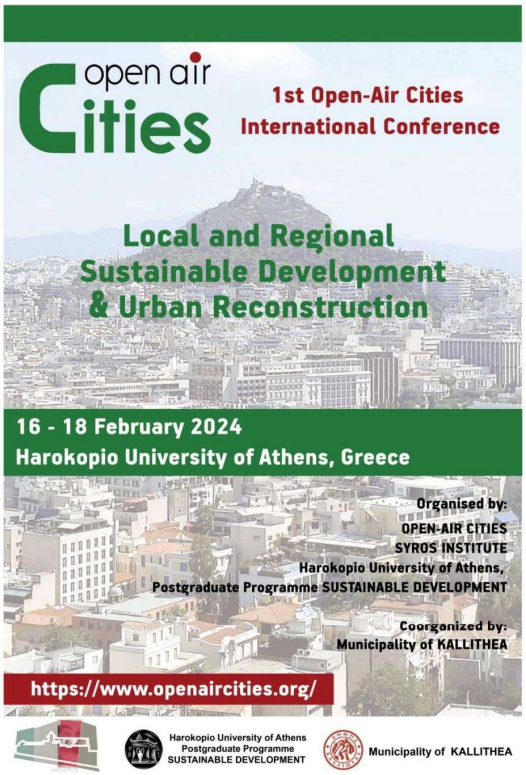
1st OPEN-AIR CITIES INTERNATIONAL CONFERENCE "LOCAL AND REGIONAL SUSTAINABLE DEVELOPMENT AND URBAN RECONSTRUCTION"

Book of Abstracts



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Open-Air Cities Institute

Athens, 2024

Pre-organised Special Session:

"Contribution of Forest and Natural Environment to climate actions for Sustainable development"

Part 1. Mitigation to climate changes

Organised by Prof Kalliopi Radoglou

ABOVE AND BELOW GROUND BIOMASS ESTIMATION OF EVERGREEN FORMATIONS

T02081

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Abstract

Forest ecosystems absorb CO_2 from the atmosphere and store carbon in their biomass through photosynthesis. Greece has substantial areas dominated by evergreen broad-leaved forests, but to date, there are no accurate methodologies or high-precision data available for estimating their biomass and carbon stocks. This makes it difficult to support the national forest inventory for more precise estimation of CO_2 sequestration and emissions under the UNFCCC. The LULUCF sector will play a crucial role in preventing global temperature increase during the period 2021 to 2030.

The aim of this study is to contribute to the improvement of the accuracy in estimating the biomass of evergreen broad-leaved forests by calibrating an allometric biomass model in the area under the jurisdiction of the Forest Service of Xanthi, Greece. This effort will support the national inventory to increase the accuracy of the LULUCF calculations at the T2-T3 level.

In the study area, 40 sample plots were randomly established where shrubs height measurements and ground cover were taken. Out of the 40 sample plots, 25 were subjected to a 4 square meters area clear cut harvesting. Fresh weight measurements and sample collection for laboratory drying were carried out. This material formed the database for the calibration of the allometric equation.

The fitting of the allometric model resulted in total aboveground biomass of 469,807t in the total area of evergreen broadleaves which covers 4,961 ha, corresponding to 234,903t of pure carbon (IPCC biomass carbon content default value=0.5). The below ground biomass is estimated to be 1.84 times the above ground biomass resulting in another 863,035t of biomass and 431,517t carbon respectively. The total amount of carbon expressed in terms of CO_2 equivalent amounts to 2,443,543t or 2.44 Tg of sequestered CO_2 in the evergreen broadleaved formations at the region of Xanthi Forest service.

Key words: allometric equation, aboveground biomass, climate change, sings, emissions, LULUCF

ALLOMETRY, BIOMASS AND PRODUCTIVITY OF DECIDUOUS OAK FORESTS IN XANTHI (NORTHERN GREECE)

T02187

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Abstract

For Oaks, a Green Fund-supported project, examines the dynamic assessment of CO_2 sequestration in deciduous oak forests and evergreen broadleaved forests as a way to enhance the National Greenhouse Gas Inventory in Greece. In this framework, the biomass allometry and productivity of deciduous oak forests in Xanthi (Northern Greece) were studied.

In this work, data from the management studies conducted by the Xanthi Forestry Service were used. From the oak management class, the diameter distributions (numbers of trees over diameter at breast height) and the wood stock amounts were analyzed.

To estimate the aboveground biomass, two methods were applied: (a) existing allometric biomass models for the species *Quercus frainetto* in Greece, and (b) a Biomass Expansion Factors (BEFs) for the same species to convert wood stock into biomass.

The comparison of methods (a) and (b) showed that the BEF used to convert volume to mass should have a value close to the upper limit of the factor's range, which is appropriate for young stands, in order to get a fair estimate of the biomass. The fact that the input data is derived from stands with an average diameter generally below 45 cm, which is the mature diameter for harvesting, further suggests that the stands are young and have a high net productivity. The estimated biomass indicates that the stands are in the early stages of growth and have a strong potential for future yield.

Key words: Allometry, biomass, deciduous oak forests, productivity

CARBON SEQUESTRATION IN A NATURAL COASTAL ALEPPO PINE FOREST

T02083

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Abstract

Anthropogenic emissions enhance atmospheric CO_2 levels,influencing the frequency of climate change extremes occurrence. Forests play a vital role by sequestering atmospheric CO_2 and storing it as biomass. However, uncertainties persist regarding the ability of natural forest ecosystems, especially in the Mediterranean region, to endure the diverse challenges posed by climate variability. This study aims to (a) quantify the carbon stocks (above-, and below-ground biomass of both the tree overstorey and the shrub understory, forest floor, deadwood, soil organic carbon) and fluxes (annual litterfall and fine root production) of a natural, near-coastal Aleppo pine ecosystem in Chalkidiki, Greece being a part of national and European Long-Term Ecological Research network (LTER) and (b) assess the effect of age on total ecosystem carbon sequestration, as tree age at the site ranges from 30 to 110 years. To date, we lack information of the carbon pools of natural pine ecosystems in Greece, particularly in regard to their understory shrub layer. For this purpose, 15 sampling plots of 0.1 ha are established, taking into account their spatial distribution and tree and understory density. The diameter at breast height (DBH) and tree height were measured at all trees, while understory vegetation coverage and mean height were determined to apply allometric models for tree biomass estimation. From each plot, litterfall and forest floor samples were collected seasonally, while fine roots and soil samples were collected once during the year. In-growth cores were also established for assessing fine root production. Finally, the carbon content of plant tissues was determined by elemental analysis. The effect of tree age and understory density is discussed and the carbon equivalents stored by this ecosystem are presented to determine the ecosystem's contribution to the carbon footprint of the region.

Key words: Climate change mitigation, Mediterranean region, Aleppo pine ecosystems, carbon sequestration, carbon equivalents

LONG-TERM MONITORING OF CARBON FLUXES AND PHENOLOGICAL SHIFTS IN A POST-MINING FOREST PLANTATION

T02086

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Abstract

The establishment of forest plantations for the reclamation and improvement of disturbed sites, such as those of former lignite mines, is a very common practice worldwide. Black locust (*Robinia pseudoacacia* L.) is a species that has been commonly used in relevant projects, because of its durability and capability to cope with the harsh environmental conditions. However, the information about its seasonal performance, mass and energy fluxes and phenology is quite limited so far.

In this study, we present the seasonal carbon flux dynamics, in terms of GPP fluctuation, and the phenological shifts for a mature black locust plantation, located in the restored areas of the Lignite Center of Western Macedonia, Greece. For the needs of the study, an eddy flux tower has been established and continuous measurements were taken for the period 2019 – 2023. The carbon flux phenology was defined in terms of start and end of growing season, as well as the period of the peak activity. The GPP response to environmental parameters during the growing season was assessed with the use of Generalized Additive Models (GAMs). Finally, with the use of a phenological camera (PhenoCam), we assessed the contribution of the forest understory to the overall annual carbon budget.

According to our results, the peak of the seasonal activity for the site is met during the beginning of June, however there are significant interannual differences in carbon fluxes inside the growing period. The contribution of the forest grass understory to the overall annual carbon budget is quite high, however there are also significant interannual differences throughout the years. The environmental variables that have the highest impact on water stress effects is the Vapor Pressure Deficit (VPD) for black locust and soil water content (SWC) for the understory grass..

Key words: Ecosystem Carbon Budget, Gross Primary Productivity, Forest Plantations, Climate Change Mitigation

SIMULATING THE CARBON POOLS OF MEDITERRANEAN PINE FORESTS UNDER DIFFERENT CLIMATE CHANGE SCENARIOS

T02131

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Abstract

Forest ecosystems provide a range of ecosystem services including Carbon (C) recycling and storage. However, under shifting climate conditions and disturbance regimes there are concerns that the ability of forest to act as C sinks might fade away. These concerns are of particular significance for lowland Mediterranean Pine forests, where increased temperature and reduced precipitation are projected to enhance drought stress and fire occurrence.

In this study we present the application and validation of a process-based forest model, parameterised with biometric and C-flux monitoring data in Mediterranean *Pinus brutia* forest stands found along a post-fire and an elevation gradient. These gradients mimic the effect of different stand structure and micro-environmental temperature variation on the overall forest productivity and carbon recycling. After evaluating our model performance, we upscaled its implementation over the entire Pine forest ecosystem on the island of Lesvos, Greece under different climate scenarios and reference periods. In particular, we simulated the gross primary productivity (GPP), the net primary productivity (NPP) and the net ecosystem productivity (NEP) during a baseline period (2000-2020), a mid-term period (2040-2060) and a long-term period (2080-2100) following the IPCCs RCP 4.5 and RCP8.5 emission scenarios.

Our simulations suggest that stand structure variation, expressed through changes in the leaf area index (LAI) of the stands, have a stronger effect than microenvironmental temperature variation, at least at the spatial scale of our study. In all cases our simulations suggests that forest stands retain their ability to store C, with the exception of the extreme RCP 8.5 scenario where a strong decline in NEP was simulated.

Key words: Forests, carbon sink, photosynthesis, soil respiration, *Pinus brutia*

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ROOT SYMBOLIC RELATIONSHIPS ENHANCE C STORAGE IN ROBINIA PSEUDOACACIA RESTORATION PLANTATIONS

T02066

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Abstract

Robinia pseudoacacia L. is extensively planted for restoring post-mining waste depositions at the lignite complex of Public Power Corporation at NW-Greece. Given the species' nitrogen-fixing ability, we firstly aimed at analysing bacterial community composition and identifying the different types of symbioses developed between the plant root and soil microbes. Nodulated and non-nodulated seedlings were then grown at waste depositions' material in growth chambers and half of them were subjected to photosynthetic tissues' harvest to simulate severe carbon starvation. The microbiome structure and distribution in two distinct-sized nodules formed on the *R. pseudoacacia* roots, was assessed by a ribosomal metagenomic strategy, sequencing a specific bacterial region of 16S rDNA. Gas exchange measurements and $^{13}CO_2$-labeling were performed to assess the effect of the root-soil microbes' symbioses on the carbon balance of *R. pseudoacacia*.

Operational Taxonomic Unit analyses showed that the microbiome of larger, indeterminate nodules harbored mainly *Mesorhizobium* (>70% of the microbial population), but also diverse bacteria taxa (*Flavobacterium, Streptomyces, Rastolnia* and *Aeromonas*) which were less prevalent in small nodules. On the other hand, several core genera including *Pseudomonas, Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium*, and *Variovorax* were more abundant in smaller nodules. Independent of the microbiome composition, nodulated plants exhibited higher photosynthesis, stomatal conductance and transpiration than C plants, and all parameters further increased following resprouting of photosynthetic tissues. The two types of nodules had similar ^{13}C-labeling efficiency and in combination resulted to higher ^{13}C abundance in the leaves, compared to non-nodulated plants. The positive effect of nodules in C allocation was more pronounced in resprouting tissues after harvest, indicating that both types of nodules enhance the plants' C-budget under C starvation. Overall, the symbioses between *R.pseudoacacia* roots and soil microbes enhances its carbon balance at the unfavourable post-mining conditions. An in-depth analysis of microbiome biochemistry could further improve our understanding of differential symbiotic performances.

Key words: black locust, gas exchange, carbon allocation, plant-soil microbial symbioses.

EFFECTS OF CLIMATE CHANGE ON THE ORGANIC CARBON IN FOREST SOILS

T02186

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Abstract

Forest soils constitute an important sink of carbon. Approximately half the quantity of carbon in land is stored in forests (1146 x 10^{15} g) and from this quantity, two thirds are stored in soils.

The carbon stocks in soils vary. In general, they are high in cold climates and they become lower in hot and moist environments. In the forests of cold regions, the stock of stored carbon can reach the 80% of the total stock of carbon in plants and soils, whereas in tropical forests it reaches 50%. In temperate regions, the carbon in soils is about 60% of the total.

The climate change affects forest soils through changes in carbon dynamics

More specifically, increased concentrations of CO_2 affect photosynthetic products reaching the soil profile. At the same time, increased soil temperatures affect the microbiological soil respiration.

The increase of CO_2 concentration in the atmosphere will cause an increase of the photosynthetic rate and in turn an increase in plant biomass, litterfall mass and consequently in soil organic matter. However, the stock of the stored organic C depends on the activity of microorganisms responsible for decomposition.

Most experiments have shown that an increase in CO_2 will be followed by an increase of thin roots and the rate of infection with mycorrhiza. Therefore, changes in soils depend on the processes in the rhizosphere.

The increase in temperature accelerates the decomposition rate of the soil organic matter but the rate depends on the soil type. If the chemical composition of the organic matter is resistant to decomposition, the loss of carbon will not be large.

In contrast, soils in cold climates have large quantities of easily decomposable organic matter and they will become a source of CO_2.

The effects of Land Use change and afforestation are discussed.#

Keywords: Forest, Soil, Climate, Organic Carbon, Decomposition, Photosynthesis, Rhizosphere

SOIL RESPIRATION IN MEDITERRANEAN OAK-DOMINATED ECOSYSTEMS IN GREECE

T02077

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Abstract

Due to rising atmospheric CO_2 concentration and its positive warming potential, studies on soil respiration or soil CO_2 efflux, have received a lot of interest recently. The present paper investigates how soil respiration changes seasonally and how seasonality and environmental inputs affect the carbon cycle in two representative oak-dominated Mediterranean forest ecosystems, deciduous oaks and evergreen shrubs, in Xanthi, northern Greece. The purpose of this research is to: i) estimate soil respiration in the two types of ecosystems and examine the difference among them, and ii) identify the seasonal fluctuation of soil respiration, and understand how it is affected by climatic parameters, such as soil temperature and humidity and other inputs like forest litter. To this end we assess the contribution of two distinct processes that generate soil CO_2 efflux: i) root-derived C breakdown (autotrophic respiration of roots) and ii) soil-derived C decomposition (heterotrophic respiration of litter and soil organic matter). For this purpose, three treatments were applied: control (undisturbed), no-litterfall (aboveground litterfall removed), and no-litterfall -no-roots (both litterfall and roots were removed). Roots were eliminated in the last treatment by digging 20-25 cm deep holes (20 cm wide) and covering them with geotextileto restrict root access.

In each of the two ecosystem types, three monitoring plots were established, each including three replicate measuring points for each of the three treatments. Polyvinyl chloride (PVC) collars were put at each measuring point, thus 54 in total. Using a Li-8100 automated soil CO_2 efflux system, soil respiration measurements are conducted once every three months for one year. Additionally, 3 litterfall traps were established in each monitoring plot and litter (litterfall and forest floor) are sampled every three months.

Our preliminary results indicate that evergreens shrubs have higher soil CO_2 efflux than deciduous oaks and that soil moisture and temperature affect the soil respiration in both ecosystems.

Key words: soil respiration, evergreen, deciduous oaks, litter, climate.

MODELLING SOIL ORGANIC CARBON STOCKS IN FOREST SOILS

T02089

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Abstract

Forest ecosystems store large amounts of carbon, in aboveground, belowground biomass, dead organic matter, and in the soil, through primary production. Climate change affects plant photosynthesis as well as soil carbon mineralization creating uncertainties about the forest carbon budgets. Especially in the context of climate change, terrestrial carbon stocks and their changes need to be measured and monitored. European Union members are required to register greenhouse gas emissions from the land use, land use change and forestry sector (LULUCF), starting with tier 1, and then transitioning to higher tiers. The present work investigated changes in soil organic carbon stocks in forest soils.

Carbon turnover model RothC was used to model soil organic carbon stocks in forest soils in Xanthi regional unit, Northeastern Greece. The effects of soil type, soil cover, plant cover and climate on carbon turnover are included in the model. It has a monthly time step and is a decomposition model, it does not include a plant growth model. Sampling in the field was conducted and soils were analyzed in the lab. Soil organic carbon, bulk density, soil texture and soil nutrients were measured. Soils were assumed to be in equilibrium for modelling. The model was initialized with a spin up phase and then run in forward mode for 20 years. A climate model was used to simulate the effects of climate change. To assess measured versus modelled values, root mean square error, mean absolute error and modelling efficiency were calculated. Two different datasets, from different points in time were used (soil data from 1995 and 2023). Then, spatiotemporal soil organic sequestration potential was calculated.

Key words: forest, soil organic carbon stock, RothC, carbon modelling

Pre-organised Special Session:

"Contribution of Forest and Natural Environment to climate actions for Sustainable development"

Part 2. Adaptation to climate change

Organised by Prof Kalliopi Radoglou

FOREST MANAGEMENT STRATEGIES FOR ADAPTATION TO CLIMATE CHANGE

T02191

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Abstract

Forest ecosystems are facing global challenges due to adverse climatic effects. In this presentation we discuss three strategies for managing Mediterranean forest ecosystems. Strategy 1: Resistance.

Managing forest ecosystems in such a way that they can resist and respond better to the undesirable outcomes of climate change. This strategy can be adopted at two levels: either passive or active. The active strategy includes a set of management measures aimed at preventing a new ecosystem from replacing the current one, through, for example, targeted regulation of the mix in favor of invasive and climate-favored forest species, as opposed to the passive approach where proposed management measures aim to allocate new areas to successional types that will favor the spread of desired forest species.

Strategy 2: Resilience

This category includes strategies targeting forest ecosystems that, while exposed to gradual changes or abrupt disturbances related to climate change, have the ability to "bounce back" to pre-disturbance or pre-change conditions through natural processes (referred to in this context as regeneration or adaptive capacity). Management measures are proposed in this category to facilitate the dispersion of forest species over short distances (natural regeneration) or long distances (migration).

Strategy 3: Transition/Transformation

Targeted assistance for adaptation to change that enables or facilitates forest ecosystems to adapt as environmental changes increase. This strategy can be implemented in three forms: autonomous, controlled, and expedited, depending on the expected speed of climate change.

Key words: Adaptation, Forest management, Climate change

ENHANCING THE RESILIENCE OF THE SCHINIAS-MARATHON NATIONAL PARK THROUGH THE REINFORCEMENT OF PINUS PINEA

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Abstract

The National Park of Schinias - Marathon is recognized is one of the most significant coastal ecosystems in Attica,boasting a rich diversity of plant species and harboring 22 habitat types. Notably, the wooded dunes with *Pinus pinea* priority habitat (2270), a unique and valuable feature for Attica and one of the few remaining sites for this species in Greece.

However, the stone pine forest in the coastal area currently confronts two major threats. Firstly, the impact of climate change has led to a gradual decline of the forest. Most of the existing stone pine trees are aging, and their regeneration poses a significant challenge.

Concurrently, the Aleppo pine has expanded its dominance within the area. Secondly, human activities, particularly the high volume of visitors, have led to the degradation of the area. This is evident in the increased density of both tree species as the distance from the sea increases.

To support the regeneration of the *Pinus pinea*, three experimental replications were fenced and 25 wire cages were installed, to facilitate planting, sowing, and monitoring of its regeneration. Various approaches were employed, including planting seedlings of differing ages (1-year and 7-year-old trees) using distinct methods such as standard planting, planting with plastic covering, and planting with hydrogel application. Furthermore, a diverse range of seed-sowing treatments, encompassing direct sowing and sowing in trays with soil cultivationwere employed in protected locations.

Preliminary results revealed that there were no significant differences based on the planting method. The survival rate of planted 7-year-old seedlings was notably low, averaging 16.7%, whereas younger seedlings showed a higher average rate of 56.9%. Regarding seed sowing, the survival of well-established plants after the second year were marginal. These findings will significantly contribute to the selection of the most efficient methods and practices aimed at enhancing the priority habitat 2270.

Key words: Pinus pinea priority habitat (2270), coastal ecosystems, natural regeneration, planting and sowing methods, biodiversity conservation, ecological restoration

DEVELOPMENT OF MEDITERRANEAN AGROFORESTRY LANDSCAPES RESILIENT TO CLIMATIC CHANGES: THE ResAlliance PROJECT

T02059

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Abstract

Climate change is leading earth to more frequent and severe extreme weather events. The Mediterranean region, experiencing a 20% faster rate of warming compared to the global average. Despite these challenges, there is a growing interest into community on enhancing resilience at the landscape level. In light of this context, "ResAlliance," or the "Landscape Resilience Knowledge Alliance for Agriculture and Forestry in the Mediterranean Basin," is a thematic network project established by an international consortium of 16 partner organizations, funded by Horizon Europe.

The primary goal of ResAlliance is to enhance the flow of information and knowledge while building the capacity for foresters and farmers in the region to strengthen landscape resilience. Focusing on Mediterranean countries, ResAlliance identifies and evaluates gaps, hindrances, existing knowledge, and best practices to achieve resilient landscapes in the face of climate change hazards, (fires, drought & floods). This is accomplished through four key thematic areas that set specific learning objectives to address knowledge and implementation gaps: Governance, Management practices, Technology, and Finance.

To achieve its objectives, ResAlliance promotes interactive initiatives involving multiple stakeholders at two levels: the creation of a LandNet, an open Mediterranean thematic network focusing on landscape resilience for forestry and agriculture, and the establishment of five LandLabs, a tool designed to facilitate knowledge transfer and activate regional landscape resilience solutions in five different Mediterranean countries, namely Portugal, Spain, Italy, Greece, and Cyprus.

Key words: resilient landscapes, agroforestry, LandNet, LandLab

WILDFIRE HAZARDS OF PERI-URBAN FORESTS AND SILVICULTURAL APPROACHES, THE CASE OF PERI-URBAN FOREST OF XANTHI

T02183

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Abstract

Peri-urban forests stabilize and protect neighboring, unstable urban ecosystems. They protect soil from erosion and cities from disastrous floods. Moreover, peri-urban forests increase biodiversity in peri-urban areas and offer high-value landscapes and opportunities for recreation to city residents. However, conifer peri-urban forests also pose a direct danger to neighboring urban areas. This is the hazard of a huge wildfire that will not only destroy the forest ecosystem but also threaten human lives and urban infrastructure. In the context of climate change, the possibilities of such huge wildfires that will affect enormous areas, including peri-urban areas, have increased. Silviculture must develop approaches and methods to reduce the possibility of the occurrence of a wildfire and, if a fire bursts, not quickly acquire large dimensions and intensity. Thus, the danger of a catastrophic wildfire will be reduced, and there will be time for extinguishing the fire at an early stage. These approaches include vegetation treatments, the creation of protection zones, etc. Xanthi peri-urban forest is, in a large area, a planted conifer forest consisting mainly of *Pinus brutia* trees. The plantation reforestations began in 1936 and continued for many decades. In many areas of the peri-urban forest, gradually broadleaved species were established under the overstory of the conifers. The main goal of the silvicultural treatments in the area is to change the forest composition, through the appropriate cuttings and thinnings, from a conifer-dominated forest to a broadleaved forest or to a forest of conifers and broadleaved trees. Moreover, to protect urban infrastructure from forest fire protection zones of various sizes, vegetation density and species composition must be created.

Key words: Peri-urban forests, conifers, wildfire, silviculture

SECURING SUSTAINABILITY OF FOREST TREES IN RELATION TO GENETIC AND EPIGENETIC POOLS

T02060

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Abstract

Forest trees, as intricate organisms, currently confront various threats stemming from climate change, diseases, insects, and pathogens. Their capacity to adapt to changing environments hinges on the integrity of their genetic and epigenetic makeup and the interplay between them. Epigenetics, in this context, pertains to the exploration of heritable alterations in gene expression and function that cannot be attributed to changes in the DNA sequence. A broader analysis of the epigenome at the landscape level can yield valuable insights into identifying genomic regions associated with adaptive variations.

While population genetic analysis has shed light on how genetic diversity, structure, and linkage operate, comprehending the role of variation in epigenetic processes at the population level remains a complex challenge. This challenge arises from the difficulty in linking epialleles to variations in observable traits, which differs from classic genetic analysis, where genetic variations can account for a portion of phenotypic diversity. Recognizing this complexity has recently gained prominence, leading to studies that investigate genetic and epigenetic diversity in natural forest tree populations. These studies aim to establish the connections between genetic and epigenetic factors and explore the additional aspects of epigenetic diversity contributing to variations in observable traits and adaptability. By assessing epigenetic diversity, particularly DNA methylation, we can enhance our understanding of the mechanisms responsible for natural variations in ecologically significant characteristics. In this study, results from genetic and epigenetic data of forest plants will be presented.

Key words: genetics, epigenetics, adaptation, DNA methylation

MEASUREMENT AND COMPARISON OF INHALABLE DUST BETWEEN PERI-URBAN FOREST AND URBAN ENVIRONMENT

T02094

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Abstract

Research has shown that urban and peri-urban vegetation is capable of retaining large amounts of atmospheric particles, thus bringing about substantial improvements in urban air quality. For these suspended atmospheric particles, the term particulate matter (PM) is used referring to small-sized solid or liquid matter suspended in the air. Thepurpose of this paper was to examine the role of a peri-urban forest in mitigating dust levels in a neighboring urban area setting by measuring inhalable dust concentrations there and in the surrounding city. To get consistent data across the year's three seasons namely summer, autumn, and winter, we took three sets of inhalable dust readings using our personal SKC Button Sampler. Measurements were performed in three repeated time cycles so that PM10 data could be collected from three different seasons of the year. Data were obtained from a total of 15 sites, 9 of which were located in the peri-urban forest and 6 in the urban fabric. Overall, data collection was carried out from July to early March and included 45 sampling days. A total of 45 samples were collected, 27 of which were obtained from a peri-urban *Pinus brutia* forest and 18 from an adjacent urban area (9 and 6 samples in each repeated sampling cycle, respectively). Results obtained from both sampling areas show a significant increase in PM10 levels during the summer (8.86 mg m^{-3}/24h) in comparison with the autumn and winter concentrations (3.71 mg m^{-3}/24h and 4.12 mg m^{-3}/24h, respectively). The PM10 concentrations in both sampling regions were found to be significantly higher in the summer than in the fall and winter.

Keywords: PM10, air pollution, Button Sampler, peri-urban forest