

Sunn hemp intercrop and mulch reduces wind stress and increases growth and development of papaya



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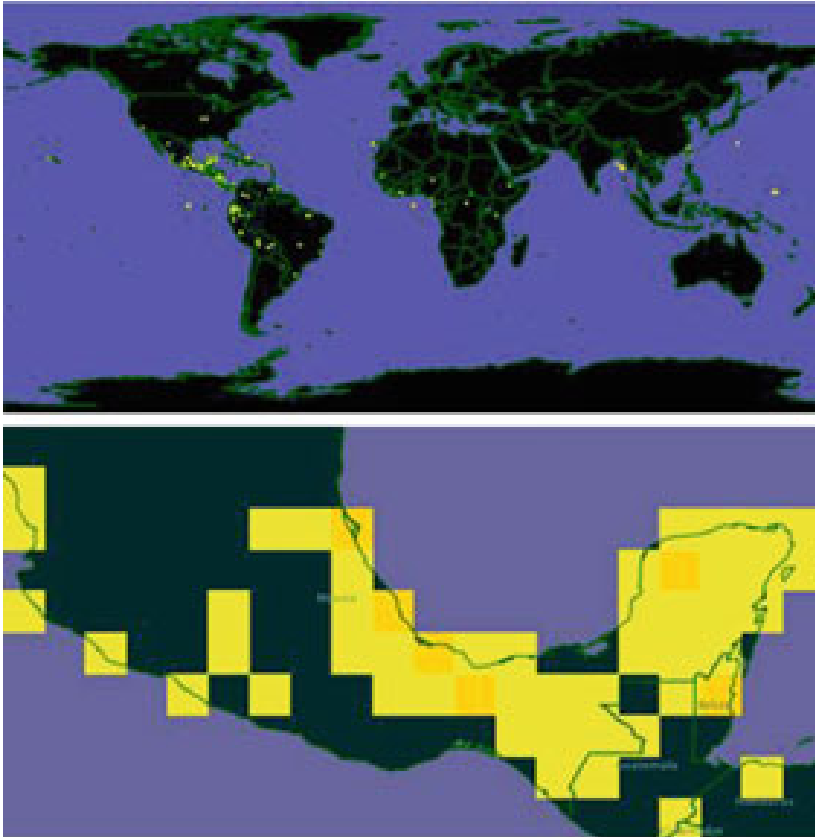
Wind damage

- Sensitive periods
- Constructed barriers costly



Photo by Kati Migliaccio

Carica papaya L.



From: G. Fuentes & J.M. Santamaria (2014)



From: Chavez-Pesquera et al. (2014)

Sunn hemp

- *Crotalaria juncea* L.
- Legume
- Vigor
- Popular with growers



Sunn hemp intercrop

- Objectives:
 - Test the effect of sunn hemp intercrop and mulch on:
 - Wind
 - Physiology
 - Growth
 - Mowing timing?



Methods

- Treatments
 - Sunn hemp mown early
 - Sunn hemp mown late
 - No sunn hemp



Sunn Hemp Intercrop

Methods

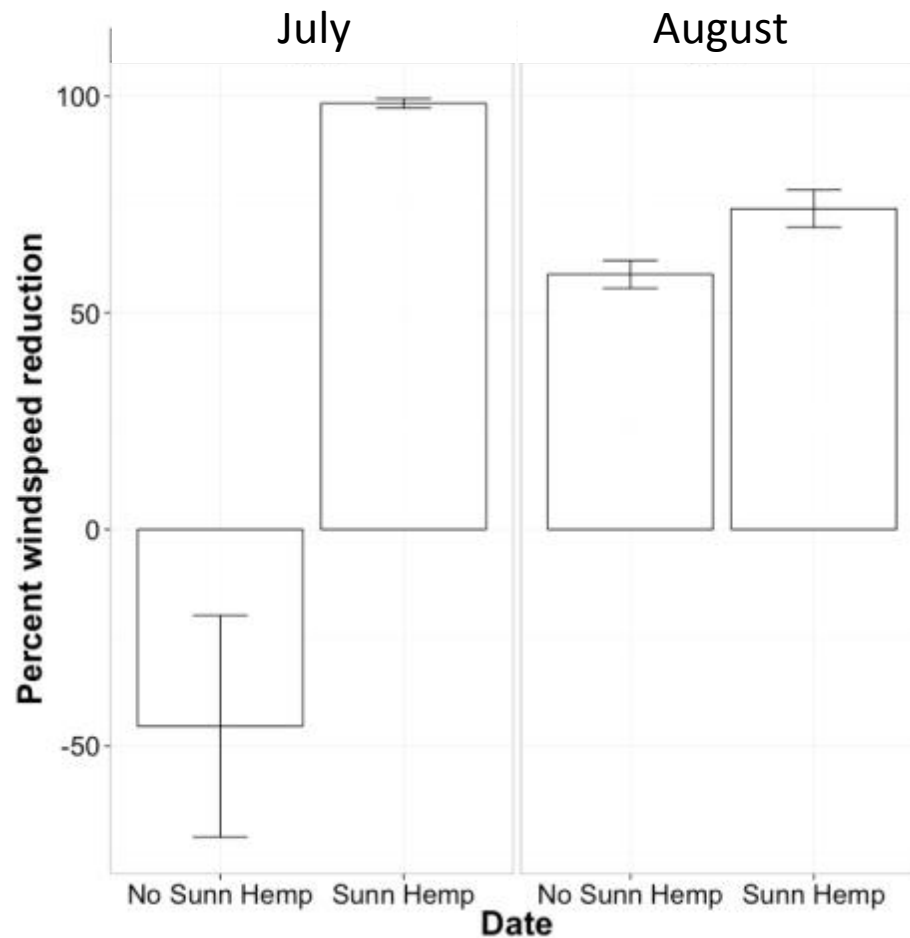
- RCB
- Variables
 - Wind speed
 - Shade
 - Gas exchange
 - Growth: stem diameter, stem length
 - Weeding time
 - Water application
- Analysis
 - Linear models for single dates (anova)
 - Linear models (repeated measures) for multiple dates
 - nlme package in R

Wind



Percent reduction of wind speed relative to outside of planting of papaya with and without sunn hemp intercrop

Low wind speed day



High wind speed day

Sunn Hemp Intercrop

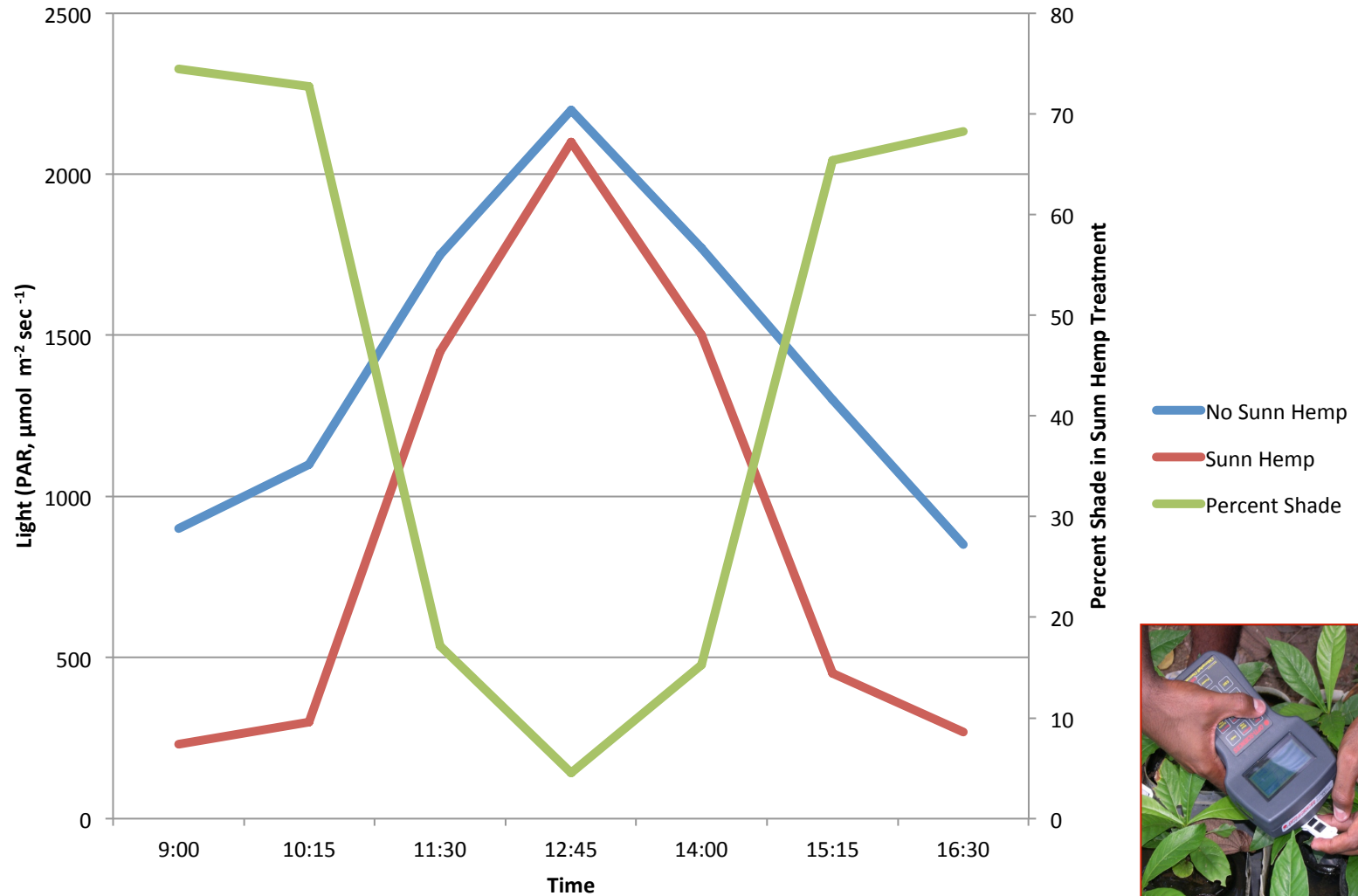
Bars represent standard error.

Shade



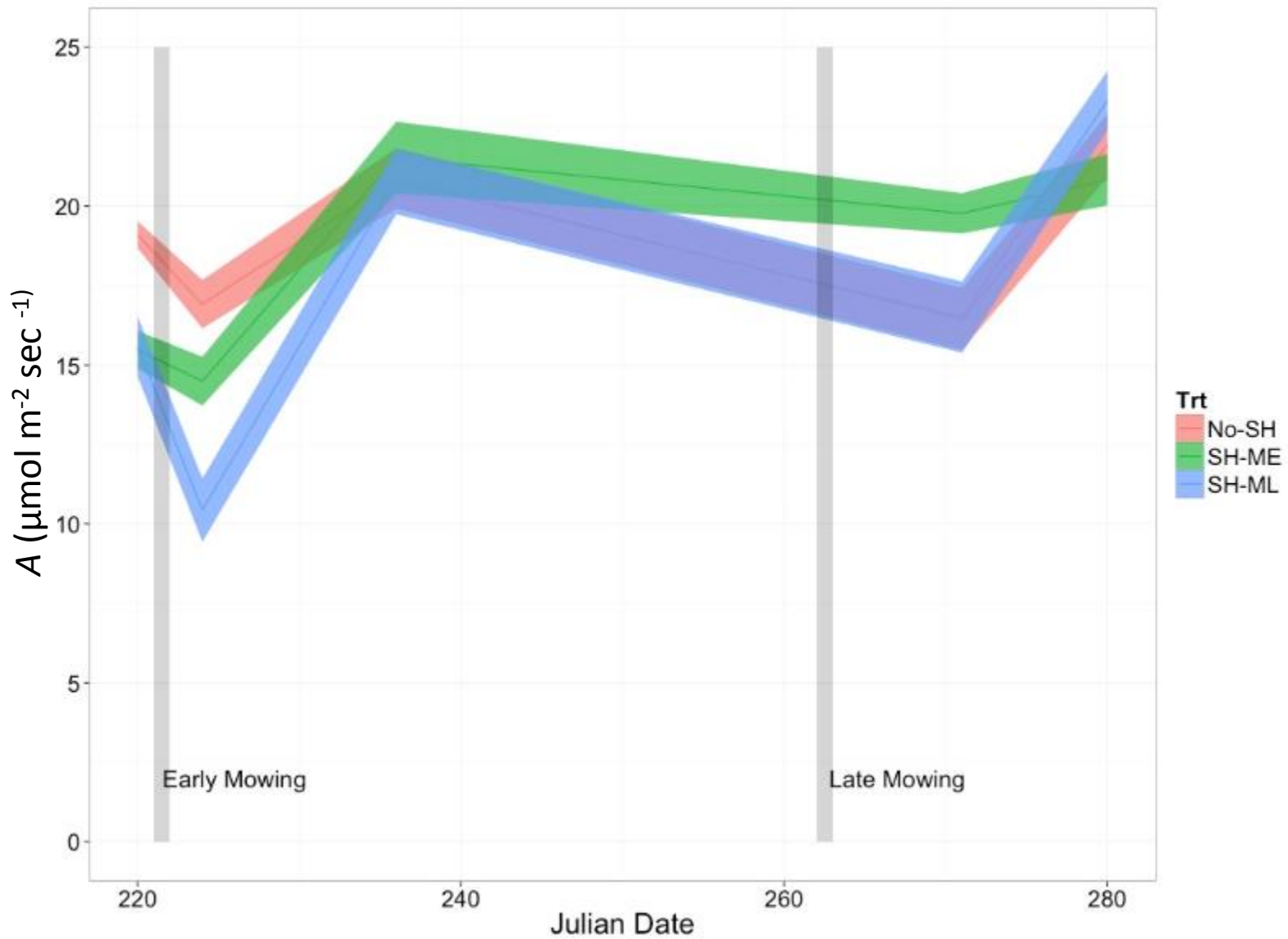
Sunn Hemp Intercrop

Shading



Sunn Hemp Intercrop

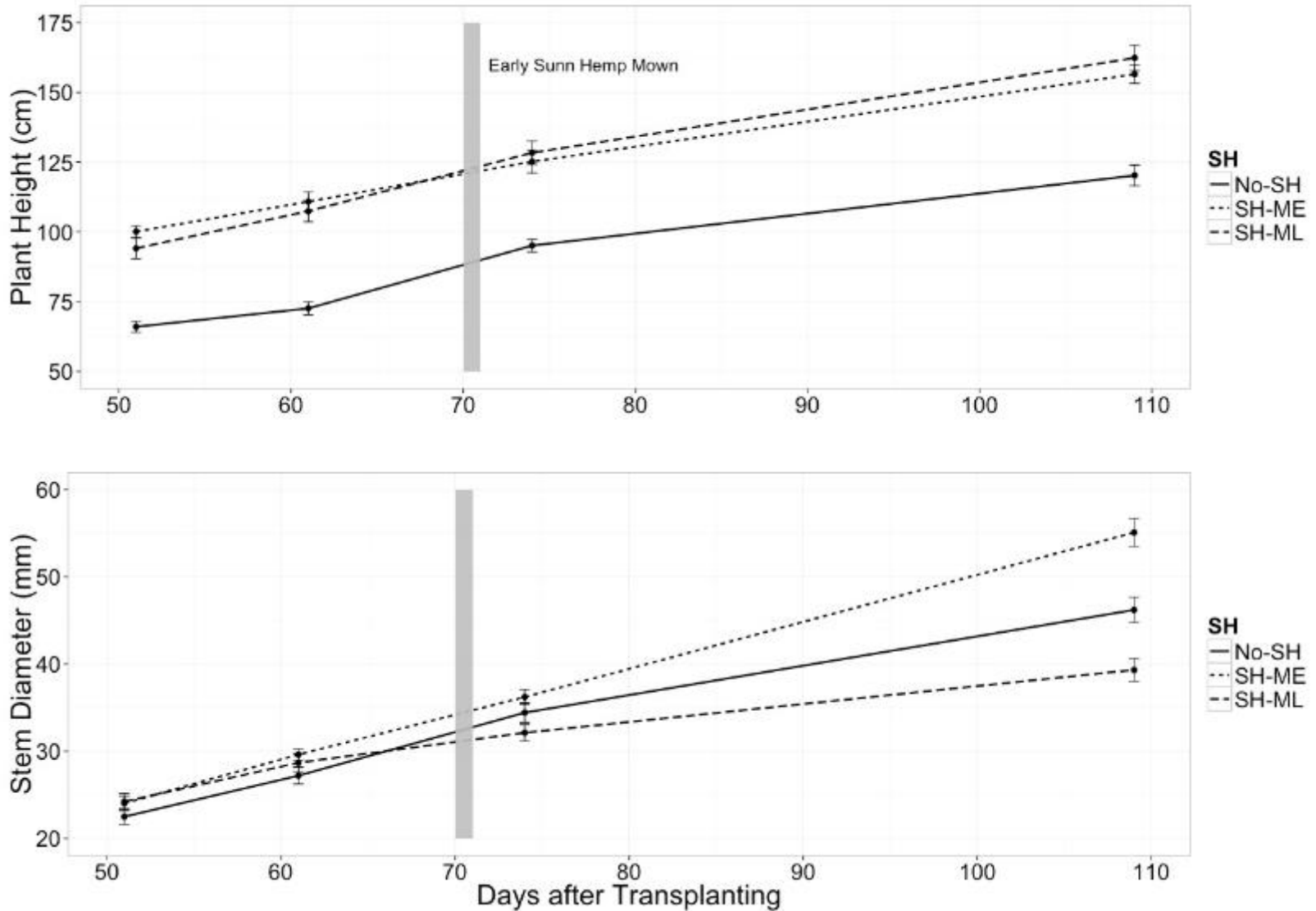
Net photosynthesis (A) of 'Red Lady' papaya intercropped with sunn hemp mown in August (ME) or September (ML)



Bands represent standard error.

Sunn Hemp Intercrop

Height and diameter of 'Red Lady' papaya prior to and following mowing of shading sunn hemp intercrop



Bars represent SE. Gray vertical line marks date of sunn hemp mowing.

Sunn Hemp Intercrop



Sunn Hemp Intercrop

Weeding time

Treatment	Weeding time (minutes per plot)
No Sunn Hemp	74.5 a
Sunn Hemp Mown Early	29.6 b
Sunn Hemp Mown Late	28.5 b

Means followed by different letters are significantly different at $P=0.05$ according to Bonferroni's LSD. Analyses performed on log transformed data, non-transformed data did not conform to assumptions of normality.



Conclusions

- Sunn hemp intercrop has potential to protect papaya from wind and improve growth.
- When prolonged, sunn hemp intercrop shaded papaya and reduced growth.
- Sunn hemp mulch improved subsequent growth.
- Sunn hemp intercrop and mulch system reduced weed pressure.

Thanks