Performances of native tree species in plantations: a synthesis for the Guineo-Congolian region

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Planting method needs to be adapted to the species

An appropriate correspondence between species and planting method is essential to optimize the survival and growth rates of planted trees. Among the planting methods, the best results were obtained in degraded areas (Fig. 1) and in clear-cuts. Some of the best performing species were *Albizia ferruginea*, *Bombax buonopozense*, *Triplochiton scleroxylon*, *Parinari excelsa, Zanthoxylum gilletii* and *Terminalia superba*.

Introduction

In the Guineo-Congolian region, several native tree species have been tested for more than 2 decades in plantations with different silvicultural methods.
The results of these trials have received little scientific research. Given the current climate and societal challenges, it is crucial to disseminate the results obtained.

Fig. 1. Plantation in the degraded area in the south-east Cameroon

Methods

We synthesized the literature by conducting a systematic review. From 45 selected studies, we collected data (687 observations) of tree survival, height and diameter growth of 89 tree species. For each planted species, we gathered information on tree planting method (Fig. 2) and species guild.

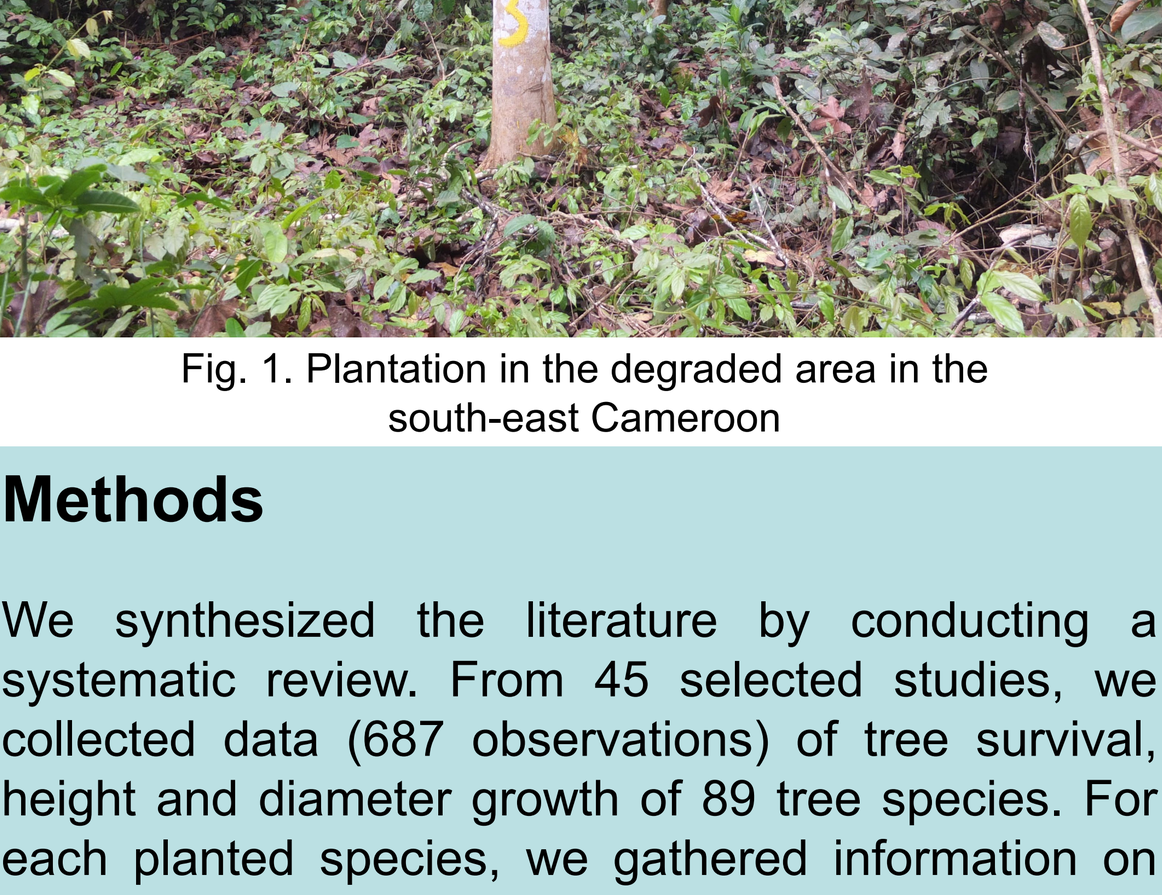

Fig. 2. Planting methods

We modelled tree survival and growth using linear mixed-effect models.

Results and conclusions

Tree survival depended significantly on plantation age and mortality rate was the highest during the seven first years. Height and diameter growth significantly depended on planting method and species guild (Fig. 3).

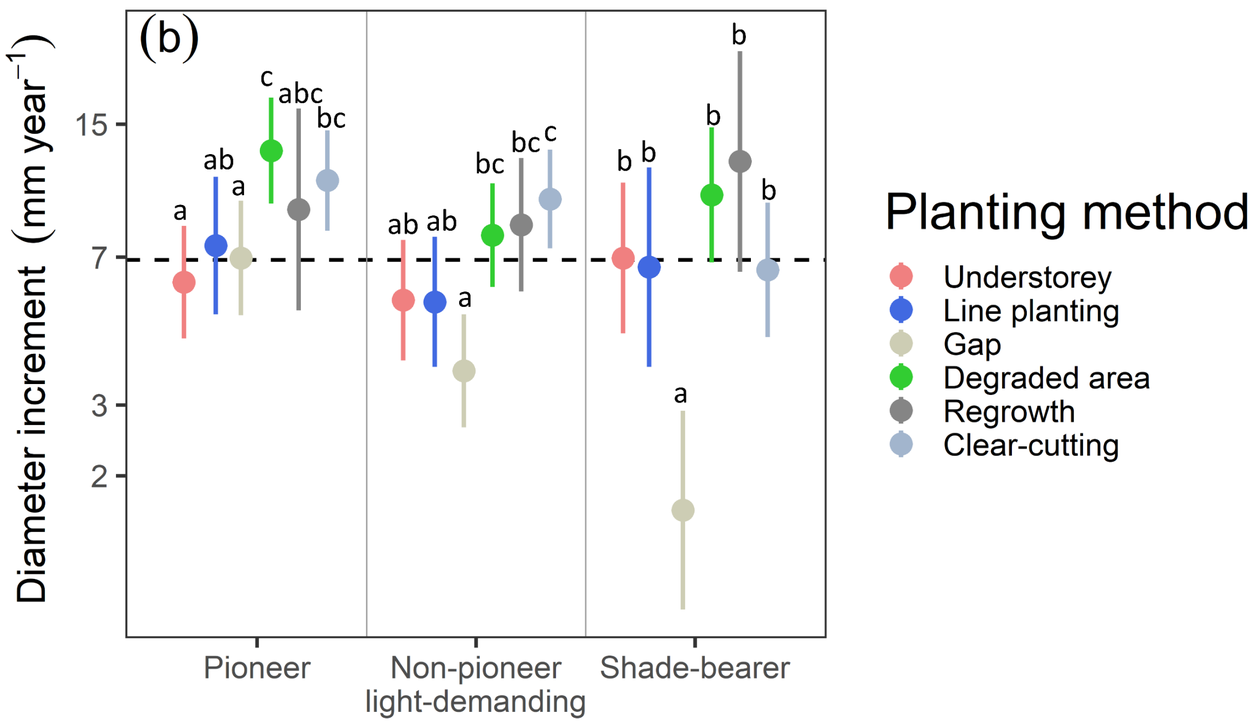

Fig. 3. Effect of planting methods across species guild on diameter increment

Species were classified considering survival rate and diameter increments to facilitate the selection of the best performing species in plantation (Fig. 4). This study provided empirical evidence that planting method needs to be adapted to the species guild.

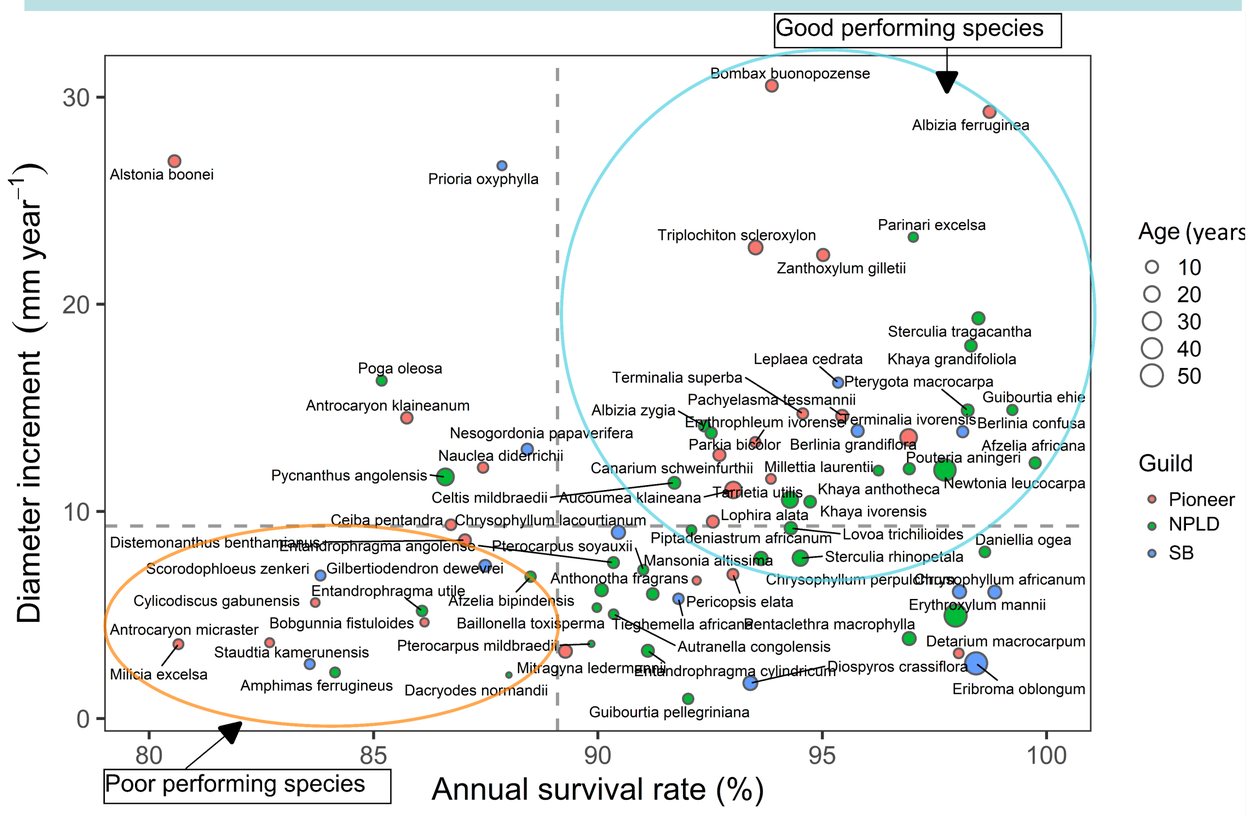

Fig. 4. Relationship between annual survival rate and diameter increment of planted tree species. NPLD: non-pioneer light-demanding and SB: shade-bearer species.

The next step will be to verify the validity of these literature-based results by modelling the survival and growth of 36 species planted in logging gaps, log yards and degraded areas of south-east Cameroon.

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