O1 EVALUATION OF THE SUSTAINABILITY OF DOUGLAS-FIR PLANTATIONS IN ACIDIC SOILS OF THE BEAUJOLAIS MOUNTS (FRANCE) STUDIED BY MEANS OF A CHRONOSEQUENCE OF STANDS.

R. Marques[1*], J. Ranger[1], E. Dambrine[1] and D. Gelhaye[1], INRA-Unité Cycles Biogéochimiques; Champenoux 54280 FRANCE.

Douglas-fir has been widely introduced in France in the last 50 years and presently is one of the species the most used for afforestation. This species, among others, has been generally planted on low productive lands, characterised by soils with low pH and very low base saturation. Very few is known about the sustainability of the Douglas-fir plantations in these soils and about their impact on the soil function and on superficial water quality. To answer these questions, three Douglas-fir stands aged 20, 40 and 60 years representing a chronosequence of stands, were selected in the Beaujolais Mounts. Nutrient and proton input-output budgets were calculated to answer the questions concerning the sustainability of these plantations and their impact on the environment. Mean input-output budgets were negative for most nutrients, characterising an imbalance of the site nutrient dynamics. Proton production, mainly resulting from the nitrification process, was strongly implicated with this behaviour and with the nutrient output from the ecosystem. Douglas-fir introduced significative changes in the soil function which could lead to an empoverishment of the soil if the present trend keeps the same in the next forest rotations.

O2 INTEGRATED UTILIZATION AND SUSTAINABLE MANAGEMENT OF RED SOIL RESOURCES: LESSON AND EXPERIENCE FROM CHINA.

X. Yang[1*], Z.L. He[1] and V.C. Baligar[2]. [1]Zhejiang Agricultural University, Hangzhou, China; [2]USD7–ARS, Beckley MV25802-0867, USA.

China has experienced both success and lesson from the red soil management in the past decades. Red soils cover an area of 152 million ha, accounting for 22',: of China total land .The red soil region in China has been contributing greatly to the economic development of the country, as it produces 42.7% of the grains and three fourths of the country's total rice production, and supports 43% of the population with 28% of the country's total cultivated land. However, .irrational use of red soils, for instance, too much intensive crop production has caused a severe soil erosion and water loss. Approximately 30% of red soils were, to varying degree, degraded because of soil erosion and .irrational management. Efforts are now being made to adopt integrated utilization of red soil resources, inrcluding establishing forestry on the mountainous area, agro-forestry on hilly region, tea plants and fruits (such as citrus) intercropping with grasses and legumes or crops on the upland and rice field in rotation with wheat, barley, rapeseed or green manures on the lowland. This has proved to be an effective way of sustainable management of red soil resources.

O3 ORGANIC MATTER MANAGEMENT IN ACID SOILS OF THE EASTERN AMAZON REGION OF BRAZIL: Possibilities and Constraints for the Production of Maize, Rice and Cowpea.

M.S.A. Kato[1], O.R. Kato[1], M. Denich[2], P.L.G. Vlek[2]; [1]EMBRAPA/CPATU-Belem-Pa, [2]Universität Göttingen(IAT), Göttingen-Germany.

The objective of this study is to evaluate the importance of above-ground biomass of the fallow vegetation for the chemical soil properties end crop production with and without burning. Four experiments have been conducted in the Northeast of Pará state, Brazil. The first experiment includes the following treatments: burning, mulching and incorporation of biomass and subsequent planting of rice and cowpea. All treatments were split to with and without fertilizer NPK. Simultaneously, three screening experiments were conducted using different varieties of maize, rice, and cowpea to evaluate their suitabi1ity in cropping systems without burning. The results show that the use of the unburned biomass of fallow vegetation increases Ca, P and K levels. Satisfactory yields of rice and cowpea under unburned conditions were observed only when NPK fertilizer was applied. The screeening experiments show the possibility of the selection or the development of varieties adapted to low soil pH and poor chemical conditions.