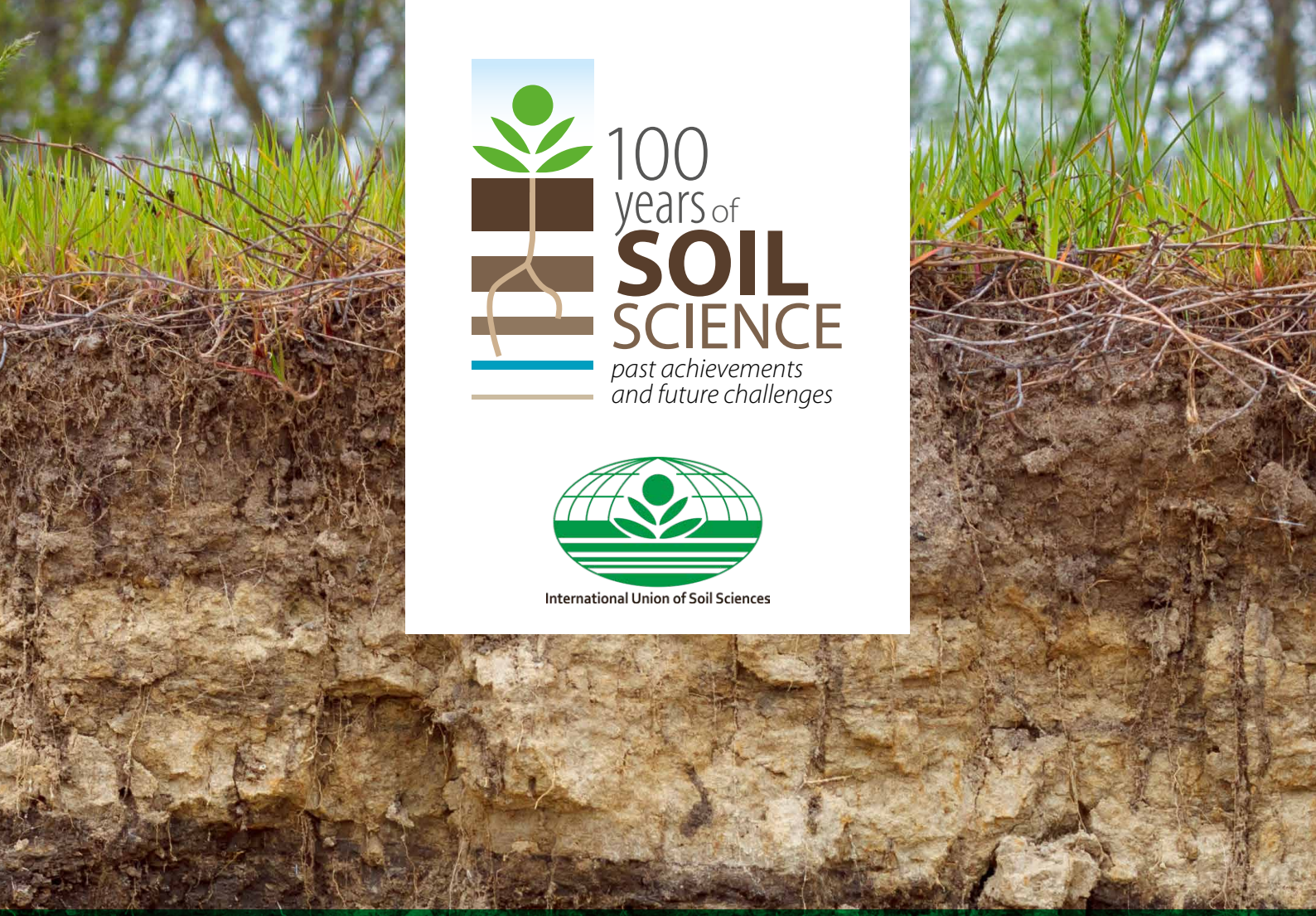

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ABSTRACT BOOK

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4. Soil health in achieving the Sustainable Development Goals
4.09 133435 - Optimization of plant-soil-microbe interaction under crop diversification

EFFECT OF AGRONOMIC PRACTICES OF COFFEE CROPS ON THE ENZYMATIC AND MICROBIAL ACTIVITY OF SOILS IN SOUTHERN META (COLOMBIA)

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The coffee crop is one of the most important farming systems for Colombia, allowing its economic development and recognition, as well as allowing the substitution of illicit crops, as occurred in the south of Meta department. However, due to the armed conflict in this region, research hadn't been carried out focused on estimating the effect of coffee production on soil microbial and enzymatic activity, and likewise, very little research generally considers the effect of the agronomic practices on these variables. Considering the above, 40 semi-structured surveys were conducted with coffee growers to identify their agronomic practices. Additionally, soil sampling was carried out in each of the farms, where the age and type of associated crop in each coffee crop were considered, taking at least three random samples from each of the coffee crops visited, for a total of 150 samples collected. To select the explanatory variables (agronomic practices) of greatest relevance concerning the response variables, a principal components analysis was carried out, which allowed redundant variables to be eliminated, and non-collinearity was also verified. Likewise, the farmer's perception of the identification of dry season, organic carbon, pH, soil particle size distribution, and acidity were selected as covariates. For the response variables, the enzymes related to the C, P, and S nutrient cycling (Beta-glucosidase, acid and alkali phosphatase, and arylsulfatase, respectively) and dehydrogenase were measured. We also recorded the cumulated microbial respiration and the basal respiration rate. To analyze the effect of explanatory variables and covariates, a partial redundancy analysis was used, which allowed us to identify that the covariates represented 23% of the variability in soil microbial and enzymatic activity, while the agronomic practices explained 33%. Finally, a statistically significant model ($p < 0.001$) could be identified that managed to explain 27.2% of the variability between sites. The previous results allow us to infer the need to include the identification of the farmer's agronomic practices when evaluating the microorganisms' activity.

Keywords: Soil enzymes,Basal respiration,Explanatory variables,Partial redundancy analysis