms for DHA exhibited spatial dependence with a range of influence approximately 124.7 m.

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ALKALINE PHOSPHATASE ACTIVITY OF SURFACE AGRICULTURAL SOILS WITHIN AN URBAN AREA

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ABSTRACT

Soil phosphatases play a major role in the mineralization processes of organic phosphorus substrates. Enzymes in soils originate from animal, plant and microbial sources and the resulting soil biological activity includes the metabolic processes of all these organisms. The activity of soil phosphatases may be evaluated statistically due to application of geostatistical methods to soil science. The objective of this study was to assess the spatial variability of soil alkaline phosphatase activity (APA) within surface agricultural soils using the geostatistical techniques. The APA at the same transect of agricultural soils in Gumushacikoy was determined using some soil properties. Thirty-nine surface soil samples (0-20 cm) were collected from agricultural areas and analyzed. The alkaline phosphatase activity varied from 0.84 to 5.81 mg p-nitrophenol g-1 respectively. A linear model was the best-fitted semivariogram model for APA. Semivariograms for APA exhibited spatial dependence with a range of influence approximately 28 km.

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SPATIAL DISTRIBUTION PATTERNS OF SNOW DEPTH AND DENSITY WITHIN THE SINIRBASI CREEK WATERSHED (Turkey)

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ABSTRACT

Information on rainfall and runoff characteristics of a watershed is essential for developing effective management strategies. A significant amount of total rain falls during winter as snow in the Sinirbasi creek watershed (Erzurum-Turkey). The objective of this study was to determine spatial distribution patterns of snow depth and density within the watershed and to evaluate the patterns with topographical characteristics. The study area (1465 km2) was gridded with 50x50 m in the east to west and north to south directions, and snow depth and density measurements were obtained at each intersection (total of 469 points) with different periods. Experimental semivariograms indicated strong anisotropy with the highest variability in the east to west direction. Block kriging analysis was performed for preparing distribution maps. Results indicated that snow density was strongly dependent on altitude, and snow depth was well-correlated with micro topography and wind direction.

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EVALUATION AND MAPPING OF RANGELANDS DEGRADATION USING REMOTELY SENSED DATA

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ABSTRACT

The empirical and scientifically documents prove that misuse of natural resource causes degradation in it. So natural resources conservation is important in approaching sustainable development aims. In current study, landsat Thematic Mapper (TM) images and grazing gradient method (systematic changes in vegetation cover with distance from stock watering point and village) have been used to map the extent and degree of rangeland degradation. For measuring ground-based data, 200 M transects and 3 M2 quadrats have been used. In during ground-based data measuring, factors such as vegetation cover, litter, plant diversity, bare soil, and stone & graveles were estimated as biophysical indicators of degradation. It is mentionable that, ground-based data measuring is conducted around the stock watering points and villages as the two important critical points in rangelands. The next stage, after geometric correction and doing some necessary pre-processing practices on the study area's images, the best and suitable vegetation index has been selected to map rangeland degradation among the Normalized Difference Vegetation Index (NDVI), Soil Adjusted Vegetation Index (SAVI), and Perpendicular Vegetation Index (PVI). Then using suitable vegetation index and distance parameter has produced the rangelands degradation map. The results of ground-based data analysis suggest that there is a significant relation between increasing distance from critical points and plant diversity and also percentage of litter, i.e. the litter and diversity indices increase with increasing distance from watering point and village. Also there is significant relation between vegetation cover percent and distance from village, i.e. the vegetation cover percent increases by increasing distance from villages, while it wasn't the same around the stock watering points. Namely there wasn't significant relation between vegetation cover percent and increasing distance from watering points. The result of analysis about bare soil and distance from critical point was the same to vegetation cover changes manner. Also there wasn't significant relation between stones & gravels index and distance from critical points. The results of image processing show that, NDVI appears to be sensitive to vegetation changes along the grazing gradient and it can be suitable vegetation index to map rangeland degradation. The degradation map shows that there is high degradation around the critical points. These areas need urgent attention for soil conservation. Generally, it shows that the most parts of rangelands in studying area have been degraded. So conservation priorities on degraded rangelands have been recognized based on current degradation.

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DETERMINATION THE EFFECT OF URBANIZATION OF SANLIURFA CITY ON THE SOILS OF THE HARRAN PLAIN USING GEOGRAPHIC INFORMATION SYSTEMS

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ABSTRACT

This study was conducted to determine the urban development and expansion over arable lands of the Harran plain by using Geographic Information Systems (GIS) and Remote Sensing (RS) techniques. For this purpose two different images from 1989 (before irrigation) and 2000 (after irrigation) were used. In order to determine the urbanization status of Sanliurfa city, images acquired in 1989 and 2000 were processed and urbanization level was determined. Soil map, published in 1988, was digitized and a soil database of the Harran Plain was performed. The urbanization map for 1989 and 2000 were integrated with soil database. After integration of urbanization map with the soil database, the expansion level on the arable land was determined. Results indicated that urbanization expansion between 1989 and 2000 was 53,4%. Because of the growing of the city, 21,6 % in 1989 and 26 % in 2000 of arable part of the Harran plain were occupied.

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THE ESTIMATION OF EFFECTS OF SALINITY ON SOIL DEGRADATION AT PARCEL LEVEL USING GEOGRAPHIC INFORMATION SYSTEMS (GIS)

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ABSTRACT

In this study, impact of salinity changes before and after irrigation on soil degradation has been estimated in field scale by using GIS techniques for two villages located in Harran Plain. In order to assess impact of salinity on soil degradation, Plot Unit Values (PUV) for the years 1988 and 2000 have been determined by averaging soil index and Current Value Points (CVP) which is calculated based on the Electrical Conductivity (EC) data. In addition, standard topographic cadastral (STC) maps, 1:5000 scaled, were digitized for both villages. Then different soil gradation maps were prepared using GIS analyses results for both 1988 and 2000 years. By integrating gradation maps for both years, area that was affected from salinity has been calculated. Results indicated that soils of 57 plots (140 hectares) in Acikuyu village, and 362 plots (893 hectares) in Guneren village, have been affected from physical and chemical degradation of salinity.

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DETERMINATION OF THE RELATIONSHIP BETWEEN MEASURED RADIOMETRIC VALUES AND SATELLITE DATA OF DIFFERENT SOIL TYPES

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ABSTRACT

The determination of the relationship between the measured radiometric values and satellite data of different soil types were studied in this paper. Reflectance values of dominant soil series in the Harran Plain were measured by a spectroradiometer. The study was undertaken in the North of the Harran Plain between the Sanliurfa and Mardin main road. For ground measurements the EXOTECH 100 BX spectroradiometer, Landsat 7 ETM + image, 1/25.000 scale topographic map and 1/35.000 scale soil maps of the study area were used. The average of Spectroradiometric values of the soil surface and their Landsat reflectance values were analyzed. According to the regression analyses the results revealed no significant relationships.

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LAND USE PLAN ON THE BASIS OF EXISTING PLOTS OF THE KONUKLAR STATE FARM BY USING GIS TECHNIQUES

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ABSTRACT

The ideal land use planning of the Konya–Konuklar state farm was prepared using the Land Capability (LCC) and Suitability Classes for Irrigated Agriculture (SCIA), as well as Suitability Classes for Agricultural Use (SCAU), and Potential Land Use Class (PLU) in this study. Data was provided from the interpretation of the existing soil map. Thus, the digital map layers of the data were produced and land use planning for each plot were evaluated using the area-soil properties–management data by the query and analysis options of GIS. In order to plan each plot used the Dominant Class (DC) method was employed as an approach. In this approach, the dominant class (DC) was identified such as the major class for LCC, SCIA and PLU. The DC area varied from 19.8-100 % at each plot. It was account as negative result of generalization. But it was not possible to make a plan without generalization. It is found that 25-30 % of the study area was not suitably managed. It was also found that it was very easy to plan for each plot via data obtained from management and farming systems and alternative crops for agricultural enterprises using GIS. In addition, GIS was an available tool for planning of agricultural enterprises with optimum lots and sufficient data for unique systems in the evaluation of the dynamic data in land use planning.

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DETERMINATION OF SUITABLE AREA FOR DISPOSAL OF TREATMENT SLUDGE BY USING INFORMATION TECHNOLOGIES

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ABSTRACT

The aim of this study was to determine the suitable disposal area and the amounts of treated sludge after stabilization processes. In this direction we analyzed various industries in Sakarya and municipality from the point of their treatment sludge amounts, properties and disposal methods. The most important outcome of this research is dumping of the treated sludge to a preset land and continuously disposal of same kind of sludge to an area affects in adversely for agricultural purposes. Industrial and municipality sludges are grouped by their contents and applied stabilization methods for efficiently usage and remediation of the lands. By this way we had a proper inventory about treatment sludges and we can provided a suitable media to prepare a waste management plan. In addition to this, we have determined favor land for sludge storage and we have designated the types of sludges convenient for these lands. During this determination we consider the usage methods of treatment sludges in soil remediation. Information obtained from this study has been saved to the special computer program which we develop by considering environmental factors. By means of this, by using computer program and database, controlling of treatment sludges will became easier and lands which sludges are dumped can be used effectively.

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THE DETERMINATION OF LAND DEGRADATION IN GUZELYALI AND DARDANOS COASTLINE DUE TO THE SECONDARY HOUSES BY GIS

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ABSTRACT

In this research, the changes of the land use types in the years 1967 and 2004 and their environmental impacts are determined by using geographical information system at 8km South-West of Canakkale, which has an area of 28 km_ with 4km width and 7km length. The land use of the year 1967 is determined with the examination of the aerial photographs, which of the year 2004 is determined by land studies and their borders are determined with the global position system device. While there was an urban development in Dardanos at the year 1967, there has been 84 ha urban development at the year 2004 and the area need was met mostly with the use of the agricultural and forest lands. In the Guzelyali district, 185.8 ha have been opened to settlement between the two periods. The new settlements are rather unplanned, and the sewage is being discharged to the sea by leaching from sewer wells and with open canals. The disposals are a problem in a way of human and sea creatures' health and unplanned urbanization has opened irreversible wounds at the coastal landscape. Also, this situation has caused visual pollution in the Dardanelles and in Canakkale, which is a tourist and history city.

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THE EVALUATION OF THE URBANIZATION IN CANAKKALE CITY BY GIS

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ABSTRACT

There has been increased public concern in city over the long-term impact of urbanization on the available land used to produce food, feed, and fiber, Concern that urban use of highly productive soils may threaten our food security and sustainability has been debated for nearly two decades in Turkey. Canakkale has continually been a favorite of the native and foreign tourists with the natural, historical, touristical and cultural enrichments. The aim of this study is to monitor and assessment of the urban development and the land use efficiency of the Canakkale City between the years of 1967 and 2004 by using geographic information system (GIS) and global position system (GPS). Produced maps and data analyzed showed that the residential area under construction of houses, and social amenities has been increased by 5.5 times in last about 37 years. These construction activities have a direct bearing on agricultural land. In view of the population, the efficiency of used area per hectare per person was found 143.5 and 85.4 in 1967 and 2004, respectively. The residential area has been increased by 5.5 times whereas the population has been increased 3.3 times. The open green area has been increased 1.65 times from 7.5 ha to 12.4 ha and the amount of the open green area per square meter per person was decreased from 3.29 to 1.64 between 1967 and 2004. Results declared that the land has been misused in Canakkale.

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EFFECT OF SOIL SPATIAL VARIABILITY ON WHEAT YIELD AND NITRATE LEACHING

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ABSTRACT

One of the goals of precision farming concepts is the reduction of nitrate losses into the groundwater with the help of subplot-specific crop management practices. Based on fertilizer input, soil properties and climatic data, nitrate losses can be estimated using a simulation model taking all important processes of the nitrogen cycle into account. Objectives of the investigation were:Σ to determine the spatial structure of soil properties and yield on a heterogeneous experimental plot by using geostatistical concepts, i.e. variograms and cross-variograms, kriging and co-kriging; Σ to validate an existing Nitrogen-model with data from an N-fertilization trial where subplots were fertilized according to three different fertilization schemes; Σ to use the N-model to calculate point-specific nitrate losses based on spatial variable soil and Nitrate input data; Σ to estimate the effect of subplot-specific fertilization versus uniform fertilization on nitrate leaching. The results showed the spatial correlation between soil and yield data; the main factor influencing the yield was the rooting depth and the soil texture. Maps of the soil parameters and the yield were prepared by kriging and co-kriging techniques. These maps were used to determine an optimum point-specific fertilization scheme based on the expected potential yield. A combination of the N-model and the maps was used to calculate the nitrate leaching for any subplot. The nitrate losses varied from 25 to 110 kg N ha-1 year-1 depending on the fertilization scheme and soil quality on a specific point. The average simulated nitrate loss for the whole field for the optimized fertilization scheme was about 10% less compared to the nitrate loss for the uniform fertilization scheme. Thus, fertilizer application based on spatial variable soil parameters can help to reduce nitrate leaching into the groundwater.

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USING METHODS OF PRECISION FARMING FOR MINIMIZING WATER POLLUTION –FIRST-YEAR-RESULTS OF A DEMONSTRATION FIELD

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ABSTRACT

The nitrogen fertilisation in crop production can have negative effects on the ground water quality if the application rate does not fit the yield potential of the soil. To get adapted application rates the use of the precision farming system could be very useful. Precision farming is a site specific management system which uses Global Positioning System (GPS) to determine the actual position of application actuator like a spreader and allocate preassigned and soil-adapted amounts of fertilisers on a field. In a three-year-demonstration (2003 – 2005), the principles of precision farming are to be applied to the site specific nitrogen fertilisation of a field. The project aims at getting information on whether precision farming could be an instrument to avoid negative effects of nitrogen fertilising on the ground water quality. In a first step the field boundary data were recorded with a mobile GPS-receiver. After reviewing and evaluating the existing information on the field as to its importance for crop production, "management zones" with homogeneous conditions were determined. Different application rates of nitrogen fertilisers were applied to each "management zone". In a geographical information system all data were processed and introduced into an application map. In the board-terminal of the tractor the data contained in the application map were processed and the application rates and the geographical coordinates were communicated to the job-computer of the spreader, which then acts according to the information received. After the yield-mapped harvest the free mineral nitrogen in the soil was measured three times from the harvest to the end of the vegetation period. After the first year there is evidence that a fertilisation system which is tailored to the potential of the soil has less adverse effects on the quality of the ground water than a system which exclusively aims at producing high yield.

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DISTRIBUTION OF METALS Cu, Fe, Zn and Mn IN SOILS FROM THE GOKTAS (Murgul) SMELTING AREA

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ABSTRACT

Goktas (Murgul) Copper Smelter, located in the bottom of a deep valley, has been operating since 1951, by emitting particulates containing some toxic metals, and also about 80-100 tons of SO2 per day. Sulphurdioxide released to the atmosphere has caused great damages to the environment around the smelter, totaling nearly 10.000 hectares. In author's previous studies, it was indicated that the values of pH, organic matter content, the mean weight diameters of aggregates and the numbers of most of the agriculturally important microorganisms of the surface soils collected from the polluted sites, were lower than the values of those collected from the control sites. This article presents the results of analysis of the metals Cu, Fe, Zn and Mn of the surface soils (0-10 cm.) collected from the polluted, less-polluted and control sites (seven samples from each sites) around the smelter. Median values of the soluble (0.25 N ammonium acetate) metals of the soils collected from the close proximity of the smelter were found to be much higher than the values of those collected from less-polluted and control sites. It was indicated that the smelting operations associated with mining and processing plant activities have contributed to severe heavy metal contamination of the top soils in addition to the deleterious effects of SO2 emissions of the smelter on the soils and vegetation. It was suggested that before the re-vegetation of the barren areas, certain reclamation steps such as terracing and liming should be applied on the polluted areas for a sustainable use of the land.

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A REVIEW UPON TO VARIOUS METHODS TO REMEDIATE THE POLLUTED SOILS IN-SITU

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ABSTRACT

Pollutants of the soils may be physical (heat, radioactivity), chemical (minerals salts, solvents, heavy metals) and bacteriological (bacteria, viruses) in nature as well as municipal (sanitary land fills, sludge's from wastewater treatment) industrial (toxic and hazardous wastes) agricultural (fertilizer, pesticides exc.) in origins. The other pollutants that may be found are chlorophenol, cyanide, polichlorobifenil, chlorinated solvents, hydrocarbons. A number of study has been carried out in different places of the world so far for remediation of the polluted soils. In this work, various remediation methods of the polluted soils were evaluated. These methods were considered in four different groups such as physical, thermal, chemical and biological. The physical method is simply by using existing water and air in the soil to transfer the pollutant to a point where it can be taken out. Thermal remediation is applied to organic pollution of excavated soils In-situ chemical treatment is basically by injection of a chemical to degrade, immobilize or flush out a contaminant. Biological remediation is decomposing organic contaminants by using microorganisms. The remediation methods were evaluated by investigating different applications under various conditions. After the evaluation of different treatment methods, the remediation that should be applied was suggested according to pollution type and soil conditions.

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A CASE STUDY ON THE MICROBIOLOGICAL POLLUTION OF VEGETABLE SAMPLES COLLECTED FROM SOME PUBLIC MARKETS IN THREE TOWNS OF KONYA PROVINCE, TURKEY

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ABSTRACT

With the application to land of large volumes of minimally pretreated wastewater, it is evident that considerable potential for adverse health effects exists. Microbiological pollution could occur from food crop contamination, pathogen-laden aerosols, ground water pollution or surface water pollution. Konya Province has the largest agricultural lands among the other provinces in Turkey and thus it has been named "food store of Anatolia" as far as agricultural production is concerned. However, the climate around Konya Province is semi-arid and thus irrigation of the agricultural lands is not usually adequate. In other words, many towns around Konya have to draw waters, for irrigation, from lower quality sources including municipal wastewaters. A case study was carried out with the principal objective to investigate entrobacteria as an indicator of microbiological pollution in vegetables collected from public markets in three towns of Konya Province. The work was conducted upon 30 specimens representing ten different varieties of vegetable samples collected from the public markets belonging to the towns of the Eregli and Ilgin of the Province. Besides, some methods were tested to disinfect the vegetable specimens. The results were summarized as follows: 1) The distribution of total coliform bacteria on the vegetable specimens ranged from 04 to 80 percent. 2) The highest incidence of coliform bacterial pollution was found with parsely (approx. 80 %) and it was followed by watercress, lettuce, radishes, green onions, carrots, cabbage, cucumber skin, tomatoes and green pepper (46-58 %) specimens, respectively. 3) Among the markets from which the vegetable samples were collected, the highest incidence of the microbiological pollution, in terms of the coliform distributions, was detected for the Ilgin market and it was followed by the Seydisehir and Karapinar markets respectively. 4) The incidences of the pathogenic bacterial pollution found with the vegetable specimens were generally very low when compared to coliform bacterial distribution detected from the specimens and, the genera of the pathogenic bacteria isolated from the vegetables were as follows: Shigellasp., Salmonella sp. and Proteus sp. 5) The findings indicated the presence of fecal pollution of the vegetables which were supposed to be eaten fresh in the region. 6) The "scalding" was found to be the most effective method to disinfect the vegetables studied among the four treatments tested then it was followed by the treatments of "washing with a bacteriocide" and "washing with a detergent" respectively.

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EFFECTS OF IRRIGATION WITH GOKSU (SILIFKE) STREAM CONTAMINATED WITH DOMESTIC WASTES UPON THE SOIL AND PLANT POLLUTIONS

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ABSTRACT

Water demands of large agricultural areas are drawn from extensive drainage areas or aquifers. A lot of agricultural activities have to draw waters from lower quality sources or from long distances. Furthermore, domestic wastes including municipal wastewater are discharged usually into surface water or to sea. Therefore in order to prevent water quality degradation, all kind of wastes including municipal wastewater should be treated properly prior to disposal. A long term greenhouse experiment was layed out in "permanent agricultural soils on the experimental term" Gazi Ciftligi at Silifke between 2000-2003 in order to find out some physical, chemical and microbiological properties of Goksu stream which has been contaminated by the domestic wastes of Silifke town, and to determine the possible effects of such pollution upon the soil properties and the plant growth. The results were summarized as follows; 1) Water quality of the stream was classified as T3A1 and it was found not to have any characteristics limiting its utilization in terms of Na, Cl and B ions which are supposed to have direct toxic effects on plant growth whereas the irrigation water was found to be highly polluted with detergent and thus it was included in the IV.th class. On the other hand, the heavy metal contents of the water were found to be below the toxic limits whereas the fecal coliform level was very high as far as the microbiological contamination was concerned. 2) According to the soil and plant analysis, the soil and the plant samples were found highly contaminated by fecal coliforms but there were no excessive accumulations of salt, boron, total and exchangeable sodium, and heavy metals to damage soil properties and the plant growth. Eventually, the decreases in the plant growth and in the yield were attributed to ill effects of the detergents accumulated in the soil samples which were irrigated with the Goksu stream water polluted with the domestic wastes of Silifke town. 3) It was suggested that the domestic wastes should not be disposed into the river or stream before they have been treated properly.

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THE HEAVY METAL CONTENTS OF SOME WATER RESOURCES IN SAMANDAG (HATAY, TURKEY)

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ABSTRACT

In this study, the extent of heavy metal pollution in some water resources that are used for agricultural purposes in Samandag was investigated. In the study area, total fifty-two water samples were collected from twenty-seven water resources (nineteen from groundwater wells, seven from drainage canals and one from Orontes River) at two different periods (August 2002 and January 2003). On the samples, pH values were recorded and the heavy metal contents were determined by Inductively Coupled Plasma Atomic Emission Spectrometer (ICP-AES). The differences between water resources for each metal content were examined by Duncan test. The pH values of all samples varied between 7.57 – 8.41. The mean contents of Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb and Zn in all samples were 0.38, 0.52, 1.33, 24.11, 13.54, 9.60, 9.68, 7.67 and 45.55 mg/L, respectively. The differences in Zn and Ni contents among all the water resources were found to be statistically significant at 0.05 and 0.001, respectively. According to results obtained, all heavy metal levels were found to be lower than the limit values reported by FAO. In other words, there was no heavy metal pollution in the water resources investigated.

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WASHING OF Pb FROM CONTAMINATED SOILS USING EDTA

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ABSTRACT

Ethylenediaminetetraacetic acid (Na2-EDTA) extraction of lead (Pb) from three artificially contaminated soils (silty clay loam, clay loam and clay) was studied using laboratory-scale batch and column washing experiments. Soil samples were subjected to 0.1 M and 0.01 M Na2-EDTA chelant extraction. The results of batch and column experiments indicate that EDTA is very effective in removing Pb and that the extraction efficiency increases with increasing EDTA concentration. The highest removal percentage of Pb was obtained with batch test, using 1:10 soil to 0.1 M EDTA solution (92%) in sandy loam clay soil.

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SULFHYDRIL PRODUCTION AND ITS RELATIONSHIP TO Cd TOLERANCE IN CEREALS

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ABSTRACT

Sulfhydril (SH) production as phytochelatin glutathione (PC-G) and its relationship to cadmium (Cd) tolerance was studied in rye, triticale, bread and durum wheats, which have been previously shown different sensitivity to Cd. Plants were grown for 11 days on a nutrient solution. Experimental treatments included combinations of 3 Cd doses (0, 2 and 10 µM Cd) applied as CdSO4. Except for rye and bread wheat roots, dry matter yield (DMY) of roots and shoots decreased concomitantly to Cd supply. More than %91-97 of total Cd concentration was found in the roots. Sulfhydril concentration increased especially in roots as a function of Cd doses. According to Florijn and van Beusichem, all cereals in this investigation seem to represent "shoot Cd excluders", since the shoot Cd concentration to root Cd concentration ratio varied from 0.04 to 0.10. The increasing Cd and SH concentration in roots showed that production of SH reduced Cd movement from roots to shoots, and it has a major role in Cd detoxification.

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DETERMINATION OF HEAVY METAL LEVELS OF YAMALAK VALLEY SOILS-NAZILLI

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ABSTRACT

Study was carried out in Nazilli Yamalak Valley irrigated by Meandros and Dandalas rivers. Meandros and Dandalas rivers have been polluted by physical and chemical waste of some factories in the region in few decades. Especially, chemicals used in leather and textile industries include heavy metals intensively. These chemicals have been carried by irrigation water to the agricultural soils in the area. Study area was 22840 da and soil sampling points determined according to differences among the soil texture. Samples were taken from 18 points, taking into consider different soil depths (0, 10, 20, 30 and 50 cm), totally 92 samples. Pb, Ni, Cr, Cd, Co, CaCO3, pH, organic matter, texture and EC of the soils were determined. Correlation and regression analyses were performed to results. The results from this study showed that Ni is present at levels considered hazardous in the samples. Currently, Co, Cr, Pb and Cd do not seem in toxic levels. However, Co, Cr and Pb are quite high and near to the toxic limits. Cd accumulation is almost nil in the samples. Extractable contents of heavy metals are highly correlated to physical-chemical characteristics of the soils. Compared to other elements Cd differed in terms of its reaction to soil properties.

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RELATIONSHIPS BETWEEN AVAILABLE BORON CONTENTS AND SOME PHYSICAL AND CHEMICAL PROPERTIES OF NAZILLI-YAMALAK VALLEY SOILS

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ABSTRACT

Study was carried out in Nazilli Yamalak Valley irrigated by Meandros and Dandalas rivers water. Meandros and Dandalas rivers have been polluted by physical and chemical waste of some factories, cities and geothermal waters in the region in last few decades. Especially, geothermal waters used in energy production include B in high concentrations. This element has been carried by irrigation water to the agricultural soils in the area. Study area was 22840 da and soil sampling points determined by differences among the soil textures. Soil samples were taken from 18 points considered in different soil depths (0, 10, 20, 30, 40 ve 50 cm), totally 92 samples. Available B (according to Azomethine-H method), CaCO3, pH, organic matter, texture and EC of the soils were determined. Correlation and regression analyses were performed to results. According to results most of the soils in the area contain "high" and "very high" amount of B in terms of agricultural limits. B is highly correlated to physical and chemical properties of the soils.

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ATMOSPHERIC DEPOSITION OF SULPHATE AND NIRATE ON SOIL

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ABSTRACT

Atmospheric pollution in urban area is a major problem in many developing countries all over the world. Sulphur dioxide and nitrogen dioxide are major pollutants in the ambient atmosphere because of their adverse effects on human health and vegetation, their contributions to the acidification of the environment. Atmospheric wet and dry deposition of sulphate and nitrate were studied in Erzurum region. The concentrations of sulphate and nitrate and pH were measured in both rain samples and bulk deposition samples. Results indicated that the average pH value of precipitation was 6.54 and not acidic owing to high concentrations of alkaline soil particles in the atmosphere; despite sulphate concentration in rain was high. While, wet deposition rates of sulphate and nitrate were calculated as1165 mg m-2and 131 mg m-2, respectively, bulk deposition rate of sulphate and nitrate were found as 2066 mg m-2and 190 mg m-2, respectively. Higher dry deposition rate of sulphate was observed in comparison with nitrate.

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DETERMINATION OF LEAD AND CADMIUM IN ROADSIDE SOILS IN ERZURUM CITY

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ABSTRACT

Heavy metals possess bioaccumulation property, and the possibility of the amount of these metals reaching to a critical value and threatening human health increases the importance of this issue. Top soils in urban area are indicators of heavy metal contamination from atmospheric deposition. In this study, lead and cadmium levels in soils alongside three roads and at city centre were determined using atomic absorption spectroscopy. Lead and cadmium concentrations for surface soil were found between 22-32 mg/kg and 0.6-1.8 mg/kg respectively in city centre. The lead and cadmium concentration in soil is related to traffic intensity. A lead concentration of 25mg/kg and a cadmium level of 1.7 mg/kg were recorded as the highest concentration for Dadaskent road among other three roads. It was found that the topsoil was enriched with Pb and Cd relative to the subsurface soils. Pb and Cd concentrations dropped with the distance from the roadside and with decreasing traffic density.

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PHOSPHATE REMOVAL FROM WASTEWATERS BY USING FLY-ASH ADSORPTION

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ABSTRACT

Phosphate is an ion which should be removed by advanced wastewater treatment techniques. Excessive amounts of phosphate lead to eutrophication problem in receiving waters. In this research, removal of phosphorus in aqueous stream was investigated by using fly-ash obtained from Afsin-Elbistan Thermal Power Plant Station. The parameters such as initial phosphate concentration, adsorbent (fly ash) concentration, stirring speed and initial pH, were investigated. It was seen that phosphorus removal rate increased, increasing fly-ash concentration and stirring speed additionally it was observed that increasing the stirring speed shortened equilibrium time of adsorption process. An increase in the pH didn't affect the adsorption yield. Finally; it was found that fly-ash could be used as a suitable adsorbent for the removal of phosphate from aqueous streams.

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SOIL POLLUTION CONTROL REGULATION REVIEW 2004

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ABSTRACT

Turkish Environment Law passed in 1983, which consists of provisions of a general nature, envisaged that the various details would be governed by regulations. Eighteen years after the enactment of the Environmental Law, Soil Pollution Control Regulation was published in Official Gazette no.24609 on December 10, 2001. It was aiming to formulate a plan with a view to developing strategy for soil protection. After the publication of new regulation, Articles related to Sewage Sludges management in Solid Waste Control Regulation were deleted and added to Soil Pollution Control Regulation and this revisions (changes) published in Official Gazette no.24736 on April 25, 2002. One of the objectives of the Regulation is to protect soils against pollution with other related regulations as follows the Air Quality Regulation (1986), the Water Pollution Control Regulation (1988), Solid Waste Regulation (1991); Regulation on the Control of Hazardous Wastes (1995), Environmental Inspection Regulation (2002), Regulation of Preparation Principles of Environmental Systematic Plans (2000). At the same time as a precondition for membership to the European Union (EU), candidate countries must align their national laws, rules and procedures, including those relevant to the environmental sector, with those of the EU contained in the acquis communautaire. The Accession Partnership sets out the principles, priorities, immediate objectives and conditions decided by the European Council. The Turkish Government announced its own National Programme for the adoption of the EU acquis on March 19, 2001 and submitted it to the EU Commission. The National Programme is composed of 29 chapters including a chapter on the "environment (Johannesburg Summit, 2002). One of the objectives of the European Union's Sixth Environmental Action Programme is to protect soils against erosion and pollution. It is to fulfill this objective that the Commission was published Communication of 16 April 2002 from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - Towards a Thematic Strategy for Soil Protection (www.europa.eu.int). This paper discusses how Turkish Soil Pollution Control Regulation meets European Union expectations in subject of soil pollution.

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EFFECTS OF REPEATED APPLICATIONS OF SEWAGE SLUDGE AND MSW COMPOST ON THE TOTAL AND BIOAVAILABLE HEAVY METAL CONTENTS IN GREENHOUSE SOIL

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ABSTRACT

The repeated applications of sewage sludge and MSW compost were tested for total and bioavailable heavy metal accumulation in the greenhouse soil, and were compared with manure. In a two years study, manure, sewage sludge and MSW compost were applied to greenhouse soil and tomato plant was grown. Soil samples were collected after harvest and total and DTPA-extractable Zn, Cu, Ni, Pb and Cd contents of greenhouse soil were determined. The resulting data demonstrate that the sludge and MSW compost used in a 2-year period, increased both total and DTPA-extractable concentrations of Zn, Cu, Ni and Pb in the greenhouse soil. Cd increase was detected only in 'total' form in the second year, by sewage sludge and MSW compost treatments. Bioavailable Cd content of soil was found below the detection limit in all treatments. The amount of bioavailable metals in the greenhouse soil were significantly high for the sewage sludge and MSW compost treatments, almost including a 9,6 and 3–fold increase in Zn, Cu and Pb, respectively. Total and bioavailable metal contents of soil in sewage sludge and MSW compost applications were higher in comparison with manure application. In sewage sludge and MSW compost treatments, 'total' concentrations of all metals were found below the pollutant limits, but the increase in available fractions was more marked than those of total concentrations.

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REMEDIATION OF THE SALT AFFECTED SOILS AND THEIR ECONOMIC VALUE: AN EXAMPLE FROM AYRANCI – KARAMAN.

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ABSTRACT

The study is carried out in the semi-arid region at the Akgol depression of the Great Konya Basin. It is one of the driest parts of Turkey and 1000 meters above the sea level. Marl is the major parent material at the study area and some local organic surfaces are also observed. All of the soils at the study area were saline and alkaline soils with very high EC up to 14.5 dSm-1 and ESP up to 59 values. After analyzing soil properties and other factors, a center pivot irrigation and drainage system construction with gypsum applications were found as the best and applicable remediation practices. The study area has very limited water resources partly from rainfall but mainly from the surrounding uplands. Ground water, which comes from the wet southern slopes of the Toros Mountains through permeable strata to the south-east part of the Basin, is main water source for the farmers. Nearest available ground water source was 3.5 km from the study area. The closest gypsum sources were at the Ulukisla region which is 90 km to the study area. According to the soil properties and their distribution, the applications of 16.800.000 m3 water, 1500 km mole drainage system with 78 km drainage channel and 18.500 tons gypsum, were required for the remediation of this 650 ha land to open the area to the agriculture. In this paper such factors as climate, topography, drainage and irrigation system economically and constructions, water and gypsum resources, and agricultural practices were analyzed economically and in detail discussed.

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SELECTIVE SEPARATION OF GALLIUM FROM THE ACIDIC SOLUTIONS BY SUPPORTED LIQUID MEMBRANES USING TOPO AS CARRIER

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ABSTRACT

Gallium has acquired significant commercial importance due to the potential use of much faster computer chips made of gallium arsenides in place of silicon (1). Because of the extensive use of gallium in the electronics industry, processes have been developed in recent years for the recovery of gallium from secondary sources. The recovery of gallium has been mainly carried out by solvent extraction. Recently separation by supported liquid membranes has received an increased attention as an alternative process to solvent extraction and ion exchange (2). The present study deals with the carrier-facilitated membrane transport of gallium from chloride media across a flat–sheet supported liquid membrane using trioctylphosphine oxide (TOPO) as an extractant. Polymer support, Poreflon FP-010 or Celgard 2730, has been immersed in a membrane solution, consisting of an organic diluent (n-heptane, xylene or chloroform), an extractant (TOPO), and a modifier (isodecanol). The soaked polymer support has been placed in between the two compartments of a test cell via flanges. The acidic feed solution to be extracted has been placed in the feed solution. 0.1 M HCl has been used as a stripping reagent. The permeation of gallium has been studied under various experimental conditions: stirring speeds of the feed and stripping phases, initial gallium and TOPO concentrations, organic phase diluent, HCl concentration in the feed, and support characteristics. The selective separation of gallium from the acidic solutions, containing various ions such as Ga, Al, Zn, and Cu, has been achieved with an extraction efficiency of 95 %. The separation factors of gallium with respect to the ions of Al, Zn, and Cu have been found to be 557, 692 and 5348, respectively. In the end of 8-hour run, the gallium concentration in the stripping phase has increased to the 20 % above the initial feed concentration of gallium.

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HEAVY METAL POLLUTION IN ROADSIDE FIELDS RELATED TO MOTORIZED TRAFFIC

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ABSTRACT

In this study, heavy metal pollution in roadside fields of Van Region was investigated as a function of motorized traffic. In order to determine the heavy metal pollution, soil samples (0-15 cm) were taken from roadsides fields of three different intensive traffic region in Van. Roadside was accepted as beginning point and soil were sampled every fifteen meters from the roadside. Soils for each field were sampled 0, 15 and 30 m far away from the beginning point with five replications. Heavy metal (Pb, Cr, Ni, Cd, Fe, Mn, Cu and Zn) contents of the soils were determined using atomic absorption spectrophotometer. Heavy metal contents of soils changed with the sampling positions. The pollution risk for the Cd and Pb can be expected in these fields due to intensive motorized traffic.

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PHYTOREMEDIATION: (A REVIEW)

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ABSTRACT

The pollution of surface water and soil has become increasingly serious, as industries have developed. Soils can be contaminated with heavy metals derived from various sources, including abandoned mining wastes, over fertilizer uses, improper treatment of industrial wastes, incomplete collection of used batteries, leakage of landfill leachate, accidental spills and military activities. As a result groundwater may be contaminated by the leaching action of contaminated soils. Heavy metals can be transferred by the intake of vegetation, and human and animal health can be impacted through ingestion of both water and foods that have been contaminated by the soil. Phytoremediation is an emerging technology that uses various plants to degrade, extract, contain or immobilize contaminants from soil and water. Phytoremediation, involves the interaction of plant roots and the microorganisms associated with these root systems to remediate soils containing elevated concentrations of organic compounds. The aim of this paper is to evaluate the phytoremediation technology and to discuss the advantages and disadvantages/limitations.

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THE EFFECTS OF DIFFERENT SOIL TILLAGE ON SOIL ENZYME ACTIVITIES IN DIFFERENT PLANT TYPES

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ABSTRACT

Soil management and tillage affects to soil by changing physical, chemical and biological parameters. The goal of this study is to determine the influence of agricultural management systems on soil enzyme activities under different plant types. For this purpose, a field experiment was designed with six crop types (Lathyrus sativus L., Medico sativa L., Sorghum L. Moench, Phacelia fanacetifolia Beutham, Brassica napus oleifera and Triticale), five different management practices (tillage and all cultivation, tillage and no cultivation, tillage and straw application, tillage and manure application, and tillage and chemical fertilizer application), and with three replications. Soil urease activity was affected by plant type. Consequently, significant statistical relations were determined between urease activity and different types of management system on the different kinds of crops.

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THE EFFECT OF DIFFERENT CONCENTRATIONS OF MUNICIPAL WASTE COMPOST ON SOIL ENZYME ACTIVITIES FOR SELECTED AGGREGATES.

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ABSTRACT

Solid Waste Disposal is a very significant issue due to environmental concern in this century. This study was conducted on Canakkale Province in North-western Turkey. The objective of this study was to determine effect of different concentrations of municipal waste compost (0, 20, 40,80, 120 and 160 t/ha) on soil enzyme activities for selected aggregates. For this purpose, a field experiment was designed with one crop type (sunflower) and with three replications. Waste compost were obtained from Izmir Municipality Halkapinar waste factory. Soil urease activity was determined as between 60.2 and 169.1 mg NH4 kg-1 2 hrs-1 in selected aggregates during the field experiment..

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PREDICTION OF SOIL EROSION IN THE GULUC RIVER BASIN AT THE WEST BLACKSEA REGION IN TURKEY USING A GEOGRAPHIC INFORMATION SYSTEMS BASED ON UNIVERSAL SOL LOSS EQUATION

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ABSTRACT

The aim of this study is to estimate for soil erosion risk in the Guluc River Basin using Geographic Information Systems (GIS) based on Universal Soil Loss Equation (USLE). The study area is located in West Blacksea Region. The Guluc River basin is particularly prone to erosion. This is because it is subject to long dry periods followed by heavy bursts erosive rainfall, falling on steep slopes with fragile soils, resulting in considerable amounts of erosion. A set of factor in the USLE was studied. Each USLE factor, with associated attribute data, was digitally encoded in a GIS database to finally create five thematic layers. Simultaneous overlay operation on these produces a resultant polygonal layer, each polygon of which homogeneous area with respect to each of the five layers. The study indicates that heavily eroded is occurred at bare soil and steep condition. Low eroded is occurred mainly field and low slope.

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SOIL EROSION RISK ASSESMENTBETWEEN ALAPLI-AKCAKOCA

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ABSTRACT

This poster presents a study of determining factors and a method to predict the existence of erosion between Alapli-Akcakoca. Erosion is a serious problem specifically in certain areas, because of relief characteristics, climate, soils and land cover. The study area located in the Black Sea Region, Turkey, is a clear example. The analysis is based on factorial scores for soil erodibilty, slope, land cover. The scores are multiplied, giving a combined score that represents potential erosion risk. Based on the information sourec of Landsat ETM data, 1/25000 scale topographic maps, remote sensing and GIS techniques were used for the task of soil erosion types and intensity classification in the study area. Finally, in attempt to qualitative erosion in the study area, using modern digital techniques that aims to asses erosion risk . The end product is a set of maps that can be used as an aid to identifying regions that are prone to erosion.

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THE EFFECTS OF SIMULATED SOIL EROSION ON WHEAT

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ABSTRACT

The effects of simulated soil erosion on wheat yield is studied as field trial between 1997- 2002. Soil erosion was simulated by removing 0, 5, 10, 20 cm of surface soil. Three levels of fertilizer (0 kg/da P2O5 + 0 kg/da N, 6 kg/da P2O5 + 6 kg/da N and 9 kg/da P2O5+ 9 kg/da) is applied to various level topsoil removed parcels. The aim of the research is to determine the fertility decline of the soil by erosion and possible restoration by different levels of fertilizer application. The trial is established at Ankara Research Institute of General Directory of Rural Services. The soil of the experimental area is Typic Calsiorthid and the slope is 6% in the north-south direction. The trial is designed in randomized blocks (split plot). Wheat-Fallow was the rotation system. Organic matter, nitrogen, phosphorus, iron and zinc contents of the soils decreased depending on increasing amounts of topsoil removal. The organic matter and nitrogen content of the soils increased depending on increasing amount of fertilizer application. Average wheat grain yield decreased from 309 kg/da to 221 kg/da depending on increased amount of topsoil removal and increased from 119 kg/da to 355 kg/da depending on increased amount of fertilizer application. Nitrogen content of the flag leaves decreased from 2.72 % to 2.36% depending on increased amount of topsoil removal and increased from 2.36 % to 2.85 depending on increased amount fertilizer application. Fertilizer applications and topsoil removal did not affect the phosphorus and potassium contents of wheat leaf and grain. Although the phosphorus content of both leaf and grain varied depending on increased amount of topsoil removal and fertilizing level, the variations were not statistically important. All fertilizer treatments including the high rates that are higher than recommended fertilizer level were not able to regenerate natural productivity of original soil at all harvest years.

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ENVIROMENTAL ACTION PLAN FOR SUSTAINABLE URBAN- RURAL DEVELOPMENT in OMERLI WATERSHED CASE

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ABSTRACT

Ecosystem is based upon the stability of human activities and the habitat of all other living beings. Sustainability is provided by the continuation of this stability, under the threat of future developments. Having an interactive structure, nature and environment cannot be considered as apart from urban life. With the rapid urban developments, most of the natural resources are influenced by human activities in the metropolitan areas. Together with the growing economic activities and population, there is an increasing pressure on these areas. Most natural resources are influenced by these human activities. To ensure sustainable development, it is necessary to apply an integrated model for sustainability and protection of ecological system and environment around the urban areas. To identify and prioritize the problem areas that are under risk, decision makers have to develop monitoring systems, using integrated RS and GIS technologies. Omerli Watershed is selected as the study area, to demonstrate the power of new technologies to share and to present information in such studies. To identify and prioritize the problem areas (hot spot areas), decision makers have to develop efficient monitoring systems and management of information for decision-making and regional planning, using integrated new technologies such as remote sensing (RS) and Geographical Information Systems (GIS). Collection of samples, survey and physical analysis & measurements, system design, information flows and statistical analysis, visualization and updating of information are also included by this project as standard phases of analytical works. New tools are needed and action schemes for development opportunities have to be designed using new technologies. Such a monitoring system can be established using GIS and Remote Sensing technologies in order to provide an efficient tool for the decision makers to identify and determine where they have to develop and take Action Plan. These tools present a new plan, which is the process of designing and implementing time-based programs for the preserving natural resources. In order to establish an Action plan for sustainable environment, there must be collection of spatial database of areas in time domain objectives, and optimal management strategies will be developing with gathering and development of information (survey, sampling, sensing, collection, scenario, decision...). So that, the decision support system has to be integrated with the model, which has a system for capturing, storing, retrieving and monitoring of data for natural and human activities, together with a systematic information system for the environmental monitoring and conservation.

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INFLUENCE OF BORON TREATMENTS ON MINERAL NUTRITION AND YIELD OF CARNATION

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ABSTRACT

The aim of this study was to determine the effect of boron fertilization to yield and mineral nutrition of carnation grown under plastic greenhouse conditions. This study was conducted Mediterranean Terra Rose soil in Antalya Province of Turkey. The treatments are % 0.0, 0.2, 0.4, 0.8, 1.6, 3.2 Borax for foliar fertilization and 0.0, 1.5, 3.0, 6.0, 12.0, 24.0 kg/da Borax for soil application. Carnation cv. Ballet was used as a plant material. B, N, P, K, Ca, Mg, Fe,Mn,Zn amount of leaves and total blooms were determined. According to the results, although the both boron applications increased the boron contents of the leaves, other nutrient elements weren't effected . The maximum boron contents of the leaves (238.96ppm) were obtained at the highest doses of foliar fertilization, but toxicity symptoms weren't occurred. Also the effect of boron applications on the total blooms per m2 were found insignificant.

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ANALYSIS OF AGROECOSYSTEM DEVELOPMENT IN A CONTRASTED HUMID TROPICAL AREA OF THE NORTHWESTERN PROVINCE OF CAMEROON.

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ABSTRACT

Quantifying underlying biogeochemical processes active in agroecosystems is of tremendous importance for assessing the suitability of actual land uses a well as identifying hot spots that need immediate and specific managerial interventions. We applied principal component analysis (PCA) as a modeling tool on surface horizons (0-20 cm) of 61 pedons from the northwest province of Cameroon. The main objectives were: i) to capture the main sources of soil variability and associated ecosystem processes and ii) evaluate soil property dynamics with respect to food production function under low input conditions. The studied area ranged from 240 to 2280m asl and covered a wide range of parent materials and soils. A 6-factor model summarized significantly the whole data set explaining 82 % of total soil variance. Component 1 highlighted soil inherent fertility which accounted for 38. % of total soil variance (TSV). This factor was strongly correlated with land use intensification potential (P<0.001) and regional rural population density (P<0.001). Soil available phosphorus (AP) and organic constituents were the second and third most important components accounting for 13.4 and 11.7 % of TSV respectively. Available phosphorus reflected both the geochemical signature of the parent rock and soil developmental stage. Ash and basalt-derived soils have greater (P< 0.001) available P levels with (17.75±9.15 _gg-1) and (9.28± 6.48 _gg-1) respectively compared to trachyte (6.99± 4.96 _gg-1) and other basement complex derived soils (5.01.±2.7 _gg-1). The remaining components (19.3 % of TSV) were related to soil differential degradation processes. Chemical degradation with increased soil acidification, increased exchangeable aluminum and bulk density was specific of high rainfall zones with oxisols. Grouping of the sites on the basis of generated components provided significant clusters essential for regional soil testing and agricultural experimentation.

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THE ROLE OF IRRIGATION AREAS IN SUSTAINABLE DEVELOPMENT FOR NATURAL RESOURSES

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ABSTRACT

It is a known fact that rainfall is irregular during the arid and semi-arid periods. During these periods, crop water requirements have to be met by irrigation along the growth periods of the crops. In other words, agricultural sector depends on climatic conditions, and this dependency may only be reduced by increasing irrigation areas. 57 % of technically and economically irrigable 8,5 million hectares area has been developed for irrigation. In present conditions, 54 % of agricultural area developed for irrigation has been developed by DSİ. Gross Agricultural Product has increased about five times in areas developed for irrigation. This point is a crucial indicator which shows how fast the investments performed for irrigation purpose transform into national economy. The problems arising from not being able to form an agricultural structure with high efficiency hinder obtaining much more added value. Irrigation investments are one of the most important means of structural transformation. On the other hand, these investments are the elements which are affected most by the structural transformation. The increase in irrigation areas causes new problems such as financing difficulties, enviromental problems and increasing competitence with other sectors in terms of water demands. For this reason, in order to be able to provide a balance between water demand and water supply, new policies have to be formed for some matters such as physical structures, economical, social and institutional measures which direct the demand, water quality protection, and participatory irrigation management development. Certainly, providing more active water distribution and use in irrigation systems is one of the principal approaches for obtaining expected benefit. In the scope of irrigation facility which serve water to the farmers in a balanced and active manner without giving harm to environment, irrigation development which has been constitued by operation and maintenance activities, land consolidation, in-farm irrigation and drainage activities and land leveling have a great importance. The community which is the subject of the matter has to participate in the process of developing and protecting water and soil resources and in the stages of decision, financing, construction, application, operation and management activities. This participation process is the most important condition in the rational exploitation of national resources. Transferring of operation, maintenance and management responsibilities of irrigation areas developed by our General Directorate to the beneficiaries in the frame of participatory irrigation management activities in recent years is a crucial transformation and an improvement for realizing above mentioned condition. This approach is a suitable improvement for totalitarian water resources management based on demand. This management type is a multi-influential project development approach which starts from farmer and progresses to the resource, not starts from resource and progresses to the farmer. This approach also means realizing these internationally accepted principles : "pays who uses", pays who pollutes", and "the people who protect the water is supported".

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