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Influence of Biochar and Poultry Manure on Weed Infestation and Growth of Arabica Coffee (*Coffea arabica*) Seedlings in the Western Highlands of Cameroon

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Introduction

Young coffee plants at nursery stage particularly after transplanting are very sensitive to weed infestation. Depletion of soil fertility and low nutrient use efficiency are also severe constraints the young plant face in the acidic tropical soils. This study contributes to existing literature that biochar; a product of pyrolysis of organic wastes such as rice husk, corncobs and coffee husk contain plant nutrients and properties that can significantly improve soil fertility and crop growth. Therefore, a pot experiment was conducted from 2017-18 to assess the influence of biochar and poultry manure on weed infestation and growth of arabica coffee seedlings.

Materials/Methods

Biochar was produced from corncobs using an Elsa pyrolysis barrel at 450 ^{0}C with 58 min carbonisation time, then milled to < 2mm and mixed at the rate of 20, 30 and 40t/ha^{-1} with 40t/ha^{-1} poultry manure and 5kg soil in 14x25cm polythene bags. Arabica coffee seedlings of Marsellesa variety were planted in each pot at march stick stage. The experimental set-up was arranged in complete randomized design with five replications.

Results/Discussion

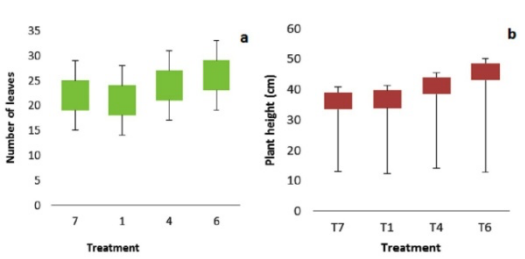


Figure 1: Effects of biochar and poultry manure application on Arabica seedling Nb of leaves (a) and

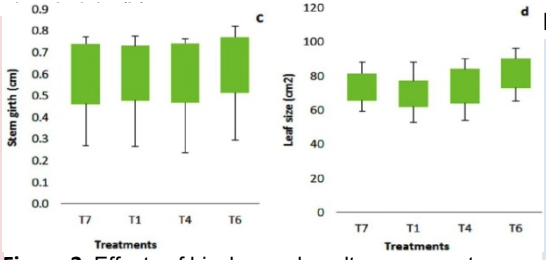
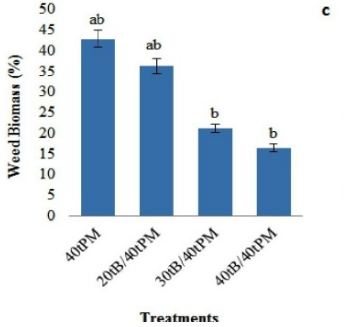


Figure 2: Effects of biochar and poultry manure stem girth (c) and leaf area (d) of Arabica coffee seedling



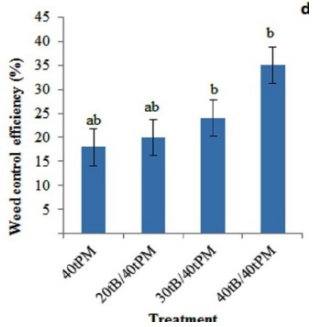


Figure 3: Effects of biochar and poultry manure application weed biomass (c) and weed efficiency (d)

30t/ha^{-1} biochar + 40t/ha^{-1} poultry manure treatment (T6) significantly (P<0.05) increased plant height, stem girth, number of leaves, and leaf area compared to control (40t/ha^{-1} poultry manure only) (T7). 30t/ha^{-1} and 40t/ha^{-1} biochar (had the lowest weed fresh weight and dry weight. *Cyperus rotundus, Oxalis cornoculata* and *Cynodon nlemfuensis* were most economically important weeds scored for their abundance and persistence.

Conclusion/Perspectives

The application of 30t/ha^{-1} biochar and 40t/ha^{-1} poultry manure were observed as the optimum agronomic interventions to harness best foliage production and also reducing weed infestation in coffee nurseries. Thus, a combined application of poultry manure and biochar appears paramount for a sustainable coffee production in the Western highlands of Cameroon. More studies to evaluate the effects of biochar combinations with other management options on soil fertility , growth and yields coffee plantations

References:
Schulz H. and Glaser B. (2012). Effects of biochar compared to organic and inorganic fertilizers on soil quality and plant growth in a greenhouse experiment," *Journal of Plant Nutrition and Soil Science,* 175: 410-422, https://doi.org/10.1002/jpln.201100143.