

VEGETATIVE PROPAGATION OF CACAO (*Theobroma cacao* L.): COMPARISON OF A LIQUID HORMONE PREPARATION AGAINST A COMMERCIAL ROOTING HORMONE POWDER

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ABSTRACT

Vegetative propagation of cacao often used to fix the agronomic traits of interest among all the trees in production. However, studies that systematically compared seedling production through rooted stem cuttings are scarce, and even less studies focused on production using young parts of the stem. In this study, a liquid hormone (NAA-IBA rooting solution) composition in ethanol was compared with a commercially available rooting hormone preparation in talc, for the ability to induce root and shoot formation in cacao orthotropic young stem cuttings. Analysis of variance and Least Significant Difference were then used to analyze the outcomes. Results indicated that the liquid hormone composition was significantly ($p \leq 0.05$) better at rooting (70.3%) and shooting (63.0%). The liquid hormone also promoted overall survival (52.7%) of planting materials derived from young stem-cuttings whereas stem cuttings treated with commercial rooting hormone in talc showed 43.5% of rooting, 31.0% of shooting and 7.5% of overall survival. The control, however showed only 17.0% of rooting, 9.0% of shooting and 2.0% of overall survival. Thus, it is concluded that treatments using a combination of two auxin hormones in ethanol produced better propagation efficiencies when using young parts of the stem compared to talc-based commercial hormone powders.

Key words: *Theobroma cacao*, vegetative propagation, hormone treatment, root, shoot induction

INTRODUCTION

Theobroma cacao L. is an economically important commodity crop whose fermented and processed seeds, commonly known as cocoa beans, form the key ingredient in making chocolate and other confectionary products (Di Mattio *et al.*, 2013). Approximately 17 million acres of agriculture land along the Equatorial belt are dedicated towards cacao cultivation (Paoletti *et al.*, 2012), creating a strong demand for planting materials, which are typically produced by germinating fresh cacao seeds harvested from existing trees. However, while easy to propagate, seed-derived planting materials have

a tendency to diverge on important agronomic traits of interest to growers, including yield, precocity and disease tolerance (Traore *et al.*, 2003; Marcano *et al.*, 2009; Tee & Lamin, 2014).

In order to overcome such variation, vegetative propagation methods such as budding, grafting, and rooting of stem cuttings have been developed to selectively propagate cacao trees with elite agronomic qualities. The use of such techniques fix the agronomic traits of interest among all the trees in production, and promotes a more homogenous stand where management practices can be uniformly applied (Miller, 2009; Tee & Lamin, 2014). The most preferred vegetative propagation method for cacao is known as the “*quick dip*” technique which utilizes indole-3- butyric acid (IBA) in various concentrations to promote rooting in stem cuttings

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