

Effect of selective pruning and thinning on tree diversity and biomass productivity in fallows of Sudanian woodlands



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Background

In fallow systems, woodlands stands of Sudanian zone of Benin are under different management regimes, including total protection and controlled use with mitigated results.



Photo 1. Early woodland's development stands in Sudanian zone dominated by *Combretum collinum* and *Terminalia avicennioides*

Aims

This study aims to:

- (i) Access the capacity of woodlands stands in fallows of Sudanian woodland to meet local population needs in fuel wood;
- (ii) Determine the effect of selective pruning and thinning on potential production of standing biomass in woodland stands.

Whatever the treatment applied, there was a deficit of 68.28 % to 85.59 % in biomass to cover local population need estimated in biomass at 9,515,850.22 kg/year. The best tree height (Fig. 2) biomass production (3,018,736.25 kg/year) was obtained with 30 % thinning and pruning.

Method

Three random blocks of 400m² were demarcated in homogeneous stands and divided into four treatment plots of 100m² each (Fig 1). Tree species growth in height of individual ≥ 1m were measured each 6 months between 2015 and 2016.

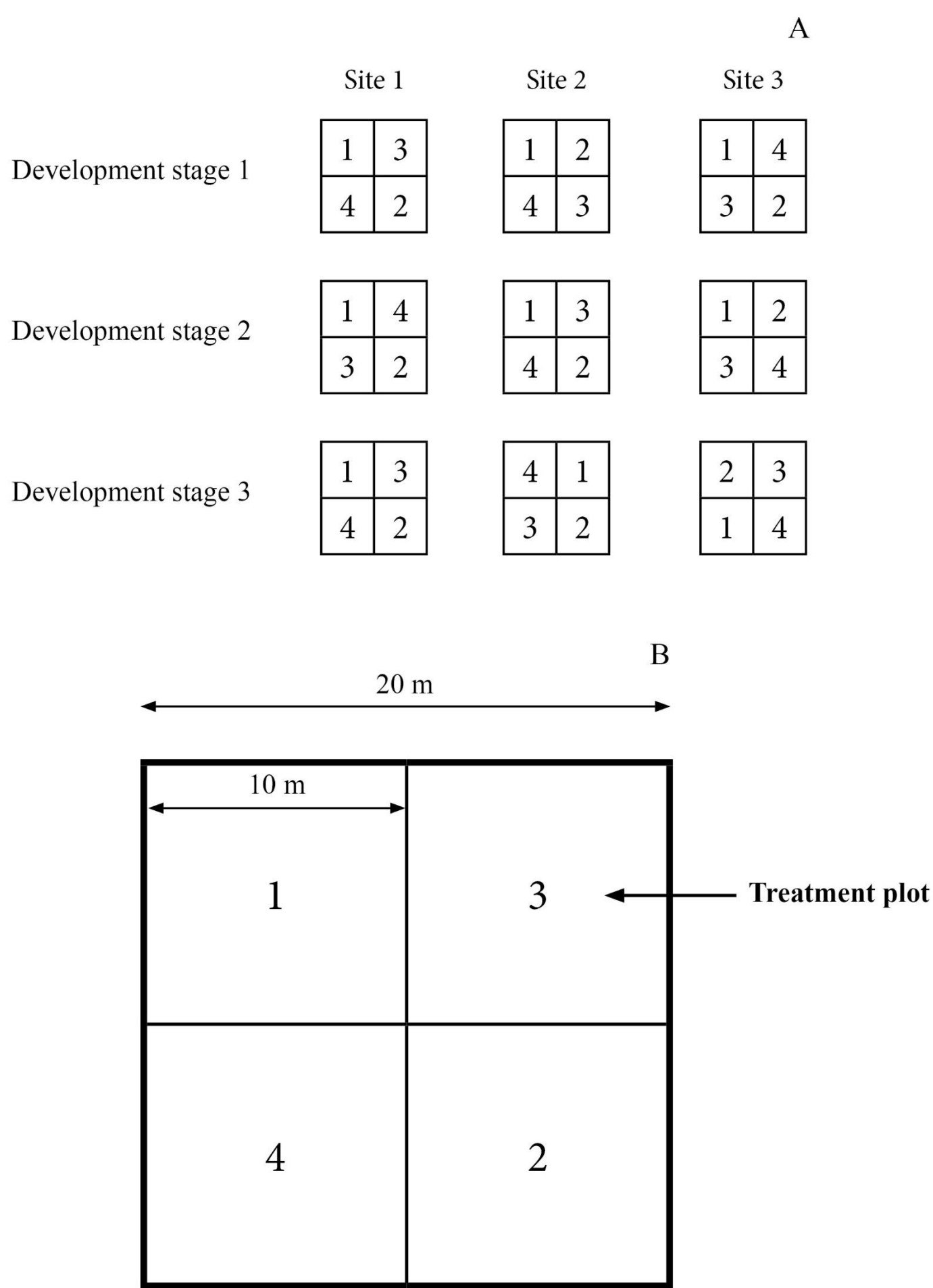


Fig. 1. Sampling design. A: Experimental design and layout; B: Layout of treatment plot. 1 = no thinning and pruning; 2 = 30% thinning and pruning; 3 = 60% thinning and pruning; 4 = 100% cutting of all stem; C: Tree pruning in early woodland stage.

Results



Photo 2. Early woodland's development stands in Sudanian zone dominated by *Combretum collinum* and *Terminalia avicennioides*: Tree measurement.

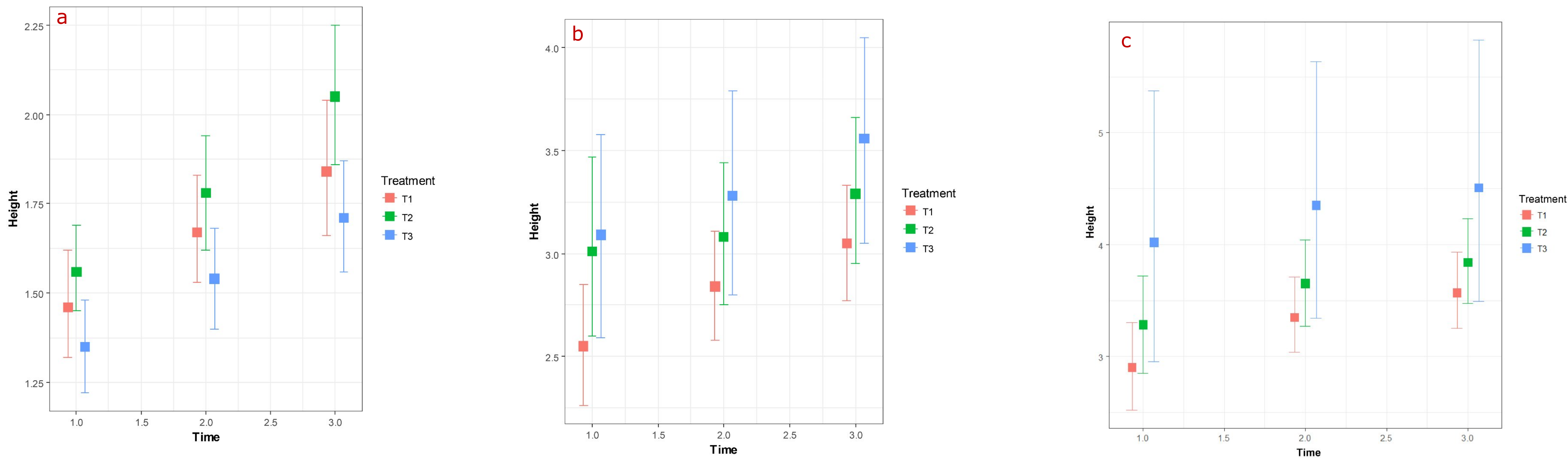


Fig. 2. Effect of treatment on tree height growth in woodland development stages: a: stage 1; b: stage 2; c: stage 3.

Compared to 30 % thinning, the biomass produced with no thinning and pruning and with 60 % thinning increased the deficit in biomass respectively by 17.31 % and 4.83 %.

Conclusion

Moderate thinning gives the best result in early woodland's development stands, while more severe thinning gives the best result at later development stands.

Acknowledgements

We are grateful to the International Foundation for Science (IFS) for financial support through the collaborative research grant to Eméline Sèssi Pélagie ASSEDE (grant reference: J/5730-1). She was further supported by the University of Pretoria Postdoctoral Fellowship Program. Thank to the staff of the Biosphere Reserve of Pendjari for logistic support and the field guides and farmers, who collaborated during data collection.