TRACK 1- FOREST CONSERVATION		
No.	**Title**	**Authors and Institutional Affiliations**
1.	Analysis on the Rainfall Regime of Ranao River Basin	Jonah Jean Callao* and Danilo Mero Mindanao State University, Mindanao State University – Marawi Campus, Philippines *jcallao17@gmail.com
2.	Assessment of Birds in the Mount Three Kings to Trigger Participatory Conservation Planning of the Landscape in South Cotabato, Philippines	Romeo M. Lomoljo*, Romeo Bornales, Abdulnasser D. Lomantong[1] and Jayson Leigh Segovia College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines *lomoljo@yahoo.com
3.	Assessment of Mangrove Forest in Arrecife Island Honda Bay, Palawan, Philippines	Jean Beth S. Jontila[1], Ma. Lotus E. Patiluna*[1], Eunice M. Becira[2] and Glesselle Batin[3] [1]Western Philippines University [2]Office of the Sangguniang Panglungsod, Puerto Princesa City, Philippines [3]Arreceffi Island/Dos Palmas Island Resort & Spa, Puerto Princesa City, Philippines *mlepatiluna@gmail.com
4.	Biodiversity of Sırçalı Canyon	Kerim Güney[*1] and Zafer Filiz[2] [1]Kastamonu University Faculty of Forestry, Turkey [2]Gazi University Faculty of Forestry, Turkey *kguney@kastamonu.edu.tr
5.	Biodiversity of Sorkun Plateau in Küre Mountains	Kerim Güney [*1], Melek Köseoğlu[2] [1]Kastamonu University Faculty of Forestry, Turkey [2]Gazi University Faculty of Forestry, Turkey *kguney@kastamonu.edu.tr
6.	Challenges on Sustainable Peatland Management in Indonesia to Minimize Transboundary Haze Pollution	Lailan Syaufina* Faculty of Forestry, Bogor Agricultural University (IPB), Indonesia *lailans@apps.ipb.ac.id
7.	Comparing Soil Organic Carbon Contents between Open and Hedgerow Fallow Systems	Wenceslao A. Coronado*[1], Johanna Iña P. Suson[2], Peter D. Suson[2], Ruben F. Amparado Jr.[2] and Olive A. Anies[2] [1]Mindanao State University-Naawan, Misamis Oriental, Philippines

		[2] Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines *wence.coronado27@gmail.com
8.	Comparing Soil Organic Carbon Contents in Three Usage Zones of Kızılcahamam Soguksu National Park, Turkey	Miraç Aydin*[1], Uğur Çitlak[2], Halil Barış Özej[3], İbrahim Yurtseven[4], and Senem Gunes Şen[1] [1]Faculty of Forestry, Kastamonu University, [2]Turkey Republic of Turkey Ministry of Forestry and Water Affairs, Ankara, Turkey [3]Faculty of Forestry, Bartın University, Turkey [4]Faculty of Forestry, Istanbul University, Turkey *maydin@kastamonu.edu.tr
9.	Determination of Buffer Effect of Forest Cover on Noise and Dust Pollution from Highway	Burak Aricak*, Cigdem Ozer, Hakan Sevik, and Mehmet Cetin [1] Kastamonu University, Turkey *baricak@kastamonu.edu.tr
10.	Determination of the Forest Road Route that can be Improved as "Type-A Forest Road" Suitable for the Use of Long Haulage Vehicles in Samatlar Forest Management Directorate	Cigdem Ozer Genc* and Burak Aricak [1]Kastamonu University, Turkey *cozer@kastamonu.edu.tr
11.	Different Insulation Materials for a Buılding in Turkey and Comparative Annual Heat Needs by Fuel Types	Gökhan Gündüz*[1], and Yeliz Cangül[2] [1]Bartın University, Faculty of Forestry, Forest Industrial Engineering, Turkey [2]Bartin Municipality, Turkey *ggunduz@bartin.edu.tr
12.	Duration of the Development Stages of *Rhizophagus grandis* Gyll. (Coleoptera, Monotomidae) in Laboratory Rearings on *Picea orientalis* logs in Turkey	Havva Aynur Özyılmaz[1], Gonca Ece Özcan*[2], Mahmut Eroğlu[3], and Hazan Alkan Akıncı[4] [1]Republic of Turkey General Directorate of Forestry, 06560 Ankara, Turkey [2]Kastamonu University, Faculty of Forestry, Kastamonu, Turkey [3]Artvin Çoruh University, Faculty of Forestry, 08000, Artvin, Turkey [4]Karadeniz Technical University, Faculty of Forestry, 61080, Trabzon,Turkey *goncaece@kastamonu.edu.tr
13.	Effect of Different Layer Thicknesses on the Surface Hardness Value of Water Based Insulation Paint Applied to Oak Parquets	Haci Ismail Kesik*[1], Ali Kabakci[2], Mehmet Ali Aksu[2], and Kubulay Cagatay[3] [1]Kastamonu University, [2]Incirli Technical Hight School, [3]Nuh Naci Yazgan University, Turkey *hismailkesik@kastamonu.edu.tr

14.	Effect of Trap Color and Trap Height on the Capture of *Ips sexdentatus* and *Thanasimus formicarius*	Erol Akkuzu[*1], Mustafa Şahin[2], Abdullah Ugış[1], and Ebru Bal[2] [1]Kastamonu University Faculty of Forestry Turkey [2]Kastamonu University Institute of Science Turkey *eakkuzu@kastamonu.edu.tr
15.	Examining State-Supported Private Afforestation Investments in Turkey, According to the Provincial Socio-Economic Development Degree	Gökhan Şen*[1], Ersin Güngör[2] [1] Faculty of Forestry, Kastamonu University, Turkey [2] Bartın University, Turkey *gsen@kastamonu.edu.tr
16.	Forest Certification in Turkey Based on Forest Stewardship Council Scheme	Ahmet Sivacioğlu Kastamonu University, Faculty of Forestry, Turkey ahmets1973@gmail.com
17.	Forest Edge Effects and Their Importance to Forest Ecosystems	Osman Topacoglu Kastamonu University, Turkey otopacoglu@kastamonu.edu.tr
18.	Identification of Suitable Tree Species for Flooded Littoral Zone of Lake Mainit	Peter D. Suson*[1] and Jerry B. Acero[2] [1]Surigao State College of Technology and [2]Mindanao State University-Iligan Institute of Technology, lligan City, Philippines *peter.suson@g.msuiit.edu.ph
19.	Introduction of Exotic Tree Species: Turkish Forestry Experience	Ahmet Sivacioğlu Kastamonu University, Faculty of Forestry, Turkey ahmets1973@gmail.com
20.	Investigation of Antioxidant Activities of *Pleurotus ostreatus* Grown in Different Compost	Fatma Bakar[1], Mertcan Karadeniz*[2], Temelkan Bakir[3], and Sabri Ünal[2] [1]Science and Art Center, 37150 Kastamonu, Turkey, Kastamonu, Turkey [2]Department of Forest Engineering, Kastamonu University, Kastamonu, 37150, Turkey [3]Department of Chemistry, Kastamonu University, Kastamonu, 37150, Turkey *mkaradeniz@kastamonu.edu.tr
21.	Mining Rehabilitation in Rio Tuba Nickel Mining Corporation, Bataraza, Palawan, Philippines: An	Bibiano P. Ranes Mine Rehabilitation Consultant Rio Tuba Nickel Mining Corporation (RTNMC)

	Integrated Strategy for Post Mining Ecosystems Restoration	Rio Tuba, Bataraza, Palawan, Philippines
22.	Promoting Conservation of Three Kings Mountain Habitat in South Cotabato, Philippines Using Bats	Abdul-Nasser D. Lomantong*[1], Romeo G. Bornales[1] and George S. Gunay[2] [1]College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines [2]Press and Information Office, Mindanao State University, Marawi City, Philippines *abdulnasserdl@gmail.com
23.	Relation Between LS Factor of Universal Soil Loss Equation and Sedimentation	Ramazan Erdem[1], Korhan Enez*[2] Ramazan Erdem, Hakan Can, Murat Demir, and Temel Sariyildiz [1]Arac Rafet Vergili Vocational School of Higher Education, Departman of Forestry, 37800 Kastamonu, Turkey [2]Kastamonu University, Faculty of Forestry, 37100, Kastamonu, Turkey *korhanenez@kastamonu.edu.tr
24.	Trace Elements of Hyperaccumulator Plants in Tropical Environment	Edgar D. Castañares*[1], Bohdan Lojka [2], Ondrej Drabek[3] [1]Faculty College of Agriculture and Forestry, Mindanao State University at Naawan, Misamis Oriental, Philippines [2]Department of Crop Science and Agroforestry, Faculty of Tropical Agrisciences, Czech University of Life Sciences, Prague, Czech Republic [3]Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences, Prague, Czech Republic *edca.4026@gmail.com
25.	Young Fast Growing Tree Species Demonstrated Promising Carbon Sequestration Potentials	Renato Pacaldo*[1], Rodrigo Pontillas[1], Romeo Bornales[1], Evelyn Bigcas[1], Danilo Mero[1], Melencio Jalova, Jr[1], Jennefer Calipusan[1], Marke Rule[1], Abdulnasser Lomantong[1], Kharis Maranda[2] and Malik Nagamura[2] [1]College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines [2]Watershed Management Division, National Power Corporation, Iligan City, philippines *renatopacaldo@gmail.com

ABSTRACTS

ANALYSIS ON THE RAINFALL REGIME OF RANAO RIVER BASIN

Jonah Jean Callao* and Danilo Mero

Mindanao State University, Mindanao State University - Marawi Campus, Philippines
*jcallao17@gmail.com

The study was conducted to analyze the rainfall regime in Ranao river basin from the past ten years to the present. The specific objectives of the study include (1) the identification of any changes in the rainfall regime in Ranao river basin for the past ten years; (2) determination of the effects of temperature in Ranao river basin; and (3) the determination of the effects of the change in forest cover in Ranao river basin. The descriptive nature of the study analyzed the rainfall data gathered from the National Power Corporation using PAST software and Regression analysis. Data on temperature and forest cover obtained were analyzed through trend patterns. Based on the result obtained using Regression analysis, it was evident that there were changes in the rainfall regime in the Ranao river basin ($p<0.01$) and it was correlated with the increase in the temperature and changes in the forest cover within the area. The result of this study implied that factors such as temperature and forest cover can affect the rainfall regime in Ranao river basin.

Keywords: *Rainfall Regime, Ranao River Basin, Temperature, Forest Cover, National Power Corporation*

ASSESSMENT OF BIRDS IN MOUNT THREE KINGS TO TRIGGER PARTICIPATORY CONSERVATION PLANNING OF THE LANDSCAPE IN SOUTH COTABATO, PHILIPPINES

Romeo M. Lomoljo*, Romeo Bornales, Abdulnasser D. Lomantong and Jayson Leigh Segovia

College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines
*lomoljo@yahoo.com

Mount Three Kings (MTK) is an important bird area within the Allah Valley Protected Landscape in South Cotabato, Philippines. Despite its status as a protected landscape, the natural resources therein, particularly birds, have been facing threats of degradation due to anthropogenic activities. To resolve this problem, it is imperative to formulate a comprehensive conservation plan. However, initiative to formulate this plan has been hampered due to resource limitations and limited biodiversity data. A pragmatic study of birds was conducted on MTK to trigger conservation planning of the landscape. Mist nets measuring 4m wide x 12m long were set-up across flight paths (trails, creeks, mid-slopes, ridge tops and forest edges) on three (3) sampling sites in the mountain. Captured birds were taken for morphometrics and photo-documentation, and released right after. Birds detected along 1-km transect were also recorded. Results show that a total of 120 birds distributed to 42 species were recorded from MTK. The over-all biodiversity is within the usual range (H' = 2.65) but the birds' populations are unevenly distributed (E = 0.79) among different species. MTK hosted high rate of bird endemism (89%) with one vulnerable species (*B. hydrocorax mindanensis*) suggesting high conservation value of the mountain and hence, participatory conservation of the area is herein recommended.

Keywords: *Biodiversity, Birds, Conservation, Mount Three Kings, Vulnerable, Participatory*

ASSESSMENT OF MANGROVE FOREST IN ARRECIFE ISLAND HONDA BAY, PALAWAN, PHILIPPINES

Jean Beth S. Jontila[1], Ma. Lotus E. Patiluna*[1], Eunice M. Becira[2] and Glesselle Batin[3]

[1]Western Philippines University
[2]Office of the Sangguniang Panglungsod, Puerto Princesa City
[3]Arreceffi Island/Dos Palmas Island Resort & Spa, Puerto Princesa City
*mlepatiluna@gmail.com

Arrecife island is blessed with rich marine ecosystems. Mangroves are one of the untouched resources that flourish and thickly cover which stretch up to 400m from landward to seaward protecting the eastern and southern parts of the island. Thus, this study was conducted to assess the mangrove forest in Arreceffi Island Honda Bay, Palawan, Philippines. Areal extent, species composition, population density, relative abundance and distribution were determined. Purposive sampling was employed. Fifteen (10 x 10 m) quadrats were laid at landward and seaward portions of the mangrove area. The coordinate's points were determined using Global Positioning System (GPS, GARMIN) to estimate the total mangrove area. The mangrove forest covers an area of 37.12 has. Mangrove stands total mean density was at 4, 234 ha^{-1}. A total of 15 species of trees (7 saplings and 5 seedlings) belonging to 10 genera in 8 families were recorded. The total mean density of the mature mangrove stands was at 4, 234 ha^{-1}. Among the species, *Rhizopora stylosa* displayed the highest mean density at 2, 611 ha^{-1} and the most abundant species at landward and at seaward part of the mangrove area in their respective growth stages, respectively. While the least abundant species found at landward area were *Exocaria agallocha* and *Xylocarpus granatum* and at seaward were trees of *S. alba* and *R. mucronata*. Most of the mangrove species were uniformly distributed and some were clumped or aggregated. Further studies on environmental or anthropogenic impacts and other associated fauna are highly recommended.

Keywords: *Arrecife Island, Mangroves, Density, Species Composition*

BIODIVERSITY OF SIRÇALI CANYON

Kerim Güney[*1] and Zafer Filiz[2]

[1]Kastamonu University Faculty of Forestry, Turkey, [2]Gazi University Faculty of Forestry, Turkey
*kguney@kastamonu.edu.tr

The study was carried out in 2006-2007 on the Flora of Sırçalı Canyon. The study area is located on the east of Safranbolu. The study area is under the effective control of semi-dried Mediterranean climate and West Black Sea Region. The flora of study area consists of 292 taxa which belong to 73 families and 218 genera. The phytogeographic regions of species have been determined as follows: Unknown (129), Euro-Siberian (51), Widespread (49), Irano-Turanian (27), Mediterranean 25. These species belowng to the following families: Asteraceae (24), Lamiaceae (18), Fabaceae (14), Rosaceae (12), Poacea (11), Brassicaceae (10), Apiaceae (10), Boraginaceae (9), Caryophyllaceae (8), Scrophulariaceae (7), Liliaceae (6), Caprifoliaceae (4).

Keywords: *Flora, Safranbolu, Sırçalı Canyon, Biodiversity*

BİODİVERSİTY OF SORKUN PLATEAU İN KÜRE MOUNTAİNS

Kerim Güney [*1] and Melek Köseoğlu[2]

[1]Kastamonu University Faculty of Forestry, Turkey, [2]Gazi University Faculty of Forestry, Turkey
*kguney@kastamonu.edu.tr

This study was carried out on the flora of the Sorkun Plateau and its environs between the years 2003-2004. The study area is located between Pınarbaşı and Cide counties. The climate of the study area, were estimated as Mediterranean. The flora of study area consists of 212 taxa which belong to 59 families and 156 genera. The phytogeographic regions of the species have been determined as follows: Unknown %34, Euro-Siberian %38, Irano-Turanian %5, Euxine %8, East Mediterranean %4, Mediterranean %18. The widespread families include Asteraceae (%18), Rosaceae (%12), Fabaceae (%8), Lamiaceae (%8), Apiaceae (%4), Poaceae (%4).

Keywords: *Kastamonu, Sorkun Plateau, Flora, Biodiversity*

CHALLENGES ON SUSTAINABLE PEATLAND MANAGEMENT IN INDONESIA TO MINIMIZE TRANSBOUNDARY HAZE POLLUTION

Lailan Syaufina

Faculty of Forestry, Bogor Agricultural University (IPB), Indonesia
lailans@apps.ipb.ac.id

Despite of the importance of peatland area in Indonesia for environmental balance, peatland fire has come as a serious threat for peatland management affected transboundary haze pollution in ASEAN region. It seems there is a gap between policy level and practices in site level for using fire in land preparation. A study was conducted to identify and review good practices on sustainable peatland management in Kalimantan, Indonesia and to review policy on sustainable peatland management and forest and land fire control. Field observations were conducted to identify good practices implemented in West Kalimantan as well as in Central Kalimantan. On the other hand, content analyses were performed to study regulation related to peatland management and fire control. The study revealed that burning is still used in land preparation for agriculture farming, which may cause transboundary haze pollution. Whereas, fire is prohibited in any land management including land preparation by regulations. Good practices on the implementation of sustainable peatland management were identified in both West Kalimantan and in Central Kalimantan, including: controlled burning practices using pile burning technique which seems to have minimize haze pollution and intercropping practices of Agroforestry using peatland endemic species. In policy level, the Government of Indonesia has produced regulation related to protection and management of peatland ecosystem as well as fire control in forestry and agricultural plantation. Gaps between policy level and site implementation level are great challenges which need to be answered. Dissemination of good practices and establishment of pilot sites are among the solution.

Keywords: *Peatland Fire, Kalimantan, Controlled Burning, Pile Burning, Agroforestry*

COMPARING SOIL ORGANIC CARBON CONTENTS BETWEEN OPEN AND HEDGEROW FALLOW SYSTEMS

Wenceslao A. Coronado*[1], Johanna Iña P. Suson[2], Peter D. Suson[2], Ruben F. Amparado Jr.[2] and Olive A. Anies [2]

[1]Mindanao State University-Naawan, Misamis Oriental, Philippines
[2] Mindanao State University-Iligan Institute of Technology, Iligan City, Philippines
*wence.coronado27@gmail.com

The study aims to compare the carbon storage capacity of two (2) fallow systems, namely: open and hedgerow. In open fallow system, which is a traditional method, the cultivated soil is allowed to rest and exposed to sunlight. In contrast, in the hedgerow fallow system, which is also known as "alley farming", the abandoned farmland is also allowed to rest, but with benefits of shading from planted trees along the alley, which are usually N-fixing species. This study is located in previous research fields of International Rice Research Institutes, suggesting that the experimental fields have more or less homogenous in cultural and management history. Two experimental plots, representing the two fallow systems were established adjacent to each other. Within each experimental plot, five sampling plots were established in which soil samples to 30-cm depth were collected, and then processed in the laboratory for soil organic matter (SOM) analysis using the Walkley and Black Method. SOM values were then converted to soil organic carbon (SOC) using a conversion factor. Significant differences of mean SOC values of two treatments were determined using t-test analysis. Results showed that the hedgerow fallow system has significantly higher carbon stored (99.55 Mg ha^{-1}) compared with the open fallow system (47.10 Mg ha^{-1}). These differences are attributed to the differences in the amount of SOM inputs between the two fallow systems and decomposition rates. Thus, it is concluded that hedgerow fallow system is a better alternative fallow system to store carbon than the open fallow system.

Keywords: *Fallow Systems, Improved Fallows, Biomass Carbon, Soil Carbon and Climate Change.*

DETERMINING THE SOIL ORGANIC CARBON CONTENT OF THE ABSOLUTE PROTECTION AND LIMITED USES ZONES IN KIZILCAHAMAM SOĞUKSU NATIONAL PARK

Senem Güneş Şen*[1], Miraç Aydin[1], and Uğur Çitlak[2]

[1]Department of Forest Engineering, Faculty of Forestry, Kastamonu University, Kastamonu,
[2]Turkey Republic of Turkey Ministry of Forestry and Water Affairs, Ankara, Turkey
*sgunes@kastamonu.edu.tr

This study aimed to determine the carbon storage amounts of different forest ecosystems which have a significant positive effect in terrestrial ecosystems specially in reducing the adverse effects of global warming. For this purpose, the carbon storage capacities of different forest ecosystems have been investigated to determine the soil organic carbon contents within the absolute protection and Restricted Uses zones in Kızılcahamam Soğuksu National Park. Results showed that the average carbon content was determined as 34,41 tons / ha in absolute protected areas and 34,51 tons / ha in limited use zones. The average carbon ratios were determined as 3.64% in absolute protected areas and 3.77% in limited use zones.

Keywords: *Protection Zone, Limited Use Zone, Soil Organic Carbon, Soguksu, Kızılcahamam*

DETERMINATION OF BUFFER EFFECT OF FOREST COVER ON NOISE AND DUST POLLUTION FROM HIGHWAY

Burak Aricak*[1], Cigdem Ozer[1], Hakan Sevik[2], Mehmet Cetin[2],

[1] Kastamonu University, Faculty of Forestry, Turkey
[2] Kastamonu University, Faculty of Engineering, Turkey
*baricak@kastamonu.edu.tr

The technology that has developed in the 21st century has brought many problems, and the factors that are not taken into consideration even in the previous century are the most important problems of our time. These problems can be examples of light pollution, noise pollution, domestic waste, radioactive substances, etc. Air pollution can be defined as existence of one or more pollutants in the atmosphere in the quantity and duration that can cause damages on human, plant and animal life, commercial or personal property or the quality of the environment (Müezzinoğlu, 1987). The most common air pollution components are particulate matter (dust pollution), CO_2 and noise pollution (Sevik et al., 2016). In today's world, noise and PM pollution are the ones that should be evaluated in this context. The fact that the source of these pollutants depends on the vehicles in a significant way, the amount of traffic and the constant increase in traffic density cause the motorways to be a permanent source of PM and noise. Therefore, studies aiming solution for these problems gain importance in order to determine the extent and effects of these problems. The purpose of this study is to determine how and with what kind of buffer effect the forest cover, which is responsible for isolation of the area affected by PM and noise pollution on the highway, according to leaf type, closeness and stand development age characteristics. Hereby the criteria of isolation of PM and noise pollution that adversely affect the human and wild life by forest cover which is a natural buffer zone have been revealed depending on certain characteristics of the forests. These criteria, it determine to the list of the leaf type (coniferous-leafy), the stand age class (period a-b and c-d) and closeness depending on the forest cover of the amount of forest cover width sufficient to provide PM and noise isolation around the highway.

Keywords: *Buffer effect, Dust pollution, Noise, Forest cover, Highway,*

DETERMINATION OF THE FOREST ROAD ROUTE THAT CAN BE IMPROVED AS "TYPE-A FOREST ROAD" SUITABLE FOR THE USE OF LONG HAULAGE VEHICLES IN SAMATLAR FOREST MANAGEMENT DIRECTORATE

Cigdem Ozer Genc* and Burak Aricak

Kastamonu University, Faculty of Forestry, Turkey
cozer@kastamonu.edu.tr

Functional-based forest management plans are implemented in Turkey to ensure that forest structure is not deteriorated. However, a functional road network plans that are compatible with current road construction's technology is lacking. The realization of forestry activities such as production, maintenance, conservation and afforestation in forest areas is provided by forest roads which are the most important infrastructure facilities for forests. Forest roads in Turkey generally form "B type forest roads" with limited standards, less construction costs and construction damage. Scope of work, in Samatlar Forest Management Directorate determined stands to be subject to whole log production, routes to be planed as type - A forest road that are suitable for use transportation vehicles with multi-wheeled truck type will be determined for transportation of tall logs and removal more log in forest areas at a time. Thus, stands within the production areas, which can be transported as a whole log form and also close to the main road (1000 m, 1500 m, 2000 m air distance from roads with asphalt superstructure) will be determined. To exploit the stands, routes of existing or planned B-type secondary forest roads that will be upgraded to A-type secondary forest roads the standards will be planned using ArcGIS. As a result, together with the upgrading of the standards of forest roads route designated in production forests, tall logs can be removed in accordance with demands of consumers from production forests. Thus, the economic value to be obtained from forest products can be increased with this method. It may also be possible to reduce road maintenance costs and minimize environmental damage.

Keywords: *Production Forests, Forest Road Network, Type-B Forest Road, Type-A Forest Road, Whole Body Transport*

Different Insulation Materials for a Building in Turkey And Comparative Annual Heat Needs by Fuel Types

Gökhan Gündüz*[1] and Yeliz Cangül[2]

[1]Bartın University, Faculty of Forestry, Forest Industrial Engineering, Turkey
[2]Bartin Municipality, Turkey
*ggunduz@bartin.edu.tr

In our country where energy is expensive, energy efficiency has gained importance and legal regulations have been introduced. The Energy Efficiency Law and the Energy Performance Regulation in Buildings are some of these regulations. The aim of these legal regulations is to regulate the rules on the efficient use of energy in buildings and the protection of the environment. Therefore, insulation applications in buildings have become obligatory with these regulations. In this study, heat loss is calculated according to the fuel types of natural gas, coal, fuel-oil and wood pellets of a building. With the data obtained, four different cost analysis of the building were carried out: XPS insulated, EPS insulated and PU insulated. Example building in the Black Sea region of Turkey, is selected from Bartin provinces. According to the Trewartha Climate Classification, Bartin province is cool in winter and warm in summers. TS 825 Thermal Insulation Rules Standard is based on the heat loss calculations and the solutions are made with the Thermal Insulation Program developed by IZODER. At the end of the study, it has been found that proper fuel is natural gas. Compared to the uninsulated building, the savings in the amount of fuel saved in the insulated building were approximately $4,000/year and the highest saving was realized in the fuel-oil heated building. The least fuel saving was in the building heated by natural gas with approximately $1,416 /year.

.

Keywords: *Heat loss, thermal insulation, cost analysis, thermal insulation materials*

DURATION OF THE DEVELOPMENT STAGES OF *Rhizophagus grandis* GYLL. (COLEOPTERA, MONOTOMIDAE) IN LABORATORY REARINGS ON *Picea orientalis* LOGS IN TURKEY

Havva Aynur Özyılmaz[1], Gonca Ece Özcan*[2], Mahmut Eroğlu[3], and Hazan Alkan Akıncı[4]

[1]Republic of Turkey General Directorate of Forestry, 06560 Ankara, Turkey
[2]Kastamonu University, Faculty of Forestry, Kastamonu, Turkey
[3]Artvin Çoruh University, Faculty of Forestry, 08000, Artvin, Turkey
[4]Karadeniz Technical University, Faculty of Forestry, 61080, Trabzon, Turkey
*goncaece@kastamonu.edu.tr

In this study, we have investigated the duration of the development stages of *Rhizophagus grandis* Gyll. (Coleoptera, Monotomidae) in "log-breeding" method in laboratory conditions. In the Turkish mass rearing programme that is based on the "log-breeding" method it is important to know the time intervals concerning development stages of this predator, the time when their highly sensitive prepupae pupate in sand and to meet appropriate humidity requirements of the prepupae. Rearing studies were carried out in *R. grandis* Biological Control Laboratory of Maçka Forestry Enterprises throughout 28 April and 14 July 2009, under the conditions of 22.5˚C±2 constant temperature, 72±5% proportional humidity in perpetual darkness. The first prepupa emergence was observed within 31 days at the earliest and 38 days at the latest following introduction of maternal *R. grandis* mature couples to the logs. Total elapsed time for feeding by maternal *R. grandis* before copulation, their copulation and depositing eggs, embryo development of the eggs and completion of larval stages were 34.5±2.7 days on the average (31 – 38 days). On rearing logs, depending on the number of obtained *R. grandis* prepupae, the time elapsed between the dates of the first and the last prepupa emergence was minimum 1 day and maximum 29 days. Prepupae emergence have lasted 14.8 days (3-29 days) on the average. A positive linear correlation was found between the quantity of *R. grandis* prepupae and prepupae emergence periods. As the number of prepupae increase, the duration of prepupae emergence get longer ($r=0.75$, $p<0.003$). 56 and 59 days after the introduction of maternal *R. grandis* to the logs, the last prepupae were observed. And in an average of 67.7±2.7 (61-71 days) days following the introduction of maternal *R. grandis* to the logs, 94.7% of the new *R. grandis* adults were obtained.

Keywords: *Rhizophagus grandis*, *biological control, mass rearing, development stages*

EFFECT OF DIFFERENT LAYER THICKNESSES ON THE SURFACE HARDNESS VALUE OF WATER BASED INSULATION PAINT APPLIED TO OAK PARQUETS

Haci Ismail Kesik[*1], Ali Kabakci[2], Mehmet Ali Aksu[2], and Kubulay Cagatay[3]

[1]Kastamonu University, [2]Incirli Technical Hight School, [3]Nuh Naci Yazgan University, Turkey
*hismailkesik@kastamonu.edu.tr

The purpose of this work was to determine the effect of different layer thicknesses on the surface hardness value of the water based insulation paint applied to oak parquets. For this purpose, one, two and three layers of water-based insulation paint and additionally one layer protective varnish were applied to the parquet surfaces produced from the oak (*Quercus petraea* L.) wood. Oak wood is preferred because of its aesthetic, insulation, mechanical strength, and surface hardness. Water based paint material is preferred because it does not harm environment and human health. The surface hardness resistance tests of water based insulation paint were performed according to the relevant standard (ASTM D 2240). The results of this study showed that the mean surface hardness values of oak parquet decreased as the number of layers increased. Therefore, it is recommended that the paint needs to be applied as a single layer on surface to have better surface hardness which is beneficial for consumers. As a future study, it is possible to investigate the thermal insulation and adhesion resistance properties of water based insulation paint applied at different layering sequences on both parquet surfaces may be studied.

Keywords: *Water Based Insulation Paint, Oak, Parquet, Hardness*

EFFECT OF TRAP COLOR AND TRAP HEIGHT ON THE CAPTURE OF *Ips sexdentatus* AND *Thanasimus formicarius*

Erol Akkuzu[*1], Mustafa Şahin[2], Abdullah Ugış[1], and Ebru Bal[2]

[1]Kastamonu University Faculty of Forestry Turkey, [2]Kastamonu University Institute of Science, Turkey
*eakkuzu@kastamonu.edu.tr

The six-toothed bark beetle *Ips sexdentatus* (Boerner, 1767) is one of the most devastating bark beetles of Eurasian pine forests. Pheromone traps are used to monitor and control *I. sexdentatus* populations. In this study, the effect of trap color and trap height on the capture of *I. sexdentatus* and its predator *Thanasimus formicarius* (Linnaeus, 1758) was investigated. The research was conducted in *Pinus sylvestris* which stands within Yayla Forest Enterprise Chief (Kastamonu-Daday) in Turkey. In the study area, 25 Scandinavian type three-funnel traps of five (5) different colors (yellow, white, green, black, and red traps with five replications) were used. Traps were placed at the height of 1.5 m above ground. For the second part of the study, a total of 20 traps (5 per height category) were placed 1.0 m, 1.5 m, 2.0 m, and 2.5 m above ground. Traps were controlled at intervals of 7-10 days and captured *I. sexdentatus* and *T. formicarius* were counted. Subsequently, the obtained data were subjected to Kruskal-Wallis and multiple comparison tests. The results of the study were as follows: 1) The Kruskal-Wallis test showed significant differences in the number of captures by trap color, and 2) There were no significant differences in the numbers of *I. sexdentatus* and *T. formicarius* captured between the trap heights.

Keywords: *Ips sexdentatus, Thanasimus formicarius, Trap Height, Trap Color, Pine*

EXAMINING STATE-SUPPORTED PRIVATE AFFORESTATION INVESTMENTS IN TURKEY, ACCORDING TO THE PROVINCIAL SOCIO-ECONOMIC DEVELOPMENT DEGREE

Gökhan Şen*[1] and Ersin Güngör[2]

[1]Kastamonu University, Turkey, [2] Bartın University, Turkey
*gsen@kastamonu.edu.tr

The main purpose of afforestation work is to increase the forest areas in a structural and spatial way. In addition, afforestation work is being carried out due to the environmental and socio-economic products and services it offers. One of these is the special afforestation investments that provide additional income and support the increase of forest areas. Government support for private afforestation investment was started in 1995 with accepted "National Afforestation and Erosion Control Mobilization Law". In this study, special plantation investments between the years 1995 to 2017 were examined according to the provincial socio-economic development degrees (SEDD) in Turkey and the economic contributions of these investments on the investments area. According to the study results, it was determined that from 1985 to the present day, a total of 6155 private afforestation projects were supported by the government. Of these projects, 22.9% were in the first, 23.7% in the second, 21.9% in the third, 12.8% in the fourth, 15% in the fifth and 3.6% in the sixth SEDD region. Among the species used in these projects, almond (26.48%), walnut (24.49%) and peanut pine (10.47%) were preferred as first three species. A total of $86892939.74 state support was provided for these investments. The 20.5% of these financial supports were in the first, 25.5% in the second, 19.3% in the third, 13.4% in the fourth, 15.2% in the 5th and 6% was used in the 6th SEGD region. On the other hand, the amount of financial support per decare was determined $70.8 for the first region, $83 for the second region, $74.1 for the third region, $107 for the forth zone, $146 for the fifth zone and $172.4 for the sixth region.

Keywords: *Private afforestation investments, socio-economic development, rural development,* n*on-wood forest products, Turkey*

FOREST CERTIFICATION IN TURKEY BASED ON FOREST STEWARDSHİP COUNCİL SCHEME

Ahmet Sivacioğlu

Kastamonu University, Faculty of Forestry, TURKEY
ahmets1973@gmail.com

The Forest Certification Council (FSC) is the governing body in Turkey that regulates the forest management certification system, which is designed to provide a credible guarantee that all forest management schemes are anchored on the sustainable forest management standards. Suppliers of forest products are required to secure a certification from an accredited certification body, which in turn perform evaluation, based on the international standards, on the different forestry practices adopted by the applicant. The main advantage of obtaining forest certification is the increased market opportunity because many industries, particularly in Europe, are inclined to buy wood products from duly certified wood suppliers. Although in Turkey the national certification standards are still in formulation process, the Turkish Forestry already adopted the international forest certification standards since 2010. As a result, a large proportion of forest lands, which is about 2.2 millions of forest lands, have been issued forest certification. By the end of 2018, the FSC has targeted about 4 million hectares of forestlands to be issued forest certification. Under the FSC scheme, the certification criteria are based on environmentally soundness, social acceptability, and economic productivity. In this paper, the forest certification experience in Turkey for eight years are discussed, with the main observation that the forest certification system has promoted best forestry practices among wood-based industries in Turkey.

Keywords: *Forest Certification, Forest Management, Sustainable Forest Practices, Wood-based Industries*

FOREST EDGE EFFECTS AND THEIR IMPORTANCE TO FOREST ECOSYSTEMS

Osman Topaçoğlu

Kastamonu University, Faculty of Forestry, Kastamonu, Turkey
otopacoglu@kastamonu.edu.tr

In a transition from one living area to another, there is usually a variety of plant and animal species. This is mostly defined by the terms “boundary”, or “edge effects” in forestry. Forest edges can also be expressed as a transition zone between two ecosystems in the forests. They are also an important function for establishing an ecosystem network. The edges of natural forests are usually shaped by factors such as fire and storm, as well as topography, hydrology and physical transitions. Human intervention and silvicultural treatments create a different edge form from the naturally created edges. Forest edges are the most important source of heterogeneity in fragmented forested areas. The biological features on the forest edges are determined by the physical environment, other plant species and their distributions. However, from edges towards the interior of forest, the more favorable conditions are observed in terms of forest microclimate and soil. Light density decreases as moving from edge to the interior stand. This effect is especially apparent for plant distribution in forest compared to an open field. The forest edges provide numerous benefits for wildlife species. Forest edges are regarded as less-preferred areas in terms of timber production due to low stem quality, wide crowns and rough branching characteristics of trees within forest edges. Nevertheless, due to their features, there has been increasing interest on forest edges in the enterprises where the protection is the main objective. In this study, the forest edge effect will be discussed in terms of biodiversity, and the establishment and sustainability of this structure in silvicultural applications will be evaluated.

Keywords: *Forest Edge, Biodiversity, Stand Structure, Silviculture*

IDENTIFICATION OF SUITABLE TREE SPECIES FOR FLOODED LITTORAL ZONE OF LAKE MAINIT

Peter D. Suson*[1] and Jerry B. Acero[2]

[1]Surigao State College of Technology, Surigao del Norte, Philippines
[2]Mindanao State University-Iligan Institute of Technology, lligan City, Philippines
*peter.suson@g.msuiit.edu.ph

Lake Mainit is a natural wonder due to its scenery and superb water quality. Its littoral zone was once fully vegetated, but currently is almost devoid of trees. Previous efforts to restore the lost vegetation generally failed due to intermittent flooding condition. This study was undertaken as a Community-based Reforestation Project of Quezon, Mainit, Surigao del Norte to evaluate the survival and growth of four (4) endemic tree species namely: Bangkal *(Nauclea orientalis),* Narra *(Pterocarpus indicus),* Molave *(Vitex parviflora)* and Dalinsoi *(Terminalia surigaensis),* when subjected to flood during wet season. For reforestation to succeed in Lake Mainit, it is vital that only trees that are adaptive to intermittent flooding should be planted. Thirty two wildlings from each specie were collected and randomly planted in August 2015. Flooding took place from Mid-December 2015 till Mid-February 2016. Growth of trees within the seventh-month period recorded an average height increment of 64.57cm for Bangkal; 33.43cm for Dalinsoi; and 59.07cm for Narra**.** Stem Diameter increment was 1.88cm for Bangkal, 0.98cm for Dalinsoi and 1.73cm for Narra. For survival rate, Bangkal obtained 93.33%, Dalinsoi was 83.33%, 30% for Narra, and 0% for Molave. Significant differences were shown among four species in all the parameters assessed. It was proven that Bangkal and Dalinsoi are appropriate littoral reforestation species for Lake Mainit as both species exhibited high survivability despite being submerged in water for two months while Molave *(Vitex parviflora)* was so sensitive to flooded condition that there was zero survival.

Keywords: *Tree growth and survival, Lake Mainit, Intermittent Flooding condition, Littoral Zone and Endemic species.*

INTRODUCTION OF EXOTIC TREE SPECIES: TURKISH FORESTRY EXPERIENCE

Ahmet Sivacioğlu
Kastamonu University, Faculty of Forestry, Turkey
ahmets1973@gmail.com

Exotic tree species have been introduced in Turkey to fill the increasing gap between wood supply and demands. Among the introduced fast growing tree species are *Pinus pinaster*. *Eucalyptus spp*., and *P. x euramericana* poplar clones. The *Pinus pinaster* has been introduced in Turkey since 1880, which started as a species to stabilize sand dunes. In early 1940's, the *Eucalyptus species* and Poplar (*P. x euramericana*), which are fast growing tree species, have been introduced, which later became widely distributed and popularized in Turkey, particularly in the Mediteranean region, as a source of wood for pulp, paper, and fiberboard production. However, studies have shown that the introduction of these fast-growing species has been introducing unfavourable impacts on the natural forest ecosystem dynamics. Although the introduction of these fast-growing species has been instrumental in narrowing the gap between supply and wood demands in Turkey, the natural ecosystem dynamics, particularly on biodiversity, have been negatively affected. Consequently, the Turkish Forestry has prescribed either mixture of native species or utilization of native species in industrial plantations establishment in order to minimize the expected negative impacts on biodiversity and water quality of pure stand plantation of exotic species.

Keywords: *Exotic Species, Pinus pinaster, Eucalyptus, Poplar, ecosystem*

INVESTIGATION OF ANTIOXIDANT ACTIVITIES OF *Pleurotus ostreatus* GROWN IN DIFFERENT COMPOST

Fatma Bakar[1], Mertcan Karadeniz*[2], Temelkan Bakir[3], and Sabri Ünal[2]

[1]Science and Art Center, 37150 Kastamonu, Turkey, Kastamonu, Turkey,
[2]Department of Forest Engineering, Kastamonu University, Kastamonu, 37150, Turkey,
[3]Department of Chemistry, Kastamonu University, Kastamonu, 37150, Turkey
*mkaradeniz@kastamonu.edu.tr

Nowadays; urbanization and population growth cause the decrease of agricultural land and food resources. This has led people to seek alternative food sources. *Pleurotus ostreatus,* one of the cultivated fungi, is one of these alternative nutrients. In many countries of the world, the use of organic waste such as tea leaves and wood chips in the cultivation of *P. ostreatus* prevents both these materials from being wasted and contributes to the provided income. In this study, the availability of infused tea leaf in the production of *Pleurotus ostreatus* was investigated. Six (6) different experimental groups and 1 control group were prepared by using "cotton", "siyez", "bran", "infused tea leaf", "poplar sawdust": 1st Group (%50 cotton + %5 siyez + %5 bran + %30 infused tea leaves + %10 poplar sawdust), 2nd Group (%50 cotton + %5 siyez + %5 bran + %40 infused tea leaves), 3rd Group (%50 cotton + %5 siyez + %5 bran + %10 infused tea leaves + %30 poplar sawdust), 4th Group (%50 cotton + %5 siyez + %5 bran + %20 infused tea leaves + %20 poplar sawdust), 5th Group (%100 infused tea leaves), 6th Group (%90 infused tea leaves + %5 siyez + %5 bran) and Control (7th) Group (%50 cotton + %5 siyez + %5 bran + %40 poplar sawdust). In this study, DPPH (1, 1 diphenyl-2-picryl hydrazyl) radical scavenging method, which is widely used for the determination of antioxidant activity of *Pleurotus ostreatus* grown in different compost media, was used. Antioxidant activity of mushroom extracts were expressed as percentage of DPPH radical inhibition and IC_{50} values (mg/ml). Percentage of inhibition ranged from 16.54 to 91.34 % and IC_{50} values ranged from 0.592 to 1.133 mg/mL for mushroom samples in different composts. The total phenolic content ranged from 84.79 to 169.58 mg/g for mushroom extracts. The content of phenols in methanolic extracts expressed in gallic acid equivalents (GAE) varied between 84.79 ±1.15 and 169.58 ±2.10 mg/g. As a result, it was determined that the antioxidant activity of the specimens grown especially in tea compost (100%) was highest. According to the IC_{50} values, the order of antioxidant activity was determined as 5th Group> 3rd group> 2nd Group> 6th Group> 1st Group> 4th Group> 7th Group from large to small.

Keywords: *Antioxidant activity, Pleurotus ostreatus, Different composts, Tea compost, Phenolic substances*

MINING REHABILITATION IN RIO TUBA NICKEL MINING CORPORATION, BATARAZA, PALAWAN, PHILIPPINES: AN INTEGRATED STRATEGY FOR POST MINING ECOSYSTEMS RESTORATION

Bibiano P. Ranes

Rio Tuba Nickel Mining Corporation (RTNMC)
Rio Tuba, Bataraza, Palawan, Philippines

This preliminary report describes an innovative approach in operationalizing mining rehabilitation strategy to shorten the time-lag of vegetative cover establishment in a totally mined-out area, at the same time addressing such critical concerns as biodiversity conservation, food productivity potential, empowerment of the Indigenous People in preserving their cultural heritage, implementation of research and development components, and gender equality initiatives, in a trial holistic management package. Photo-documentations are shown covering the different operationalization aspects including site preparation, nursery and planting stock production, out-planting activities, agro-forestry farming systems, as well as observed recolonizing faunal populations on rehabilitated areas including invertebrates, amphibians, fish, reptiles, birds and mammals, among others. Eco-tourism potential of rehabilitated mined-out areas is also given emphasis as a sustainable post-mining land-use.

Keywords: *Mining, Rehabilitation, Biodiversity Conservation, Indigenous People*

PROMOTING CONSERVATION OF THREE KINGS MOUNTAIN HABITAT IN SOUTH COTABATO, PHILIPPINES USING BATS

Abdul-Nasser D. Lomantong*[1], Romeo G. Bornales[1] and George S. Gunay[2]

[1]College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines
[2]Press and Information Office, Mindanao State University, Marawi City, Philippines
*abdulnasserdl@gmail.com

Three Kings Mountain (TKM) is an important component of Allah Valley Protected Landscape in South Cotabato, Philippines. It holds old-growth forest and is known to have high biodiversity but is not fully understood. Bats were surveyed in April 2016 to promote conservation of TKM habitat. Three (3) sampling stations were selected in the area for bat netting. Trapped bats were taken for morphometrics, marking, and photo-documentation. After the documentation, bats were immediately released to minimize animal stress. Fruiting trees and other site variables were noted with the help of local guides in locating bat nests. The species diversity, endemism, and conservation status were assessed and the abundance with site variables was analyzed using PAST software. Bat guild in the area consisted of comparably diverse species (H' = 1.53; N = 72; S =7) with 42.9% endemism, including the Mindanao endemic *Ptenochirus minor* and a vulnerable *Megaerops wetmorei.* The abundance of bats markedly varied ($p<0.01$) between species and was notably influenced ($p<0.01$) by site variables. Overall, conservation of TKM as habitat is herein promoted and the local people must be tapped for rehabilitation of degraded portions of the forest using native wildlings.

Keywords: *Conservation*, *Bats, Ptenochirus minor, Megaerops wetmorei, Allah Valley Protected Landscape South Cotabato*

RELATION BETWEEN LS FACTOR OF UNIVERSAL SOIL LOSS EQUATION AND SEDIMENTATION

Ramazan Erdem[1] and Korhan Enez*[2]

[1]Arac Rafet Vergili Vocational School of Higher Education, Department of Forestry, 37800 Kastamonu, Turkey
[2]Kastamonu University, Faculty of Forestry, 37100, Kastamonu, Turkey
*korhanenez@kastamonu.edu.tr

Forest roads include necessary transportation services for ensuring a sustainable forest management. However, forest roads cause loss of habitats of plants and animals, erosion and sedimentation over sources of water and streams. This study aims to examine the relation between sedimentation arising from forest roads within the borders of Kastamonu Forest Sub-district Directorate and LS of the factors of universal soil loss equation (USLE). For this study, sediment traps were set at 10-meter intervals on 4 different forest roads having a road length of 100 m and slope angles of 2-4%, 4-6%, 6-8% and 8-12% respectively and through these traps sediment amount originating from forest roads was calculated. As per slope length-slope angle factor (LS) of universal soil loss equation factors (USLE), which is among erosion estimation methods, a steeper and longer slope poses a higher risk for erosion. The fact that forests in Turkey are distributed in mountainous areas requires investigation of the risk of sediment formation to be caused by interventions in forests.

Keywords: *Sedimentation, USLE, Forest Roads, LS*

TRACE ELEMENTS OF HYPERACCUMULATOR PLANTS IN TROPICAL ENVIRONMENT

Edgar D. Castañares*[1], Bohdan Lojka [2] and Ondrej Drabek [3]

[1]Faculty College of Agriculture and Forestry, Mindanao State University at Naawan, Misamis Oriental, Philippines
[2]Department of Crop Science and Agroforestry, Faculty of Tropical Agrisciences, Czech University of Life Sciences, Prague, Czech Republic
[3]Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences, Prague, Czech Republic
*edca.4026@gmail.com

Hyperaccumulators are plants with unique ability to absorb certain metals and metalloids as well as accumulate them in normally toxic shoot and root tissue concentrations wherein little or no analytical work has been performed in tropical environment. Trace elements are important to determine plant for hyperaccumulation criterion onwards to bioremediation technology. Hence, this study was conducted in varied habitats to identify hyperaccumulator plants for phytoremediation. Sampling stations were designated in Agroforest, Lower Dipterocarp, Mid-montane Forest, Sago, Mixed and Terminalia Forest habitats in Mount Magdiwata and La Paz, Peatland Forest. Collected plant specimens were analyzed in the laboratory and data were interpreted using SPSS software. *Cratoxylum sumatranum* (Jack) Blume, *Syngramma alismifolia* (C. Presl) J.Sm., *Mitragyna speciosa* Korth, *Pneumatopteris laevis* (Mett) Holtta and *Pneumatopteris glabra (Copel) Holtt* were species that shown hyperaccumulation criterion and had significant accumulation capacity on respective habitats. There were trace elements analyzed in plants and these were classified into groups of heavy metals such as, Cd, Cu, Cr, Co, Pb, Mn, Ni and Zn. Elements Al, Fe and Mg have been classified as major soil elements. All the heavy metals being identified in the study were above the standard reference worldwide set for plants and Mn had accumulation capacity in the leaves of *Mitragyna speciosa* Korth above the threshold level for heavy metal concentration at 22,393 mg/kg[1]. The accumulation capability on this identified species were prospective sources for phytoremediation to cleanse environmental toxicity.

Keywords*: Accumulation, Hyperaccumulator, Phytotoxicity, Phytoremediation, Trace Elements, Heavy Metals*

YOUNG FAST GROWING TREE SPECIES DEMONSTRATED PROMISING CARBON SEQUESTRATION POTENTIALS

Renato Pacaldo*[1], Rodrigo Pontillas[1], Romeo Bornales[1], Evelyn Bigcas[1], Danilo Mero[1], Melencio Jalova, Jr[1], Jennefer Calipusan[1], Marke Rule[1], Abdulnasser Lomantong[1], Kharis Maranda[2] and Malik Nagamura[2]

[1]College of Forestry and Environmental Studies, Mindanao State University, Marawi City
[2]Watershed Management Division, National Power Corporation
*renatopacaldo@gmail.com

Climate change is one of the most challenging environmental issues in our times. To address this problem, vegetation fix solution, through terrestrial carbon sequestration, has been promoted as a cheapest, but most effective alternative solution to mitigate climate change impacts. This study seeks to identify the best species for carbon sequestration projects and estimates the size of C pools stored over time. Four replicate blocks were established using the randomized complete block design (RCBD). Measured variables include the above- and belowground biomass, basal area, crown evolution, and diameter breast height. Researchers employed destructive sampling methods in the determination of the above- and belowground biomass components. It is assumed that carbon content is 50% of the dry matter. A conversion factor of 3.67 is used to convert biomass into CO_2 equivalent ($CO_{2eqv.}$). Results revealed that fast growing species (i.e. Falcata, Mangium, and L.L. Mahogany) demonstrated rapid growth compared with Narra and fruit trees. Due to rapid growth, the fast growing recorded the highest C sequestration rates. Falcata sequestered about 115-tons CO_2eqv ha^{-1} yr^{-1}. For a small coal power plant that consumed 10 tons of coal per day with 70% C content in coal, the coal power plant needs to establish about 265-has of falcata plantation to offset its total emission per year. This information is very useful for the Environmental Management Bureau (EMB) in defining the appropriate size of C sequestration project in which polluters need to establish as sources of C sink.

Keywords: *Carbon Sequestration, Fast Growing Species, Falcata, Climate Change, Environment*