

NETWORKING APPROACH TO THE SUSTAINABLE DEVELOPMENT OF EUROPEAN REGIONS BORDERING MAJOR RIVERS

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Received May, 2013; Accepted June, 2013

ABSTRACT

The paper proposes a systemic approach called Networking to the model of major rivers in Europe – assets which bring together multiple organisations and combine economic, social and environmental elements – to address changes aimed at sustainable development. The paper focuses on the lower basins of major European rivers. The ultimate aims of this new 'networking' approach are: (a) to implement a model of territorial planning and governance from a European perspective and (b) to improve the socio-economic knowledge base for a sustainable development. European major rivers, despite their relevance as commercial transport routes, divide the territory into two parts, one on each bank of the river, with different levels of economic and social integration. The banks of major rivers are more or less urbanized and populated, with a variety of economic structures, business dimensions, cultural heritage and tourism all items to combine to produce a sustainable territorial management. One obvious reason for this separation is material: the inadequacy of infrastructure for moving people from one side of the river to the other. Less obvious are the immaterial reasons, related to the absence of a truly integrated system which crystallizes the riparian regions on each side into a single economic district which would be better structured to attract people, investors and ideas. The paper discusses initiatives under way to implement this culture and the networking methodology for an integrated territorial planning and management.

Keywords: river governance, networking, sustainable development.

MONITORING OF EXTREME RAIN AND SNOW EVENTS FROM SATELLITE REMOTE SENSING OBSERVATIONS

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Received May, 2013; Accepted June, 2013

ABSTRACT

Extreme hydrometeorological events triggered by heavy rain and/or snowfall are becoming more common as heavy precipitation combined with expanding populations and development aggravate already vulnerable areas. Space-based monitoring is especially valuable in regions where ground-based weather stations are not available or unreliable, where extreme meteorological events frequently contribute to significant social and economic losses. Most current meteorological satellite instruments collect observations which are used to estimate geophysical parameters of rain and snow. Optically-based sensors on board geostationary weather satellites collect measurements at a high spatial and temporal resolution that are ideal for tracking rapidly evolving weather systems. Microwave-based sensors on board the polar orbiting satellites, on the other hand, provide less frequent measurements and at a coarser spatial resolution, but these measurements are more physically related to precipitating cloud properties. For snow cover monitoring, microwave measurements at specific frequencies penetrate clouds and thus are capable of monitoring snow on the ground in near all-weather conditions. This study demonstrates the utility of NOAA/NESDIS's high resolution satellite rainfall product called Hydro- Estimator (HE) and multi-sensor snow mapping product called Interactive Multi Sensor Snow and Ice Mapping (IMS) System for the monitoring of rainfall and snow cover associated with hydrometeorological disasters. An application of HE and IMS products for the monitoring of rainfall and snow that led to a major disaster flooding event in Albania is presented.

Key Words: Satellite Remote Sensing, Snow and Ice, Rain, Extreme Hydrometeorological Events

DATA ON THE PALYNOMORPHOLOGICAL CHARACTERISTICS OF FIVE PLANTS OF COMPOSITAE FAMILY IN THE REGION OF ELBASAN, ALBANIA

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Received May, 2013; Accepted June, 2013

ABSTRACT

Palynomorphological characteristics of the five plants of Compositae Family: *Arctium lappa*, *Solidago virgaurea*, *Cichorium intybus*, *Senecio vulgaris* and *Leontopodium alpinum* (the latter is very rare plant (status R) according to the data of IUCN), pollens of which were collected in fresh condition to the habitat of Great Site of the mountain Polis, were provided for the first time in the Albania's palynological literature by this article. This article aims to assess and highlight the existence of differences of some morphological features of the pollen grains of this family, regardless common particulars which distinguish the pollens of Compositae plants such as: the aperture three furrows three pores and the echinate exine. Regular pollen grains of three plants: *Senecio*, *Leontopodium* and *Solidago* were 3-zonocolporate, oblate spheroidal to prolate spheroidal and could be classified as *Senecio* type based to the data of the palynological literature. Three sharp tip furrows with smooth membrane and three pores with circular frames which due to thickening of intine in this zone, come out like cupoles, were identified to the pollen grains of the plants of genus: *Senecio*, *Solidago* and *Leontopodium*. Based on the results obtained by this study, it was concluded that the exine sculpture of the pollen grains of the five plants was echinate which vary from fenestrate-perforate at *Cichorium*, to echinate accompanied by small verruca at the pollen grains of *Arctium*, echinate accompanied by small granules at the pollen grains of *Senecio*, echinate accompanied by hools in the base of every spine at the pollen grains of *Solidago*, and echinate accompanied by microspinules at *Leontopodium alpinum*.

Key words: Pollen grains, aperture, pore, furrow, sculpture, echinate, fenestrate, Compositae Family.

PALYNOLOGICAL STUDY OF POLLEN GRAINS OF ARTEMISIA VULGARIS PLANT

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Received May, 2013; Accepted June, 2013

ABSTRACT

This article represents for the first time in the Albania's palynological literature information about data on the palynological characteristics of pollen grains of *Artemisia vulgaris* plant, Compositae family. The results obtained are shown compared with the palynomorphological features of *Artemisia absinthium* and *Artemisia caerulescens* taken by the Albanian literature. Pollen grains of the plant of *Artemisia vulgaris* were collected in fresh conditions to the Elbasan area. By making comparison among the main palynological characteristics of pollen grains of these plants showed that there are similarities in terms of pollen grains shape to three plants, the number of furrows and pores but at the same time there are also changes related to the size of pollen grains, furrows and diameter of pores. These changes are a consequence of the ecological factors and pollen grains processing method. Based on the results obtained by this study, by comparison made between pollen grains studied species showed that larger proportions of pollen grains in length, width and the diameter of the pores represent those of *Artemisia vulgaris*. Width of furrows in pollen grains of *Artemisia vulgaris* is thinner than the other two plants. The layer of exine at *Artemisia vulgaris* is thinner than *Artemisia caerulescens* and slightly thicker than *Artemisia absinthium*. The sculptures of exine of pollen grains of the three types is accompanied by small granules but especially, the pollen grains of *Artemisia vulgaris* are accompanied by microspinules.

Key words: palynological study, pollen grains, furrow, pores, *Artemisia vulgaris*, *Compositae*, Albania

CURRENT AND POTENTIAL USES OF PLANT RESOURCES IN THE MIDDLE FLOW OF SHKUMBINI RIVER BASIN

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Received May, 2013; Accepted June, 2013

ABSTRACT

Although middle flow of Shkumbini river basin's territory is small, its flora is characterized by a considerable species richness of higher plants c. 700 – 750, greater than that in much larger area. This is due to its geographical position, geological factors, relief, climate and hydrology. The total number of plants of economic importance in area is larger than many might suspect. The presence of about 172 medicinal and aromatic plants, such as mints (*Mentha*), Thyme (*Thymus*), marjoram (*Origanum*) and leek (*Allium*), improves the biodiversity values in this area and also play an important role in everyday life in this region, because of the locality consume as phytomedicines, herbal teas etc. Also very rich, about 228 plant species is the assemblage of well-known plants for honey producing by bees. 42 plant species have forage values, distinguished for their nutritional values and as food for the animals. A great importance represents the recognition of 59, harmful and toxic plants in preventing and avoiding the damages which may be caused by them. This great diversity constitutes a rich reservoir and is of great importance not only from the scientific, but also from the economic point of view.

Key words: plants of economic importance, medicinal and aromatic plants, honey plants, forage plants, harmful and toxic plants.

FORECASTING OLEA POLLEN CONCENTRATION BY REGRESSION AND ARTIFICIAL NEURAL NETWORKS

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Received May, 2013; Accepted June, 2013

ABSTRACT

Forecasting airborne pollen concentrations is one of the most studied topics. The most used tools for this problem are regression models. Notwithstanding, few works have used more sophisticated tools based in Neural Networks (NN) models. In this work, we applied some of these models to forecast olive pollen concentrations in the atmosphere of Tirana. After treatment of the Olea pollen data the relation between these and meteorological parameters were studied by multiple regression. For this a sequence of regression equations was made in order to find the best fitting equation. Each independent variable introduced in the equation explains a new percentage of variance, which is not explained by any other variable. This is the recommended method when the independent variables are intercorrelated, which occurs frequently with meteorological parameters. In this paper we have developed a new forecasting method that applies the ability of NNs to predict the future behaviour of chaotic systems in order to make accurate predictions of the Olea pollen concentration for pre-peak, post-peak and whole periods. This method gave good results for Pearson's correlation and R-square: the correlation was 0.96, R-square of 0.92 for pre-peak period and 0.82, R-squared 0.76 after the peak correlation, respectively. We used different MPL with three layers and a variable number of hidden nerves. Experimental results show an advantage of the NNs against statistical methods, although there is still room for improvement. Used models gave more satisfactory predictive results, where it was best for the pre-peak, then for post-peak and weak for the whole period.

Keywords: Neural Networks, Multilayer perceptron, Olea pollen, prediction, allergenic pollen.

GC-MS ANALYSIS OF SUBCRITICAL CO₂ EXTRACTS OF TUBERS OF GYMNOSPERMIUM ALTAICUM SUBSP. SCIPETARUM

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Received May, 2013; Accepted June, 2013

ABSTRACT

Recently we were interested in the chemical composition of *Gymnospermium Altaicum* subsp. *Scipetarum*. This is a new sub-endemic plant found in Albania, and never before anything was said about its chemical composition. Lately we presented some preliminary studies on chemical composition of extract taken with DCM from the tubers of this plant. In this paper will be presented preliminary results on the analysis of the extracts taken with sub-critical CO₂ from the tubers of this plant. The dried tubers were grinded and extracted with subcritical CO₂ in high pressure autoclave. The extraction was done at 65 bars and 33°C. Under these conditions the CO₂ is near its critical state and a Soxhlet like extraction could be produced. The extraction time was optimized at 4 hours, which allowed obtaining between 12-15 Soxhlet cycles. After completion of extraction the CO₂ was released giving the crude extract free from any traces of solvent. The crude extract was then analyzed with TLC and GC-MC. Identification of unknown peaks was done by Masspectroscopy. In order to better identify the minor peaks the crude extract was fractioned by column chromatography. The GC analysis of these fractions showed some new peaks that were not visible in the crude extract.

Key words: medicinal plants, subcritical CO₂, GC-MS, gymnospermium

Vol. 3 (3): 425-430 (2013)

ASSESSMENT OF THE SURFACE WATER QUALITY OF THE DRINI I BARDHE BASIN USING THE WATER QUALITY INDEX (WQI) METHOD

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Received May, 2013; Accepted June, 2013

ABSTRACT

The water quality index (WQI) method (Oram et al., 1970) was used to assess the quality of surface waters in Drini i Bardhe basin. The purpose of this paper was to analyze and present the results for the quality of surface waters in the river basin Drini i Bardhe based on the data for the period (2005-2011, KHMI 2012). The annual average values of nine physic-chemical parameters for each hydrometric station were taken into consideration for the calculation of the WQI. From the obtained results it is observed that the quality of surface waters in the Drini i Bardhe watershed range from 50 to 70. According to the WQI categorization the water quality of the Drini i Bardhe basin belongs to the middle class.

Keywords: Index, water quality, basin, surface water.

Vol. 3 (3): 431-436 (2013)

BIOREGULATOR INFLUENCE IN SHAPING OF THE “KNIP” APPLE TREE NURSERY

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Received May, 2012; Accepted May, 2013

ABSTRACT

This research work presents the results of a field trial with managed nursery trees including apple cultivar Gala Galaxy on the two different rootstocks M9 and MM 106. In April 2011, the saplings (copulated in March 2011) were planted in the distance 100 cm x 35 cm. In the second period of vegetations (2012) the field demonstrate separated in randomized block system in five combinations of treatments (Control, removal of terminal leaves, Progerbalin (GA4+7)1.8%, 2.2%, and 2.5%,) with three repetitions (in total 150 saplings for each apple rootstock combinations). We examined following parameters: trunk diameter 10 cm below and above the graft place, diameter of branches, length of apple tree nursery, number of lateral shots, length of branches and crotch angle of branches. Application of treatments was done three times in 14 days interval, starting when the main axis reached the length of 15 cm above cutting scion (70 cm on the ground). All parameters are shown differences between treatments and removal of terminal leaves compare control (untreated). But the treatment with Progerbalin (GA4+7) 2.5% resulted in the lower tree height, in the higher number of branches, and in the greater branch length compare with other variants in particular control, for two rootstocks M9 and MM106. While the removal of terminal leaves has displayed more influence width crotch angles.

Key words: apple nursery tree, rootstock, Progerbalin (GA4+7), removal of terminal leaves,

Vol. 3 (3): 437-442 (2013)

AIR DRIED HUMIDITY OF LUMBER IN OUTDOOR LOCATIONS IN ALBANIA

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Received May, 2013; Accepted June, 2013

ABSTRACT

This study is focused on giving useful information on equilibrium moisture content (EMC) of wood based on relative humidity and temperature data. Relative humidity and temperature data from about 30 main forestall and wood industries location, was available from the Institute of Meteorology in Tirana, Most of the relative humidity and temperature data are based on at least 30 years of observation. After the calculation of the means for monthly temperature and relative humidity are calculated the respective EMC. The EMC values for every month of the year, for every chosen location, give important information on air drying of lumber and the final humidity of wood products used in outside locations.

Keywords: Equilibrium moisture content, lumber, air drying

Vol. 3 (3): 443-446 (2013)

FOREST PROTECTED AREA AND THEIR ECONOMIC IMPACT ON TOURISM

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Received May, 2013; Accepted June, 2013

ABSTRACT

Protected areas are specific area with a special landscape value, rich in formation and rich in biodiversity. These areas have major historical and cultural values which are protected with a special status provided by law. Tourism is one of the most profitable sectors all over the country's economy and is in interest of all counties. The tourism on protected areas has a large part on it. This sector is an important one even in Albania. According to a publication by the National Bank of Albania, travel and tourism may represent more than 10% of GDP, and perhaps more than 60% of services trade. Dajti National Park, the area we have made the study, was been declared as a protected area with DCM nr.402, dated 21.06.2006, with an area of 29384.2 ha. It is the closest mountainous area to the district of Tirana, the country's most populated areas. This study is focused on the economic impact of the protected area on tourist incomes during a specific period of year (April- June 2013). For this purpose are made interviews where the target groups were chosen from random tourist, with different ages and different countries. The results obtained showed that this area is visited by this contingent mostly one time in a year and 30% of them expend at around 2.000 ALL during their staying in the park, and almost 30 % of the interviewers expend 1.000 to 2.000 ALL for the transportation in the park.

Keywords: protected area, economy, incomes, National Park, tourism.

Vol. 3 (3): 447-452 (2013)

STATISTICAL STUDY ABOUT THE LUNG CANCER IN REGIONAL HOSPITAL OF SHKODRA DURING 2008 - 2012

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Received May, 2013; Accepted June, 2013

ABSTRACT

Primary carcinoma of the lung is a major health problem with a generally grim prognosis. The International Agency for Research on Cancer estimates that there will be over 1.18 million deaths from lung cancer worldwide in 2007, which will raise to 10 million deaths per year by 2030. Each year, primary carcinoma of the lung affects males and females, making it the leading cause of cancer death in both men and women. Lung cancer accounts for 29% of all cancer deaths (31% in men, 26% in women). Lung cancer is responsible for more deaths in the world each year than breast cancer, colon cancer, and prostate cancer combined. More women die each year of lung cancer than of breast cancer. The aim of this study is to describe the incidence of all the hospitalized cases with lung cancer at the Regional Hospital of Shkodra during the period of 2008-2012. We have used a descriptive method and the data are elaborated with Microsoft Word Excel 2007. In this article we have considered all hospitalized cases in Regional Hospital of Shkodra, diagnosed with lung cancer. We conclude that the rate of lung cancer has increased. This increase is related to the changed lifestyle of population (tobacco smoking, inappropriate nutrition) and the improvement of diagnostic skills of doctors. On the other hand the improvement of methods and items in medicine influenced in an easier discovery of these new cases.

Key words: asthma, cancer, diseases, health, lung.

APPLICATION OF SHANNON- WIENER INDEX AND OTHER PARAMETERS AS A MEASURE OF POLLUTION IN A DRINKING RESERVOIR

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Received May, 2013; Accepted June, 2013

ABSTRACT

Many diversity indexes have been developed extensively to characterize a variety of biological communities. Since 1967, Wilhm and others suggested the widely used ShannonWiener diversity index (H) as a means for establishing water-quality parameters. The usefulness of this diversity index for assessing water quality is based on the assumption that clean streams have high diversity indexes, because clean streams contain many species of relatively equal numbers of individuals per species (Wilhm and Dorris, 1968). In contrast, polluted streams are interpreted to have low diversity indexes because many pollution-sensitive species are eliminated from the community and only a few pollution-tolerant organisms flourish in the absence of competition and in the presence of an abundant food supply. According to Wilhm (1970), "H usually varies between three and four in clean-water stream areas and is usually less than one in polluted-stream areas." Zooplankton organisms are basic food for fishes that live in fresh water ecosystems; besides, they include indicator species that determine water quality, pollution and the state of eutrophication. For this reason many researches have been conducted in terms of both taxonomical and ecological aspects on zooplanktonic organisms. We used the composition of zooplankton species (rotifers, cladocers and copepods) and their specific tolerance to abiotic factors in Bovilla reservoir, like saprobic index, in the way of classifying the trophic state of reservoir that is used as drinking water storage for at least 800 000 inhabitants. Composition of zooplankton showed a total from 44 taxons (26 for rotifers, 11 for cladocers and 7 for copepods), but the total abundance is quite opposite. The total numbers of copepods (where copepodit and nauplii larva's are most dominant), goes for more half percent of the total found in the two years of sampling. We had this low diversities species because the reservoir has young age, and the eutrophication process is not to be considered. In contrary the trophic status of these waters (most of the time were oligotrophic) should be maintained in low values as much as it possible, because of its use as drinking water. Saprobiological analysis showed that species of zooplankton using as indicator are not in high concentration along typical species that are also cosmopolitan species. The investigated area during these periods had values from 1.2 to 2.5, which correspond to I, and I- II water category.

Key words: Bovilla reservoir, rotifer, cladocer, copepod, composition ,diversity, Shanonn^Weinerbioindicator, water quality.

EFFECT OF PLANTING DENSITY AND SUBSTRATE TYPE OF THE CHARACTERISTICS OF THE GROWTH, THE ONION SEEDLINGS, BE PREPARED IN MODULE WITH MORE NEST

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Received May, 2013; Accepted June, 2013

ABSTRACT

The experiment was conducted in QTTB Korca. The objective of the study was to assess the impact of the number of seedlings in the nest and the type of substrate in the onion seedlings indicators prepared in many cube trays. For the sowing, were used the seeds cv. "Tak Star". In the study, three types of substrates were tested and five seedling density in the nest. Planting the seeds was conducted in polystyrol trays containing 288 nests. In each nest were planted 1, 2, 3, 4 and 5 seeds, respectively, were prepared the same number of so seedlings for nest. The experiment was set up with three repetitions according to the randomized block scheme with under separate variants. Types of substrate used, constituted the main version and the number of plants in the nest, sub-alternatives. Because of the competition, during the preparation of seedlings was evidenced a reduction in the number of leaves, height of seedlings, their diameter and dry matter. No differences recorded in connection with the substrates used. With better indicator seedlings are prepared to submit variant with three seedlings per cell density.

Key words : Allium cepa, trays, substrate, sapling.

Vol. 3 (3): 463-470 (2013)

SME-s GROWTH MODES: ARE HYBRID MODES APPROPRIATE FOR DEVELOPING COUNTRIES?

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Received May, 2013; Accepted June, 2013

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Various studies show that business growth is usually achieved through two main modes the acquisition and organic growth. However, there is a third way of firms' growth, the hybrid mode. Hybrid mode of growth means a method that lies between the first two modes. It is important to note that few attentions have been paid to this way of business growth. Hybrid mode of Growth occurs in several forms such as licensing, joint ventures, franchising, strategic alliances and partnerships. Despite multiple forms that Hybrid mode takes, our paper will focus on the theoretical treatment of Licensing and Joint Venture. During their theoretical treatment, we will aim to show the potentials of Kosovo's business to implement these forms of business growth. Some best practices of joint ventures among enterprises of Kosovo and developed countries shows that joint ventures offer benefits for each partner as well as other stakeholders. 'Modeli company' and "Birraria Peja" as a joint venture between local and international firms are success stories in terms of generating investments, increasing sales volume, and offering high quality products for customers. Using licensing offer reducing cost and time for a start up business and is a proper way to protect the foreign investors who came in Kosovo to expand their business through licensing or other hybrid modes.

Keywords: Hybrid mode of growth, Licensing, Joint venture, Kosovo.

EFFECT OF GROWTH RING ON HARDNESS AND BENDING STRENGTH IN BEECH (*FAGUS SYLVATICA* L)

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Received May, 2013; Accepted June, 2013

ABSTRACT

The beech wood (*Fagus sylvatica* L) is the most widespread deciduous wood in our forests. It is one of the most widely spread materials not only in the Wood processing Industry but also in construction, chemistry and paper industry. This study focuses on the effect of the growth rings on the mechanical properties of beech and more specifically on the static bending and Janka hardness . The tests were carried out in the Wood study laboratory in the Faculty of Forest Sciences. 240 samples in sizes 2x2x32 were prepared, following the UNI ISO standard 31-33 prerequisites, which were classified according to the number of rings in the transversal section and according to the angle formed by the force direction with the annual growth ring in the transversal section for the static bending and 138 samples in size.5 x 5 x 5 cm After carrying out the tests in the static bending, it resulted that the maximum tension value was 144N/mm².It is noticed that according to the number of the annual rings in the transversal section the maximum tension is present in the samples that have a small number of rings in the transversal section (4-5 rings) a value which is 3% higher than the group of samples that have 6-7 rings in the transversal section and 10% higher than the group of samples which have 8- 11 rings in the transversal section .For the hardness test resulted that the mean value was 538 kG in radial section, 640 kG in transversal section and 546 kG in tangential section, the highest hardness was in transversal section and in samples with 8-10 growth rings.

Key words: beech, bending strength, growth ring, transversal section

INSURANCE SERVICE ON PROPERTIES – INUNDATES IN SHKODRA

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Received May, 2013; Accepted June, 2013

ABSTRACT

The industry of financial services is so hard and complex at the same time. Though for many years, in Albania, the insurance market was enriched not only by the services offered by INSIG company – public owed, at this market many other private companies were added. Many of the insurance companies, make their gross income mainly from the obliged insurance services. The consumers behavior is dominated from the responsibilities that are born from businesses debts born from the relations to banking loans, from partnerships with foreign businesses, different European partners, transport system etc. The main reason, that we focused our study at the property insurance category is related with the inundates phenomena that is often happening recent years in Shkodra and Lezha ares. Apparently, exists always the potential risk that this area, specially during winter and fall, to be covered from water, for this reason, during this paper we are trying to study the present market, and the potential of insurance service on properties from the inundates risk. At one side of medal the inundates of a large area is a tragic situation for the inhabitants, but on the other side the insurance market targets this situation as the best opportunity for market extension. This paper makes a reflection of the situation of property insurance, the main reasons that actually influence the scheme of insurance services, also expanding new prospectives for this niche of insurance market. The main objective, of this paper, is related with the evidence of the insurance market at this area (Shkodër, Lezhë), valuating the new potential that have the insurance companies. The conclusions that we have discovered from this study, are related mainly to the potentials of insurance market and the spaces to make people and businesses act more responsibility to this phenomena not strange any more to this area.

Keywords: Property insurance, individuals and businesses, insurance companies, inundates – a climatic phenomena.

THE STUDY OF ORGANOCHLORINE PESTICIDES IN BREAST MILK AND THE IMPACT IN HEALTH, IN TIRANA ALBANIA

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Received May, 2013; Accepted June, 2013

ABSTRACT

Organochlorine pesticides are highly lipophilic and stable resulting both in their persistence in the environment and their tendency to pass up the food chain. Residues of these compounds are detectable in breast milk and have been monitored since the 1950s. Exposure data to organochlorine pesticides (OCPs) of mothers' breast milk samples were measured in different locations in Tirana and mothers have completed questionnaires about their diet. Milk samples were collected from mothers aged 18-40 years mothers involved in the study were nursing either their first or second child. The samples are taken at random. There are set 21 organochlorine pesticides including: dieldrin, aldrin, endrin, lindane, chlordane, heptachlor, DDT, α HCH, β - HCH, γ - HCH, BCH, Heptachlor epoxide, op-DDE, α Endosulfan, pp-DDE, op-DDT, pp-DDD, pp-DDT, β -Endosulfan, Captane, Methoxychlor, Mirex. In this work, we have detected PCB 36.84%, lindane 31.5%, α HCH31.5%, Heptachlor15.78%, α Endosulfan 15.78%, endrin 10.52%, dieldrin 10.52%. The samples have been examined by the methods of FAO, with gaschromatography ECD detector, and the results are frequently used to assess degradation in the environment as well as risks to recipient infants. The measurements have been calculated in mg/kg levels. Numerous studies have linked organochlorine pesticides exposures with cancer and other health effects. Exposure of DDT is linked with the cancer of breast in women. As a food, breast milk is unique. It is manufactured entirely for an individual consumer with some of its constituents driven by its recipient. It can form the sole source of nutrition for a considerable period of an infant's life.

Keywords: Organochlorine pesticides, breast milk

EVALUATION OF THE RESOURCES FOR A SUSTAINABLE DEVELOPMENT OF PRESPA AREA IN KORÇA COUNTY

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Received May, 2013; Accepted June, 2013

ABSTRACT

Prespa, the largest national park in Albania is well known for its natural, cultural and spiritual values. A small Macedonian minority, rich in traditions and customs and highly integrated into the Albanian society lives in Liqenas commune, which is situated within Prespa Park. Various important projects were carried out by national and international organizations, focused on improving the Prespa Park management and providing a better touristic offer. This research evaluates the resources of Prespa Park through the analysis of the sustainable development indicators (environment, population, economy). Written records and information provided by Liqenas commune besides interviews and questioners with the local officials and local community are analyzed to understand the importance of this protected area for the sustainable development of this area. The economical evaluation of the natural and cultural resources of this area as well as the policies and strategies that should be followed in the future for the sustainable development of Prespa area is the essential of this paper.

Key words: sustainable development, national park, cultural values, management, local community.

Vol. 3 (3): 497-500 (2013)

SUSTAINABLE DEVELOPMENT OF COMMUNE NDROQ OF TIRANA IN ALBANIA

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Received May, 2013; Accepted June, 2013

ABSTRACT

Albania is yet today an agricultural country where about 50% of the population lives in rural areas and agricultural production takes about 23% of GDP. (Gross Domestic Product). This article will make an economic and social diagnosis of the commune, based on indicators for sustainable development. For this diagnosis are used the data obtained from the Institute of Statistics and Directory of Agriculture of the district, surveys, interviews. Agriculture and livestock are developed in this commune. Although this is a commune not far from national road and not far from the capital of Tirana, some of the people are poor. We will analyze the source of their economic income, the investments that have been made by the farmers of this commune. Another issue will be how much they have benefited from the policies of government for the development of this commune. From surveys and interviews with farmers and commune's leader results that while farmers work hard, their economic situation is not very good. Conclusions and recommendations will be drawn at the end of the study connected with strategies and policies to be followed for the future.

Key words: commune, sustainable development, strategy, diagnosis

Vol. 3 (3): 501-506 (2013)

MONITORING OF QUALITY PARAMETERS FOR GASOLINE AND DIESEL FUEL MARKETED IN ALBANIA AND THEIR ENVIRONMENTAL IMPACT

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Received May, 2013; Accepted June, 2013

ABSTRACT

The transport sector is one of the major nodes of economic development. After 2000 in Albania this sector has seen a growing development which is directly reflected in the development of hydrocarbons, especially vehicle fuels market that characterized by a gradient increase in the values of 15-20% for year. In our country as in all developing countries, the major health and environmental problem is air pollution and increased consumption of petroleum products highlights the environmental pollution caused by CO₂ emissions, gas, NO_x, SO_x, CO, Pb, soot and unburned hydrocarbons. Since the amount of these pollutants in atmosphere depend on, inter alia, from the quality of fuels used, special importance has taken control of fuel quality parameters, with a focus on monitoring the content of sulfur and heavy metals such as Pb which are and determining environmental indicators. The purpose of this paper is to present quality diesel hydrocarbon market situation for the city of Tirana for the period of the first six months of 2011, monitoring of Pb content in gasoline imported and consumed in the country for the period 2005 to 2010, environmental impact relevant, as well as their compliance with the Albanian standards and those of the European countries.

Key words: Transport sector, environmental impact, fuels, SO₂, lead, legislation.

Vol. 3 (3): 507-512 (2013)

IMPLEMENTATION OF ENVIRONMENTAL POLICY IN PRACTICE, THROUGH ENVIRONMENTAL EDUCATION FOR SUSTAINABLE DEVELOPMENT IN KOSOVO, DURING THE PERIOD 2008 -2013

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Received May, 2013; Accepted June, 2013

ABSTRACT

Although environmental education in the Republic of Kosovo is not fully integrated into the curricula for formal education at different levels of education and teacher education, I have specifically focused on the Lower secondary school level because primary education is basic and compulsory for every Kosovo citizen. In this sense, pupils at primary level need to develop the necessary knowledge, skills and attitudes at an early age to enable them live sustainably in their environment after completing school. Another reason for my focus on primary education is that since in environmental education we are concerned with helping learners develop knowledge, skills, values and attitudes concerning the environment, it is appropriate to be taught at this stage because it is easy to mould a young person., it is believed that the primary school years are an important level of education because the learners at this stage develop most of their physic-neurological capacity quite early in life. Therefore, learning especially of attitudes and values is important to be learnt at an early age so that they can take action in addressing environmental problems. Environmental education refers to organized efforts to teach about how natural environments function and, particularly, how human beings can manage their behavior and ecosystems in order to live sustainably. Lectures during these six years were held, almost throughout the territory of the republic. Professional lectures are developed starting in 2008 (7 municipalities and 7 schools), 2009 (11 municipalities 14 schools), 2010 (7 municipalities 19 schools), 2011 (2 municipalities and 4 schools), 2012 (4 municipalities and 7 school) and 2013 (2 municipalities and 3 schools).

Key words: Lower secondary school, Environmental Education, Knowlegde, Sustainable development, lectures, especialy.

EFFICIENCY OF PHOTOSYNTHETIC APPARATUS IN POLLUTION CONDITIONS OF METALLURGICAL FACTORY

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Received May, 2013; Accepted June, 2013

ABSTRACT

Different specialized institutions have noticed a serious problem with contaminant emissions in atmosphere in Elbasan city and surrounding area. Air pollution is generated by Albania's largest industrial complex comprise Steel, FerroChrome and Cement Factories. Pollutions of metallurgical complex as all biotic and abiotic stressors affect the photosynthetic performance of leaves either directly or indirectly. Chl fluorescence signature of leaves as an efficient tool and a nondestructive method for the *in vivo* analysis of plant stress is applying to investigate the photosynthetic light processes and quantum conversion to detect stress on the photosynthetic apparatus. The aim of this paper is to assess changes of photosynthetic activity of the plants by in the presence of industrial pollution from metallurgical complex through chlorophyll fluorescence imaging technique. Fluorescence images of leaves were measured using the FluorCam 700MF imaging system that offers the possibility to study the distribution and patchiness of fluorescence signatures over the whole leaf area. Fluorescence images and measured parameters during the induction kinetics show a reduction of photosynthetic activity apparatus of endemic spontaneous plant Poplar. Fluorescence parameters demonstrate that the degree of reduction of photosynthetic activity depends from the distance of the plant grown areas to the source of pollution.

Keywords: spontaneous plants, chlorophyll fluorescence imaging, induction kinetics, photosynthetic apparatus

GENERAL DATA ON ASTER ALBANICUS, SHKOPET AREAL IN MAT REGION

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Received May, 2013; Accepted June, 2013

ABSTRACT

This paper, for the first time, provides data on the determination of morphological characteristics, number of chromosomes, as well as chromosomal formula, kariograma and idiograma, and morphological features of the pollen granules of *Aster albanicus* Degen. This species has been studied in its natural habitat in the area of Shkopet, Alt. 110 - 111m/T; N. 41°41'19,3"; E.0,19°50'24,1" in Mat region. The aim of the paper is the assessment of the probability of the existence of changes in the morphological, karyological and palynological features of this plant. The data obtained are compared with the evidences provided from different scientific resources and research references. Our research work shows that there are not observed changes in the morphological level related to the overall length of the plants of this population. There is also found an accordance of the palynological characteristics with the data of the research references. The number of chromosomes $2n = 18$ and the chromosomal formula $2n = 2x = 6M + 8m + 2m^{\circ} + 2sm^{\circ} = 18$ of this species is also determined.

Key words: Number of chromosomes, chromosomal formula, palynological characteristics, caryological features.

Vol. 3 (3): 525-532 (2013)

A COMPARED STUDY ON SOME ALFALFA CULTIVARS FORAGE YIELD IN MIDDLE AND NORTH- EAST ALBANIA CONDITIONS

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Received May, 2013; Accepted June, 2013

ABSTRACT

Alfalfa is the common and the most important forage plant in Albania. Recently the alfalfa planted area is much more than the area cultivated with wheat or maize. There is a lot commercial alfalfa cultivars present in Albanian agriculture these last two decades. Unfortunately, the most of these cultivars are very little tested for their biomass production stability. This study compare the biomass production in four commercial alfalfa cultivars and an autochthon one, evaluated at two distinct parts of Albanian territory, the central and north-east ones. Different measures of yield stability were calculated for the mean performance of each cultivar. The statistical analyses of three years data show that exist variations among studied alfalfa cultivars not only for biomass production, but for some other characteristics, too. The height biomass production correlation coefficient is positive and very strong at every mowing for all studied cultivars.

Keywords: Alfalfa cultivars, biomass, yield stability, height biomass correlation.

THE STUDY OF SOME PHYSIOLOGICAL CORRELATIONS DURING DYNAMICS OF OLIVE FRUIT'S (*OLEA EUROPAEA L.*) GROWTHErta Dodona¹, Hairi Ismaili²¹Agricultural University of Tirana, Dept. Plant Production, Albania²Genetic BankAUT, Koder-Kamez, Tirana, AlbaniaEmail: ertad2000@yahoo.it

Received May, 2013; Accepted June, 2013

ABSTRACT

During three years (2008-2011), from August to February, in 15-day intervals, were taken samples of fruit and leaves on cv. *Ulliri i Zi*, in over 10 randomized olive trees in Gerbllesh, Tirana. The analysis consisted in statistics estimates according diagnostics and multivariate correlation analysis for: fruit weight, percentage of oil, the humidity in leaves and fruit, acidity and peroxides no. too determinate physiological correlations. After bonding, fruits have increased rapidly until endocarp sclerification 17.3 mg/day . In August and September fruits and leaves are dehydrated (withered), and fruit's growth was lower, 11.1 mg/day . Reduction of water in the fruit to 50% correlates linearly with the leafy content 55%, ($r^2=0.92$). As a result, the photosynthesis was reduced, and therefore oil daily assimilation rate was 0.11%, in linear correlation with leafy moisture ($r^2=0.86$). After strong dehydration a part of leaves and fruits were falling down. By recreating of turgor, growth of mesocarp's fruit was 17.1 mg/day , at the same time as oil synthesis in fruit 0.18 \%/day , ($r^2=0.87$). At the beginning of December fruit's weight=2.31g (maximum weight) and oil percentage of 19.2% considering the biological correlation. After dehydration of fruit as a result of further maturation, and decreased weight 18.6 mg/day , while the % of oil has resulted in an increase of 0.1%/day and between these phenomena has been negative correlation ($r^2=-0.17$). At this stage the humidity of the leaves is normal while the value of acidity, and peroxides no. has been associated with the maturity of the fruit.

Key word: olea europaea; pericarp; percentage; olive oil; dehydration.

THE SPREAD OF GEOMORPHOLOGIC RISKS IN ALBANIA, ENVIRONMENTAL EFFECTS AND THEIR MANAGEMENT

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Received May, 2013; Accepted June, 2013

ABSTRACT

The main aim of this paper is to present the spread of geomorphologic risks in Albania, causes of origins and their development, the consequences in the natural environment and human economic activity. These risks are caused as a result of natural factors and social ones. The over controlled human activity on the environment stimulate the intensity of the action of geomorphologic processes. Through this paper is presented an overall assessment of natural hazards and human intervention with high intensity in the natural environment. As a result, it is important to have complex studies to analyze natural and human factors over environment. Further, this paper presents the types of geomorphologic risks in Albania, geographical coverage, favorable factors, the evolution and consequences in the natural environment and social-economic activity. A detailed analysis is made of erosion as the main form of land degradation. Albania is among the Mediterranean countries characterized by high levels of erosion. As a result, it is necessary to take protective measures for a good environmental management. Refers to the principle, it is easier to prevent "risks" rather than cure "scars", which often turn into "chronic", through this paper are presented the measures and recommendations that aim to prevent these risks in origin.

Keywords: Geomorphologic risks, erosion, sliding, environmental consequences, measures.

DETERMINATION OF SOME PHYSICO-CHEMICAL PARAMETERS IN OSUMI RIVER

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Received May, 2013; Accepted June, 2013

ABSTRACT

Rivers are important sources of surface waters in Albania. Monitoring and evaluation of environmental conditions of rivers is an indispensable need for determining the quality of aquatic ecosystems. This study was carried out to assess the present status of physico-chemical parameters of Osumi River, such as temperature, pH, Total alkalinity, ammonia ions, COD_(Mn), nitrate ions, chloride, TSS, TDS. The samples were collected during March 2012-March 2013. Three sampling stations were established for this study. Comparing the physico-chemical parameters with EU Directive [78/659] and Norwegian Institute for Water Research, resulted that Osumi River was classified in class 1 on the pH and Total alkalinity, mean value of ammonia ions 0.49mg/L exceed the limit of 0.16mg/L N-NH₄ of the EU Directive, according to COD, Osumi River was classified in class 5, mean value of N-NO₃ 2.23 mg/L is within the norm of 2.63 mg/L for 654 river stations in Europe. Mean concentration of phosphates results 0.624 mg/L, is out of the norm 0.4 mg/L of the EU Directive, value of chloride 208.3 mg/L ranged within the limit of 250 mg/L by USEPA, mean value of TSS 205.57 mg/L classified Osumi River in class 5, max. value of TDS 470.56 mg/L and mean value 232.87mg/L ranged within the limit of 500 mg/L related to WHO 2004 and USEPA, iron ions varies from 0.1-0.3 mg/, Osumi River waters were classified in class 3 by NIVA. This study provides the preliminary data for the evaluation and monitoring of physico-chemical parameters for the current status of Osumi River.

Keywords: physico-chemical parameter, water quality, aquatic system, Osumi River.

Vol. 3 (3): 553-560 (2013)

STRUCTURE OF THE FOREST OWNERSHIP AND MANAGEMENT RIGHTS IN THE ALBANIAN FOREST LAWS

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Received May, 2013; Accepted June, 2013

ABSTRACT

Many changes in the forest sector during the last 6 decades, political social and economic ones, are reflected clearly also in the forest legislation. They do show the trend and the policy being followed regarding many important issues in the forest sector as the ownership structure, property rights regimes and management practises on the Albanian forests and pastures reflecting the traditions and attitudes which have influenced the use and management of forests in Albania. This paper analyses the evolution of the Albanian forest legislation and the most important issues it has regulated in different periods, since 1923 when the first law on forest was approved and it is based on document analysis and literature review related to the laws on forests issued in Albania since 1923. A comparative analysis of the above mentioned elements of these laws and of complementary official documents was made to better understand how the forest laws have evolved and the role they played on the political, social, economic and environmental changes that occurred in the forestry sector at each period of time taken into consideration.

Keywords: Forest legislation, Forest Law, Forest ownership, Forest management, Comparative analysis

Vol. 3 (3): 561-568 (2013)

EVOLUTION OF ALBANIAN LAWS ON FORESTS

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Received May, 2013; Accepted June, 2013

ABSTRACT

The history of the path the forest laws have followed is an interesting topic and the most important issues these laws have regulated in different periods, show the trend and the policies being followed, the importance the forestry sector had for the society and the economy and its impact on the environment. This research paper is based on document analysis and literature review of all the laws on forests issued in Albania starting from 1923 to 2007. The analysis is focused on the evolution of the law objectives and the regulation intensity of different forest laws. Laws objectives have been identified and a comparative analysis of the main elements addressed in these laws and of complementary official documents was made. In order to understand how these laws have evolved and what have been the social challenges of each period, the laws elements addressed are comparatively analyzed on the importance they played on the political, social and economic changes that occurred in the forestry sector at each period of time taken into consideration.

Keywords: forest legislation, forest law, law objectives, comparative analysis

Vol. 3 (3): 569-572 (2013)

HEMATOLOGIC STUDIES OF HUMANS EXPOSED TO SULPHUR DIOXIDE

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Received May, 2013; Accepted June, 2013

ABSTRACT

The detrimental effects of air pollution on health have been recognized for most of the last years. The outdoor environment in industrial country without strong effective legislation remains a major health hazard. This paper discusses the effect of sulphur dioxide on hematologic parameters of humans. The study investigates venous blood samples of 106 inhabitants of two areas in Albania, an industrial region where the observed ambient air included sulphur dioxide, and the other a non-polluted one. The factors that can be effective as risk of hematological problems among inhabitants have been listed and regarding that, a database is taken. The parameters of blood samples of two areas are compared using ANOVA method and as a result, no statistically significant changes are seen in erythrocytes or immunologic parameters examined and in leukocytes. The mean of erythrocytes is at minimum normal value. All parameters of leukocytes formula are examined and using statistical methods is studied the role of independent variables on these parameters. A possibly significant decrease is found in monocytes of residents that have only 20 years of timestay, but this is recovered after 40 years timestay. A decrease effect (statistically significant) was noted in lymphocytes.

Keywords: hematological problems, erythrocytes, lymphocytes, monocytes

Vol. 3 (3): 573-578 (2013)

THE QUALITY OF THE SHARRI CHEESE IN THE MICROBIOLOGICAL AND PHYSICO-CHEMICAL ASPECT

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Received May, 2013; Accepted June, 2013

ABSTRACT

“Sharri” cheese is called so because it is made in the earlier years of Sharr Mountains with an altitude of 800-1200m. "This type of cheese is produced from a combination of half sheep milk and half cow's milk and the Sharr fragrance or aroma". "Pathogenic microorganism, if present in untreated milk, thought to be present in the cheese if the cheese is prepared several months before consuming. *Escherichia coli* is the most common cause of failure of cheeses and other foods". The purpose of this paper is to check the microbiological quality of “Sharri” cheese in a dairy licensed in the Republic of Kosovo. Work methodology: sampling, transport and analysis of samples in the laboratory is done according to standards. Samples were taken during 2012. During 2012 samples were taken for the analysis of physico-chemical microbiology. Our results speak in favor of that 8% of the samples resulted in bacterial contamination, which is isolated: *Escherichia coli*, while after the implementation of HACCP no bacterial contamination has been confirmed. All samples analyzed in terms of physico-chemical standards are in conformity with what works IKSHP. Implementation of HACCP in the dairy has given satisfactory results. HACCP is an immediate need to be implemented in all other subjects that deal with food activities.

Key words: sample, contamination, bacteria, hygiene, “Sharri”, HCCP.

ON PERFORMANCE IMPROVEMENT AND POLLUTION DEGREE OF USED VEHICLES THROUGH MAGNETIC TREATMENT OF FUEL

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Received May, 2013; Accepted June, 2013

ABSTRACT

This study analyzes the problem of vehicle performance change and their pollution degree during the use and their impact on the human and nature. The study analyzes the causes of the performance reduction and the increase of vehicles pollution level and their improvement ways. In the study it is taken the influence of the magnetic field on the fuel, before entering in the combustion chamber by taking the influence of the field strength in the burning process of fuel and vehicle engine performance. For this study were obtained in 3 diesel vehicles, in which magnets are placed with the different powers. The influence of magnetic effect on vehicle performance seems on the changing of engine revolutions and pollution reduction. For this we have measured the work period, when the performance difference occurs for case of the placement and removal of magnetic devices. Results of the study showed, that the influence of the magnetic field, increases fuel efficiency, making a faster and complete combustion, providing the performance preservation and the pollution degree on new vehicles. To used vehicles the performance increase goes up 15% and reducing pollution to 4 times, but the action effect starts late and depends from carbon deposit amount. The period of performance storage and the pollution degree by removing the magnetic field is the same. Magnetic device can use with interest for agricultural tractors and their maintenance during use.

Keywords: engine performance, vehicle use, pollution reduction

INTERACTIONS AT METAL INTERFACES-A COMPARISON OF VARIOUS MODEL APPROACHES

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Received April, 2013; Accepted June, 2013

ABSTRACT

Many of the mineral processing techniques depend on the interfacial interactions between solid and liquid, essentially water. The interfacial surface tension control those two phases, while the surface energy is one of the main components in understanding the interface process. The most common standard method used for determining the surface energy is contact angle method that characterizes the properties of the solids. This paper reports a description of the theory of interactions occurring at the metal interfaces and the experimental methods available for assessing those interactions. We made a review and a direct comparison of widely used models *for the calculation of surface energy of solids* such as Owens-Wendt-Rabel-Kaelble, Wu and Acid-Base models in order to evaluate their advantages and disadvantages. The particular site of Trepça Mining Complex jarosite waste material was used as an example for reviewing these interactions. In this case a contact angle between the surface and the edge of droplets of water, formamide, diiodo methane is measured. We conclude that values of contact angle provide an indication of the degree of surface hydrophobicity / hydrophilicity character. This method is an important parameter of processing the jarosite waste material in Trepca.

Key words: Interaction, metal interface, *surface free energy*, *contact angle*, Owens-Wendt-Rabel-Kaelble, Wu, Acid-Base model, jarosite waste.

ASSESSMENT OF ALTERNATIVE REPAIR TECHNIQUES OF RAFTER-TIE BEAM CONNECTIONS

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Received April, 2013; Accepted June, 2013

ABSTRACT

Timber trusses have been widely use in the medieval buildings, but also in the modern ones. In the timber trusses structure the most important connection is the so-called rafter-tie beam. The destruction of the connections and as a consequence the diffraction of the timber trusses normally occurs because of the overload or natural degradation by biological agents of the truss structure. In those cases there is a need of connections repair and the identification of simple and efficient repair techniques is very important for the normal function of the truss for a long period of time. The evaluation of two repair techniques of rafter-tie beam is in the focus of this study. Tests are conducted in connections composed of elements with 15x15 cm of section, from several timber species namely, poplar (*Populus sp.*), white fir (*Abies alba* Mill.), spruce (*Picea abies* Carst.) and chestnut (*Castanea sativa* Mill.). The connections tested originate partly from beams used in old/medieval buildings and partly from new beams. After the mechanical tests, the rafter-tie connections were repaired and tested again, which allowed us to compare the functional performance of the original and the repaired connections. We evaluated two repair techniques, one consisting in adhesive bonding of heel above parts separated during the mechanical tests, using a special wood adhesive and the second technique consisting in using metal tie elements, which don't affect the dynamics of the connection. Tests results are showing that all the repaired rafter-tie beam connections, despite the repair techniques used are functional under the same and in some tests under higher forces that the ones measured during the destructive mechanical tests.

Keywords: timber truss structure, connections, rafter-tie beam, repair techniques

MODELING OF CONSTITUIVE BEHAVIOR OF WHITE FIR TIMBER TRUSSES

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Received April, 2013; Accepted June, 2013

ABSTRACT

Wood material has found a wide use in different areas of human activity, including construction. It is a material that is used for a variety of structural forms such as beams, columns, trusses, girders, etc. In this study we have analysed first the behaviour of the timber trusses and their connection components based in mechanical properties test values. Tests are conducted for timber trusses and structural timber manufactured from white fir (*Abies alba* Mill.). Timber trusses in relatively small dimensions, 160 cm long, 32 cm high and with a cross section of 3x3cm are tested in order to calculate the shear strength, cause of its importance in calculating the dimensions for the construction of the timber trusses. This behaviour is also analyzed based on a mathematical model build on the basis of finite elements methods using modelling software. Knowing that the timber is an anisotropic and inhomogeneous material, for simplicity in modeling process, the material was assumed to be homogeneous and transverse isotropic with identical properties in radial and tangential directions. From the mechanical tests on timber trusses resulted that the failure of the structure occurred in the rafter tie-beam connection, because of the shear stress τ_{xy} on the heel. The behaviour of the connections during the tests has been confirmed by similar results achieved from modelling the behaviour of the trusses with the method of the finite elements. Tension values achieved from the behaviour modelling are close to the mechanical tests results.

Keywords: structural timber, timber trusses, mechanical properties, calculating criteria

DYNAMICS OF NITROGEN (N) AND PHOSPHORUS (P) DISCHARGE BY THE RIVER SHKUMBINI OVER DIFFERENT PERIODS

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Received May, 2013; Accepted June, 2013

ABSTRACT

The purpose of this paper is to evaluate these nutrients transport from the river Shkumbini based on the perennial database. These data are used to study the dynamics of the yearly distribution according to seasons in the region of our study. The calculations performed in this study show that Shkumbini river discharges into the Sea approximately 7.19 t nitrogen and 0.642 t phosphorus each year. Coefficient of these nutrients discharge varies on average 25-32 kg N ha⁻¹ yr⁻¹, and 1.8-2.8 kg P ha⁻¹ yr⁻¹. By using these perennial data and our experimental measurements in the field for many years it is noted that the values of phosphorus discharge are mainly in summer when the flow are low, while its very low concentration are observed during winter and spring. There is also repeated the same legitimacy in the case of nitrogen notes in the river Shkumbini. The change of nutrients' concentration reflects fully the different sources of discharge in Shkumbini river such as: industrial, urban, agricultural etc. So the contents of nitrogen and phosphorus in Shkumbini river are lower in the upstream of the river, while in its downstream is higher. Also referring to the estuary study data of Shkumbini river it noted that indicators of nitrogen and phosphorus content transported were higher than the two above references.

Key words: Shkumbini river, nutrient concentration (nitrogen and phosphorus), seasonal change, water flow, nutrient discharged coefficient.

Vol. 3 (3): 615-618 (2013)

ECOTURISTIC DEVELOPMENT IN DISTRICT OF DELVINA AND IT' S IMPACT ON SOCIO – ECONOMIC LIFE

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Received May, 2013; Accepted June, 2013

ABSTRACT

District of Delvina lies in a very favorable geographical position and also in a rich territory with a lot of natural and cultural potentials. We can say with no doubt that the nature is affluent. But there are a lot of problems associated to the use of the environment that has an impact on people's lives, in their economic status and theirs social life too. What impresses us mostly is lack of exploitation and ill-treatment of environment. It is clearly seen in the inconsistency between social- economic life and natural resources. Natural resources are indisputable asset that should be used as soon as possible, and this exploitation should be based on environmental criteria, otherwise will have environmental pollution and abandonment of the territory from the local population. Controlled exploitation of environment and application of tourism in nature based on environmental criteria would bring economic growth and social welfare. Ecotourism development in Delvina can be seen as one of the priority economic branches, as an indication of economic growth and better social conditions, this will help this district to transcend economic problems that exist. Ecological spaces lies everywhere; they are all very unique and special, a good reason to be seen and to be visited.

Keywords: tourism, ecotourism, ecology, tourist, region, environment.

Vol. 3 (3): 619-622 (2013)

EVALUATION OF MORPHOLOGICAL AND ESSENTIAL OIL COMPOSITION OF *ORIGANUM VULGARE* WILD POPULATIONS IN ALBANIA

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Received May, 2013; Accepted June, 2013

ABSTRACT

Rigoni (*Origanum vulgare* L.) is one of major aromatic plant that belongs to Labiatae family in Albania. In this work nine morpho-biometric traits of *Origanum vulgare* from 57 localities, scattered all over Albania, cultivated during 2010-2011. One year after planting, from the observations based on morpho-biometric traits was analyzed in order to determine the valuable morphological characters. A second harvest was carried out fresh weight and dry weight (g/plant) was registered. The high level of morphological variability among the studied populations suggests approach attractive for the pharmaceutical industry, to the variability of cultivated material and for breeding programs in the future.

Key words: *Origanum vulgare*, breeding, correlation, genetic distance, variability.