

# Growth and carbon sequestration in biomass of *Cordia alliodora* in coffee agroforestry systems in Tolima, Colombia

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## Introduction

Timber production and carbon sequestration (CS) of timber trees in agroforestry systems (AFS) are key for their productivity and climate change mitigation. Non-linear models of growth and CS of *Cordia alliodora* in coffee AFS with, a range of shade levels in Líbano, Tolima, Colombia, were timber production and CS of timber trees in agroforestry systems (AFS) are key for their productivity and climate change mitigation.



## Materials and methods

Non-linear models of growth and CS of *Cordia alliodora* in coffee AFS with, a range of shade levels in Líbano, Tolima, Colombia were developed. A total of 98 trees with an age between 1 and 19 years were randomly selected in private farms and measured (diameter at breast height -Dbh- and total height - H). Total timber volume (V), biomass and carbon stock (C) of these trees were estimated with volume and biomass allometric models and a carbon fraction of 0.47.

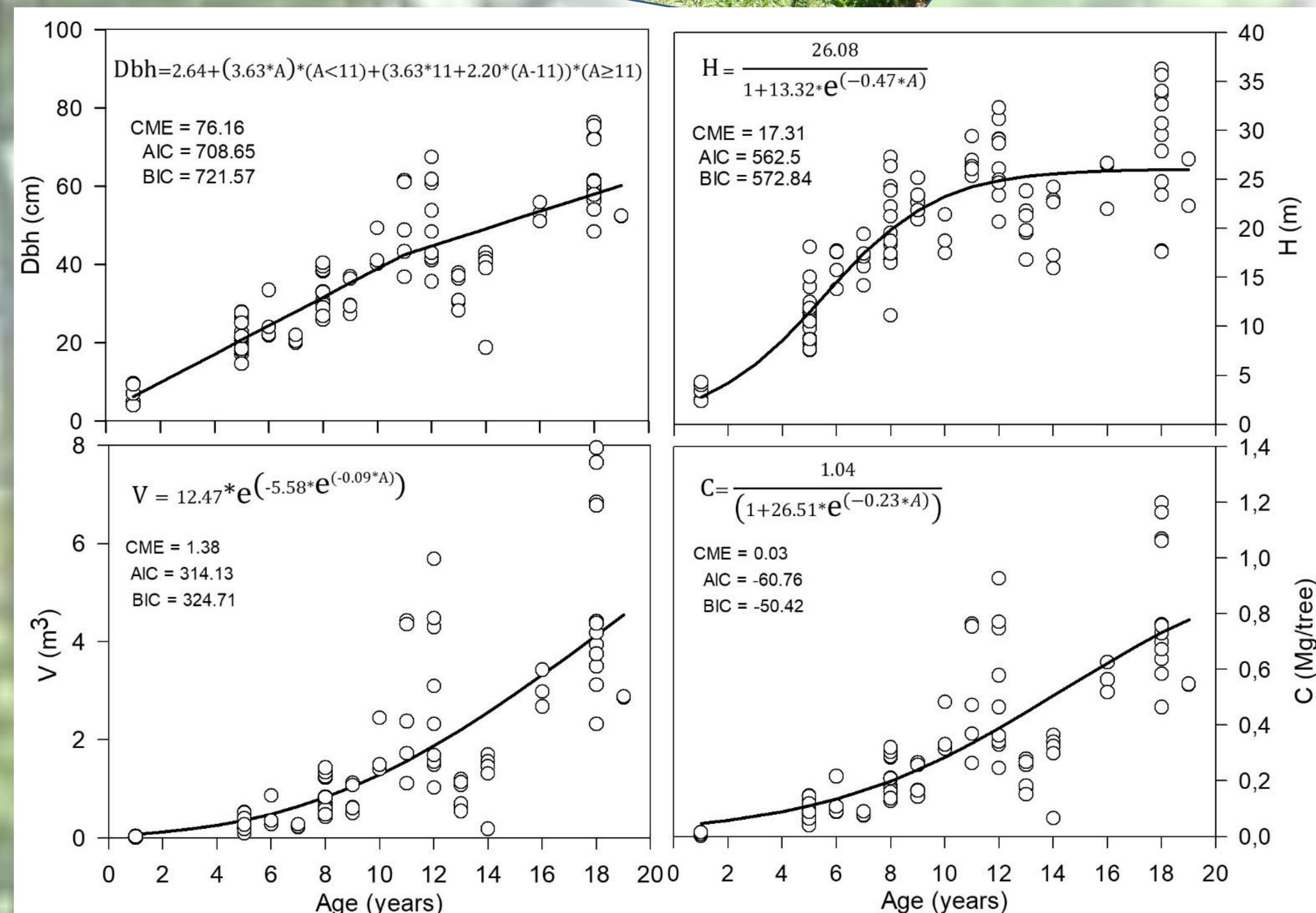


Figure 1. Growth and carbon sequestration of individual trees of *Cordia alliodora* in coffee agroforestry systems in Líbano, Tolima, Colombia. Dbh: diameter at breast height; H: total height; V: total timber volume; C: carbon stock in aboveground biomass.

## Conclusions

The th reached the maximum value at 12 years, later that it was more or less constat. In a 20-years cycle in coffee AFS, *C. alliodora* could stock a total volume of timber of 148-495 m³/ha and fix between 1.2 and 4.1 Mg C/ha/year with tree abundances of 30 and 100 trees/ha, respectively. These results show the importance of this species in AFS, mainly when timber production and carbon sequestration are priorities for their profitability.

## Results

The best-fit models were selected based on Information Criteria of Akaike (AIC) and Bayesian (BIC), the mean square error (MSE) and the biological adjustment. A residual analysis was also included in the selection. The greatest growth rate was reached at an age of 6 and 11 years (3.6 cm/year in Dbh and 3.0 m/year in H, respectively); whereas the maximum carbon fixation was found between 13 and 17 years (60 kg C/tree/year) (Figure 1).

