

Response of Three Cacao (*Theobroma cacao* L.) Varieties to Biochar and Microbial Inoculation

Nelly S. Aggangan^{1*} and Edna A. Aguilar²

¹National Institute of Molecular Biology and Biotechnology (BIOTECH), University of the Philippines Los Baños (UPLB), 4031 College Los Baños, Laguna, Philippines; ²Institute of Crop Science, College of Agriculture and Food Science, UPLB, 4031 College Los Baños, Laguna, Philippines.

*Corresponding author, nellysaggangan@gmail.com

The study determined the influence of biochar and arbuscular mycorrhizal fungi (AMF) on the survival, growth and yield of three grafted cacao varieties planted under an agroforestry ecosystem in Barangay Mabacan, Calauan, Laguna. Plants were inoculated with AMF inoculant MYKORICH[®] (MR) without or with 15% bamboo biochar (15% BB). Results showed that K1 cacao variety treated with MR+15% BB had the highest height increment as compared to other treatments 1-2 yr after field planting but was outgrown by MR treatment alone after 3 yr. The highest stem diameter was also observed in MR+15% BB and MR inoculated K1 variety on the first and third year, respectively. MR treatment also consistently gave the highest plant survival in UF18 and K2 varieties (100% and 87%, respectively) throughout the 3 yr experiment. The highest mycorrhizal spore count and nitrogen-fixing bacteria was obtained in UF18 when treated with MR alone. The results also showed that soil amendment with MR alone improved the survival and rhizosphere microbial population of grafted cacao especially its association with K1 grown under acidic and drought-prone agroforest ecosystem. This practice of adding biochar and biofertilizers, either alone or in combination, can be applied in other agricultural farming system in the country.

Keywords: acidic soil, grafted cacao, beneficial microbes, Philippines