

Ecophysiological effects of mistletoe infestation on host trees – a long-term mistletoe removal experiment

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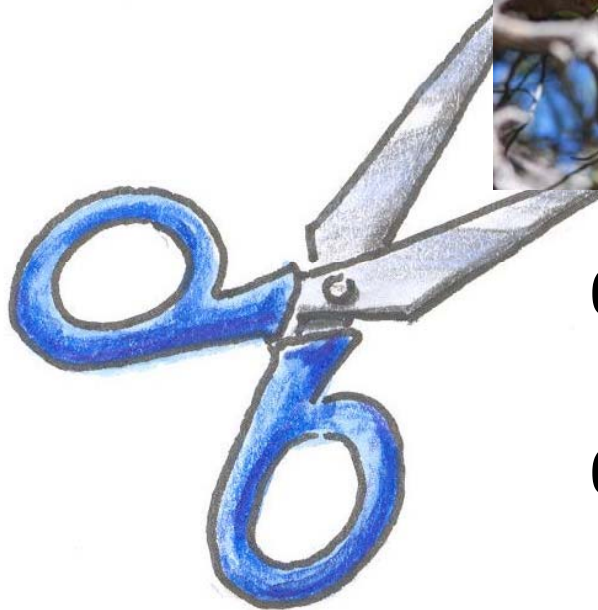
Matthias Dobbertin

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Mai-He Li

This paper is dedicated to the memory of our good friend and colleague Matthias Dobbertin who initiated this mistletoe removal experiment

Experimental design



6 MRT = Mistletoe-removed trees

(removed in 2004, and repeated in 2007, 2010)

6 MIT = Mistletoe-infected trees

We compared

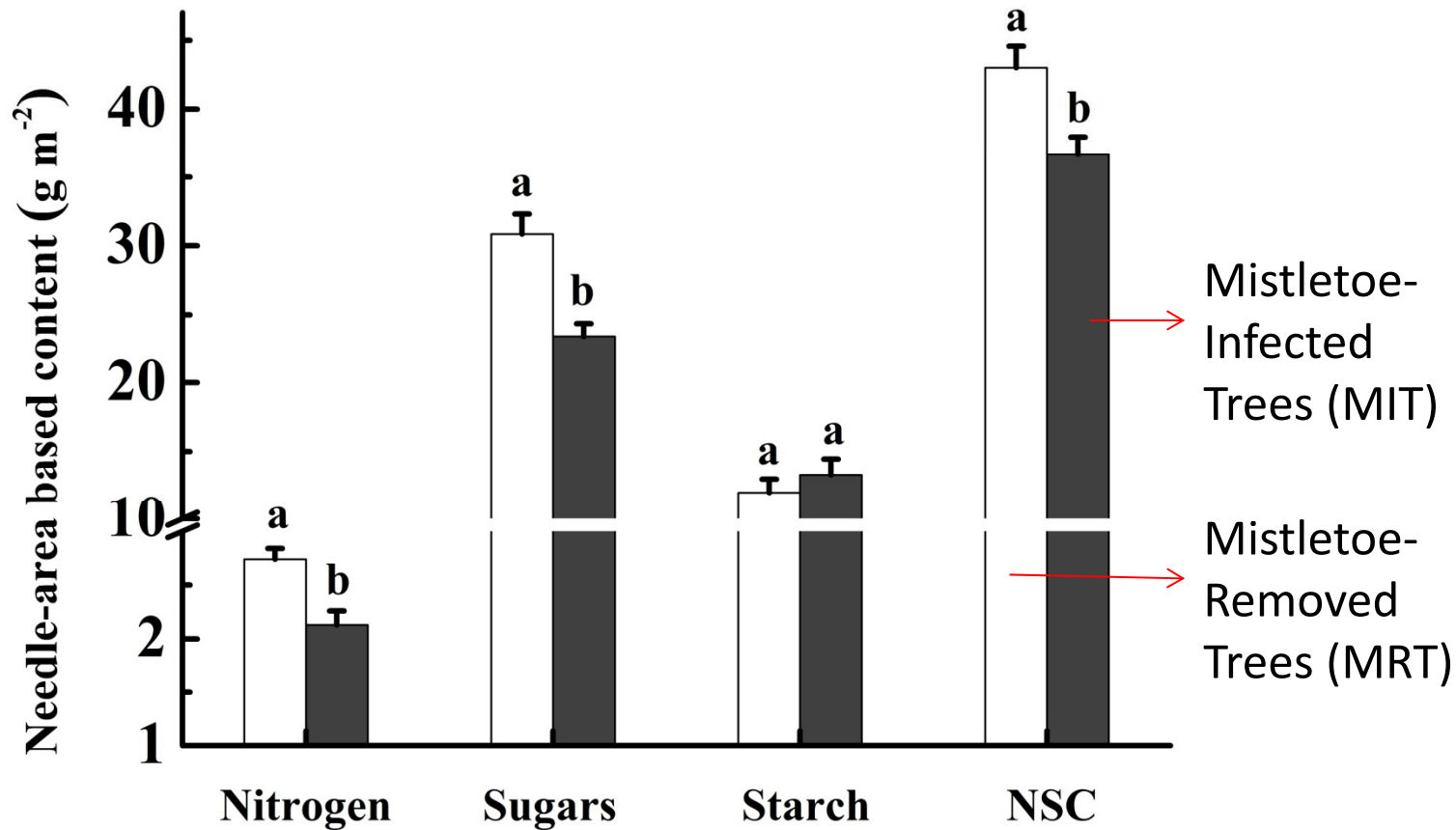
- 1) pre-removal data with post-removal data, to detect the removal effects, and
- 2) MRT data with MIT data, to eliminate the effects of annual environmental variations

Hypotheses to be tested

Mistletoe removal will lead to

- (1) an increases in concentrations of mobile carbohydrates and N, and
- (2) a decreases in both $\delta^{13}\text{C}$ (more negative) and $\delta^{18}\text{O}$ (less positive) values in host trees

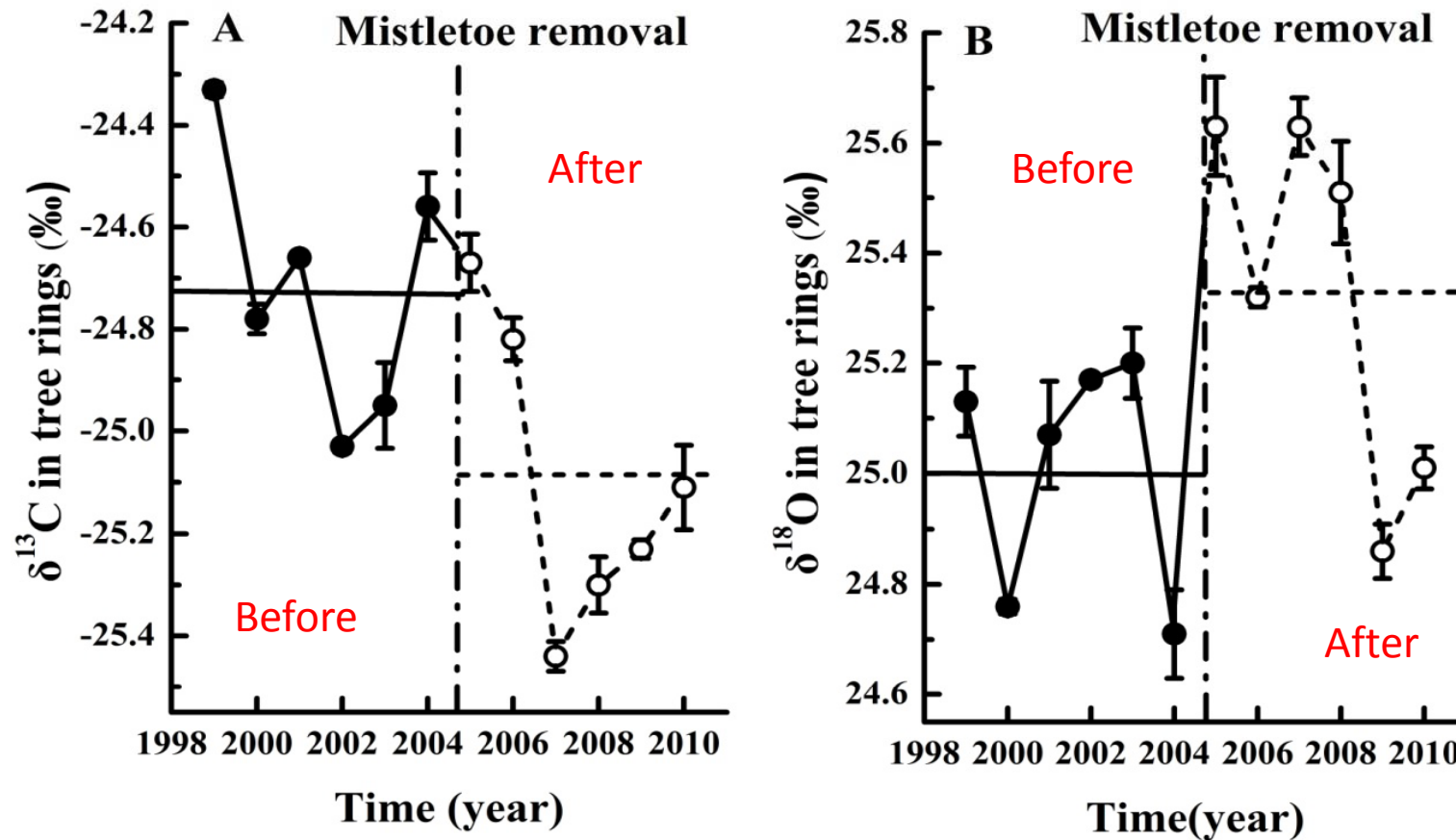
Results & Discussion



Mistletoe-removal tended to increase N and mobile carbohydrates in needles

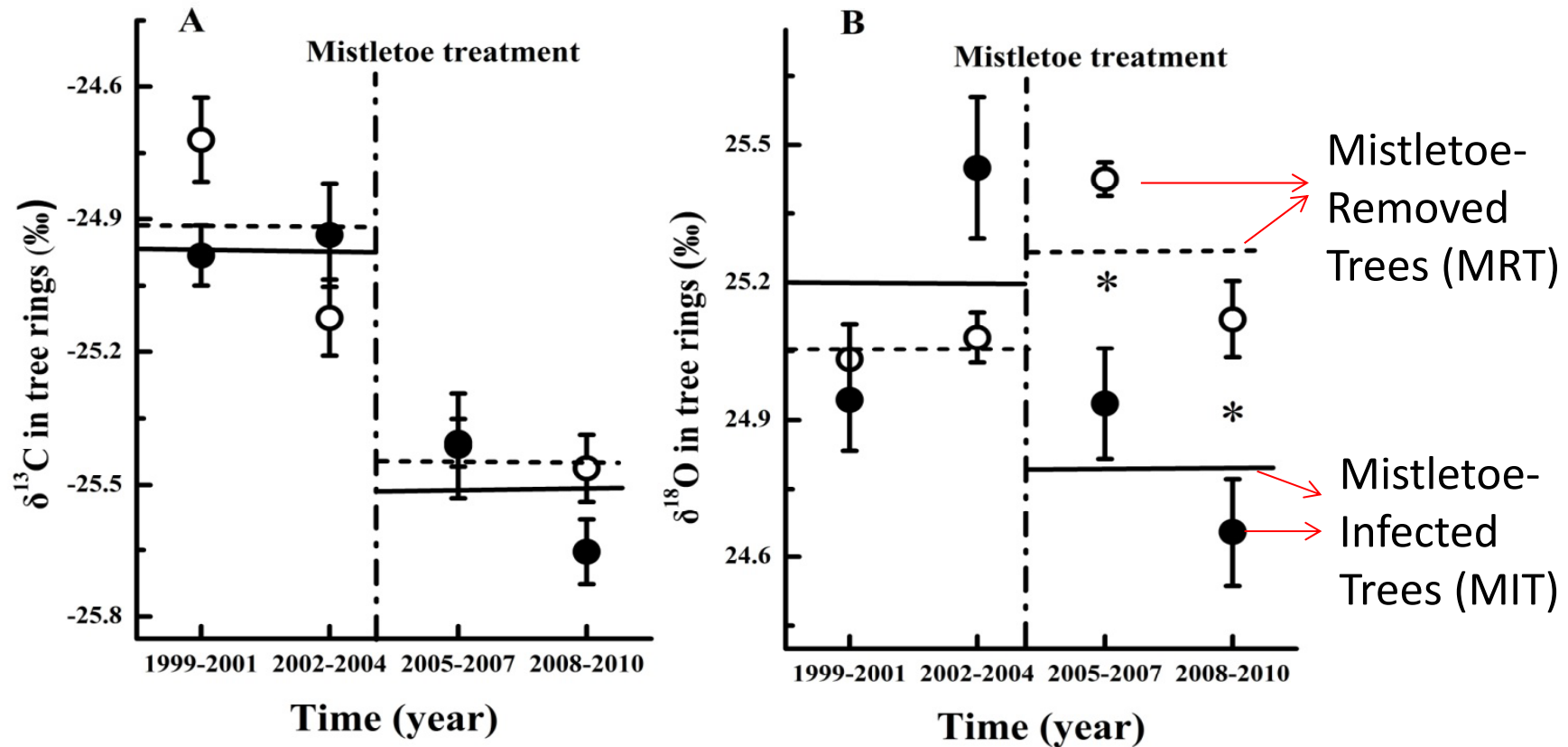
Yan et al. in prep.

Results & Discussion



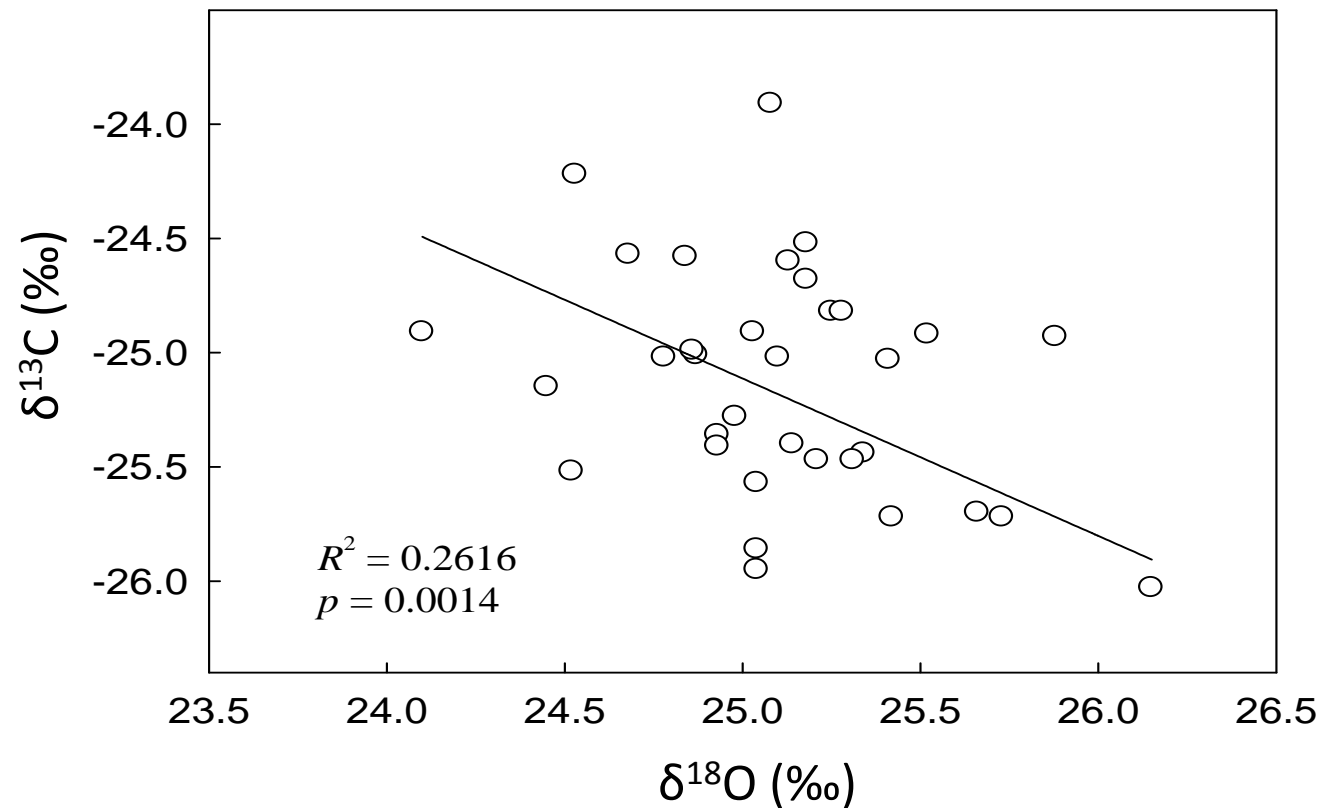
Mistletoe-removal resulted in a decrease in $\delta^{13}\text{C}$ but an increase in $\delta^{18}\text{O}$

Results & Discussion



The decrease in $\delta^{13}\text{C}$ may be mainly a natural process caused by annual envir. variation, but the increase in MRT $\delta^{18}\text{O}$ was caused by mistletoe-removal

Results & Discussion



Mistletoe-removal resulted in an increase of both stomatal conductance and photosynthetic capacity ([Scheidegger *et al.*, 2000](#))

Conclusions

- 1) Increases in N and carbohydrates in MRT indicated a net negative effect of mistletoe infestation on host trees
- 2) Mistletoe removal-induced decreases in $\delta^{13}\text{C}$ and increases in $\delta^{18}\text{O}$ indicated an increase in both stomatal conductance and photosynthesis, which probably reflects an increase in water availability in host trees growing in that dry environment.
- 3) Mistletoe removal-induced increases in water, N, and carbon availability, will lead to an increase in growth rate and a decrease in mortality of host trees

Growth

