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ABSTRACTS

Volume II

Symposia 13-21





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Slash-and-char: a feasible alternative for soil fertility management in the Central Amazon?

LEHMANN Johannes (1), DA SILVA Jose Pereira Jr. (2), RONDON Marco (1), CRAVO Manoel da Silva (3), GREENWOOD Jacquellue (1), NEHLS Thomas (4), STEINER Christoph (4) and GLASER Bruno (4)

(1) College of Agriculture and Life Sciences, Department of Crop and Soil Sciences, Cornell University, Ithaca, NY 14853, USA

(2) Embrapa Amazonia Ocidental, 69011-970 Manaus, Brazil

(3) Embrapa Amazonia Oriental, Belem, Brazil

(4) Institute of Soil Science, University of Bayreuth, 95440 Bayreuth, Germany

The application of charcoal to nutrient-poor upland soils of the central Amazon was tested in lysimeter studies in comparison to unamended control to evaluate the effects of charcoal on plant nutrition and nutrient leaching. Testing the application of charred organic matter was stimulated by the fact that anthropogenic soils in the Amazon (so-called "Terra Preta") with high soil organic matter contents contain large amounts of pyrogenic carbon. These soils also show high cation exchange capacity and nutrient availability. Charcoal additions significantly increased biomass production of a rice crop in comparison to a control on a Xanthic Ferralsol. This increase was largely an effect of improved P, K, and possibly Ca nutrition, whereas N and Mg uptake decreased in charcoal amended soils. In order to improve crop growth, fertilizer applications of N, S, Ca, and Mg may be necessary in addition to charcoal for optimizing rice growth. Combined application of N with charcoal resulted in a higher N uptake than what would have been expected from sole fertilizer or charcoal applications. The reason is a higher nutrient retention of applied ammonium by the charcoal amended soils. Charcoal applications therefore acted in two ways, first as a direct fertilizer and secondly as an adsorber which retained N. The amount of charcoal which can be produced from forest biomass is significant and corresponds to charcoal amounts needed for effectively improving crop growth. The slash-and-char technique is an alternative to burning of the above ground biomass and only the biomass from the same cropping area will be used for charring. Field trials need to be conducted to investigate the efficiency of charcoal production and applications under field conditions.

Keywords: Amazon, humid tropics, Ferralsols, leaching, nutrient cycling, slash-and-burn