Change in soil properties and plant growth at reclaimed land due to application of torrefied wood chip and vermicompost

Byung Bae Park[1,2], Aung Aung[1], Si Ho Han[1], Jeong Min Seo[1], Woo Bin Youn[1], Huong Thi Thuy Dao[1]
[1]Department of Environment and Forest Resources, Chungnam National University, Daejeon, Korea, Republic of; [2]Korean Society of Forest Science, Seoul, Korea, Republic of (bbpark@cnu.ac.kr; baganaung777@gmail.com; bupleurumhan@gmail.com; jmseo3@naver.com; dbsdnqls95@naver.com; thuyhuong.150495@gmail.com)

Soil salinity change in reclaimed land is one of major constraints for food production. However, soil properties in this land can vary by time as attempts for desalinization process accelerate. There are several soil-amendment methods to remediate reclaimed land. A field study was conducted for three years at Saemangeum reclaimed land to investigate effects of certain organic amendments to its soil. Three levels (0, 2.5 and 5.0 Mg ha^{-1}) of torrefied wood chip (TWC), and two levels (0 and 2.7 Mg ha^{-1}) of vermicompost (VC) were applied in split-plot design (n=3). *Populus euramericana* was used as crop tree. To observe soil properties, soil samples were collected twice at 2016 and 2017 in three depths (0~15, 15~30 and 30~45 cm), and analyzed its properties. We measured growth parameters of poplar, and biomass and nutrient analysis of weed to know the nutrient uptake across treatments. TWC, VC and soil depths did not show interaction for all soil elements. Similarly, TWC and VC did not have interaction on all soil properties, poplar growth, and weed nutrient uptake. However, higher TWC application showed removal of Na+, especially at 0~15 cm soil depth. For tree growth, VC showed significant positive response to height and diameter. VC application significantly affected on weed biomass and nutrient uptake of weeds too. These results suggested that TWC could be used in higher application rate to leach out Na+ concentration in salt-affected soil, whereas VC can be applied as an organic fertilizer to reclaimed soil.

Changes of physical properties of a soil reforested with *Tectona grandis* L. F. in the region of Urutaí, GO

Vitor Corrêa de Mattos Barretto[1], Matheus da Silva Araújo[2], José Eduardo Dias Calixto Junior[3], Carlos Leonardo Pereira Bogas[1], Teresa Cristina Tarlé Pissarra[4], Allan de Marcos Lapaz[1]
[1]São Paulo State University (UNESP/FCAT), Dracena, Brazil; [2]University of São Paulo (USP), Piracicaba, Brazil; [3]University of Brasília (UnB), Brasília, Brazil; [4]São Paulo State University (UNESP/FCAV), Jaboticabal, Brazil (vitor.barretto@unesp.br; araujomatheus@usp.br; junplant@hotmail.com; carlospereirabogas@gmail.com; teresa.pissarra@unesp.br; allanlapaz60@gmail.com)

The changes of soil physical properties occur in several ways, influencing the development of plants. However, is not very well known the changes of soil physical properties in populations of teak (*Tectona grandis* L. F.). The teak is an arboreal specie that has been cultivated in Mato Grosso, and presents potential for planting in Goiás, Maranhão, Bahia and Minas Gerais, whose purpose is to obtain wood for the sawmill industry. To this end, the aim of this study was to evaluate changes of soil physical properties of Red-Yellow Latossol reforested with teak with 4 years of age. For that, chose a population of teak with 6 hectares, 3 x 2 meters spaced, PU farm in Urutaí-GO (220 km from Goiânia-Goiás). It was determined the particle size, the density of the soil, macroporosity, microporosity, total porosity, resistance to root penetration and gravimetric moisture. The soil sampling was carried out in 2 depths (0-0.20 and 0.20-0.40 m), 34 simple samples being collected for each depth. It was used a complete randomized design with 34 replications. The averages were compared by the Tukey test at 5% of significance, through the SISVAR program. There have been changes in porosity, soil density and resistance to penetration in depths. The highest values of total porosity was 0.56 m^3 m^{-3}, soil density was 1.48 g cm^{-3} and the resistance to penetration of 3.1 MPa in 0.20-0.40 m, due to the adoption of minimum tillage system in planting, no soil plowing and maintenance of litter on the surface.

Density of ammonificators and nitrifiers bacteria in soils cultivated with pine and native forest in the South of Brazil

Kauanna Brok Ferreira Pepe[1], Rafael Hennel Tulio[1], Krisle Silva[2], Josiléia Acordi Zanatta[2], Marcos Fernando Gluck Rachwal[2]
[1]Pontifícia Universidade Católica do Paraná, Curitiba, Brazil; [2]Embrapa Florestas, Colombo, Brazil (kauanna.pepe@hotmail.com; rafael.tulio@outlook.com; krisle.silva@embrapa.br; josileia.zanatta@embrapa.br; marcos.rachwal@embrapa.br)

This work aimed to evaluate the density of soil bacteria involved in the process of N mineralization and nitrification in soils cultived with pine and native forest in the south of Brazil. Soils samples were collected at 0-10 cm depth in two areas: Rio Negrinho – Santa Catarina in a soil cultived with pine (Pinus taeda) for 6 years and in a native *Mixed Ombrophilous Forest* and Telêmaco Borba – Paraná in an area cultivated with pine (*P. taeda*) for 4 years and a native seasonal Semideciduous Forest. Bacterial density was evaluated by the most probable number method utilizing media for ammonificators (N mineralization) and nitrite oxidizers (nitrification). The soil pH was also evaluated. The mean values of ammonificators ranged from 5.61 to 6.15 log cells g^{-1} soil and there was no significant difference between pine and native forest in both areas. In the media for nitrite oxidizers significant differences were observed, with higher density values in soils with pine compared to native forest in the two areas. In Rio Negrinho/SC the mean values obtained were 7.29 (pine) and 6.24 (forest) log cells g^{-1} soil and Telêmaco Borba/PR 7.65 (pine) and 6.85 (forest) log cells g^{-1} soil. Also, a positive correlation between soil pH and density of nitrite oxidizers was observed. Thus, there were differences in the density of nitrite oxidizers in pine compared to native forest, which could be inferring in different rates of nitrification in these soils.

E8w: CURRENT UNDERSTANDING AND FUTURE CHALLENGES FOR FOREST RESEARCH AFTER THE TWO NUCLEAR ACCIDENTS OF CHERNOBYL AND FUKUSHIMA

Movement of radiocesium as litterfall in deciduous broad leaved forests with special reference to litter origin compost production

Tatsuhiro Ohkubo[1], Mineaki Aizawa[1], Kazuya Iizuka[1]
[1]Utsunomiya University, Utsunomiya, Japan (ohkubo@cc.utsunomiya-u.ac.jp; aizawam@cc.utsunomiya-u.ac.jp; kiizuka@cc.utsunomiya-u.ac.jp)

Litterfall is important agent in the process of radiocesium (RCs) movement from tree canopy to forest floor in forest ecosystems, and for litter origin compost production, however, the information on the relationships between them is limited. We clarified the process of radiocesium movement in Konara oak (Quercus serrata) coppice forest after the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) accident for seven years in three studied sites with different RCs deposition level, and also predicted the time of resume of leaf litter collection for leaf litter origin compost production. RCs concentration of foliar litter is getting lower according to the level of RCs initial deposition, and also lower than that of A0 layer in three sites. The level of RCs deposition to the canopy depends on that of initial deposition, and also the initial deposition before flushing in March 2011 cause the difference of RCs concentration between foliar litter and A0 layer. Seasonal concentration of RCs in living leaf and branches in the canopy in 2015 showed the highest value in April and May, and the values are getting a decrease in living leaves and a increase in living branches in defoliation period. This suggested the transfer of RCs from flushing to defoliation is limited within the part of the branch. RCs concentration of A0 layer on the forest floor is fitted by negative exponential decay curve, and the availability of foliar litter for litter origin compost production after the FDNPP accident is predicted by the level of initial RCs deposition.