Influence of liming on *Cedrela odorata* L. seedlings growth and attack by *Hypsipyla grandella* Zeller (Lepidoptera: Pyralidae)

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Introduction

Cedrela odorata is one of the most important commercial Neotropical forestry species, harvested mainly from natural forest, what have taken the species to danger of extinction. Its commercial plantation is limited by *Hypsipyla grandella* attacks, which could reach 100% of individuals in a forest plantation (Figure 1). Inverse relation of available calcium concentration in the soil for *C. odorata* and attacks of *H. grandella* had been reported (da Silva et al., 2009). Some studies indicate that calcium and boron addition to the soil has a positive effect in height growth of *Swietenia macrophylla* (da Silva Junior et al., 2014); nevertheless, some studies suggest that when growth is high there is an increase in attack probability (Newton et al., 1993). Then some clarity on this subject is required.

Figure 1. Attacks of *Hypsipyla grandella* on *Cedrela odorata* seedlings showing the necessity to prune the multiple shoots to maintain one leading terminal shoot.

Goal

In this short study, the effect of adding dolomitic limestone (CaCO3 57.8% and MgCO3 36.7%) to *C. odorata* seedlings on height growth, aerial biomass and attack by H. grandella was tested.

Materials and Methods

In September 2017, two months seedlings were exposed in the field for four months, planted in pots (21205 cm3) with sand (50%) and vermicompost (pH 6.75, high saturation of calcium, magnesium and potassium). Treatments were the application of 0 g (T1), 200 g (T2), 300 g (T3) and 400 g (T4) of dolomitic limestone. 25 seedlings in each treatment. The seedlings were exposed to full sunlight for four months, with irrigation when required. It was established in AGROSAVIA, San Roque (Antioquia, Colombia) (06°28'48.18"N, 074°39'28.80"W), in a humid tropical forest at 850 m of elevation, with a mean multiannual precipitation of 2223 mm and a temperature of 23 °C.

Results and discussion

All in all treatments individuals survived, except for 2 individuals in T4. Height growth was positively influenced by liming: T3 showed a higher mean height but only differs from T1 (Table 1). Treatment T4 had the higher shoot dry weight only differing from T1. Regarding the percentage of shoot dry matter, T2 had the highest percentage of shoot dry weight and differ from the other treatments. Only 2 seedlings in T2 and 2 in T4 were attacked by H. grandella, showing no difference in the number of attacks between treatments.

Figure 2. 1.5 years old *Cedrela odorata* after multiples pruning developing one leading terminal shot.

Treatments	Total height (cm)	95% confidence intervals*	Dry weight	95% confidence intervals*	Dry matter (%)	95% confidence intervals*
T1 (0 gm)	61.4	55.3 - 67.4	38.1	30.7 - 44.2	33.0	29.0 - 36.50
T2 (200 gm)	75.5	66.0 - 85.4	54.4	46.6 - 61.7	38.9	36.51 - 41.1
T3 (300 gm)	93.9	84.5 - 103.6	68.1	57.4 - 78.6	31.6	29.8 - 32.9
T4 (400 gm)	81.9	72.0 - 92.2	72.6	58.1 - 87.0	32.1	28.5 - 35.5

*using 9999 bootstrap replicates.

In this study, no relationship was found between growth and attacks of *H. grandella*. The fact that the seedlings had better growth and dry matter when dolomitic limestone is applied, will help them reach a commercial height in less time, reducing exposure to attacks of *H. grandella* and the necessity to prune multiple shoots when damage occurs, in order to maintain one leading terminal shoot (Figure 2). Improving soil nutritional properties could be part of an integrated pest management scheme for *C. odorata,* although plants with better nutrition could contribute to produce adults of *H. grandella* with an increased capacity of fly and of oviposition, then a similar evaluation in the field for multiple years should be done.

References

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