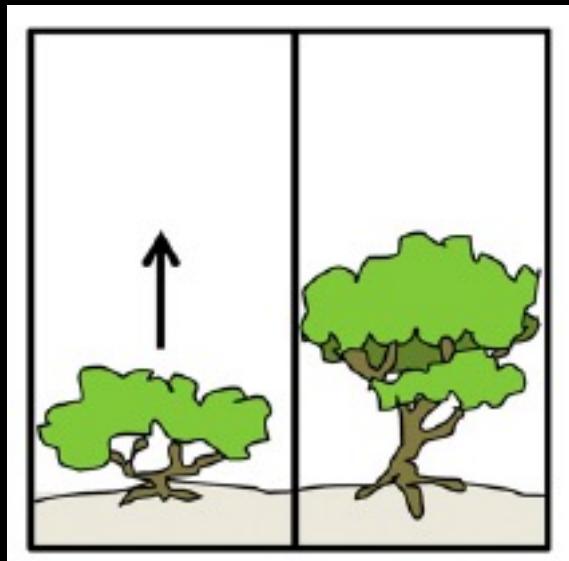


# Chapter 6

## Examining intra-canopy carbon cycling patterns in an Arctic shrub community

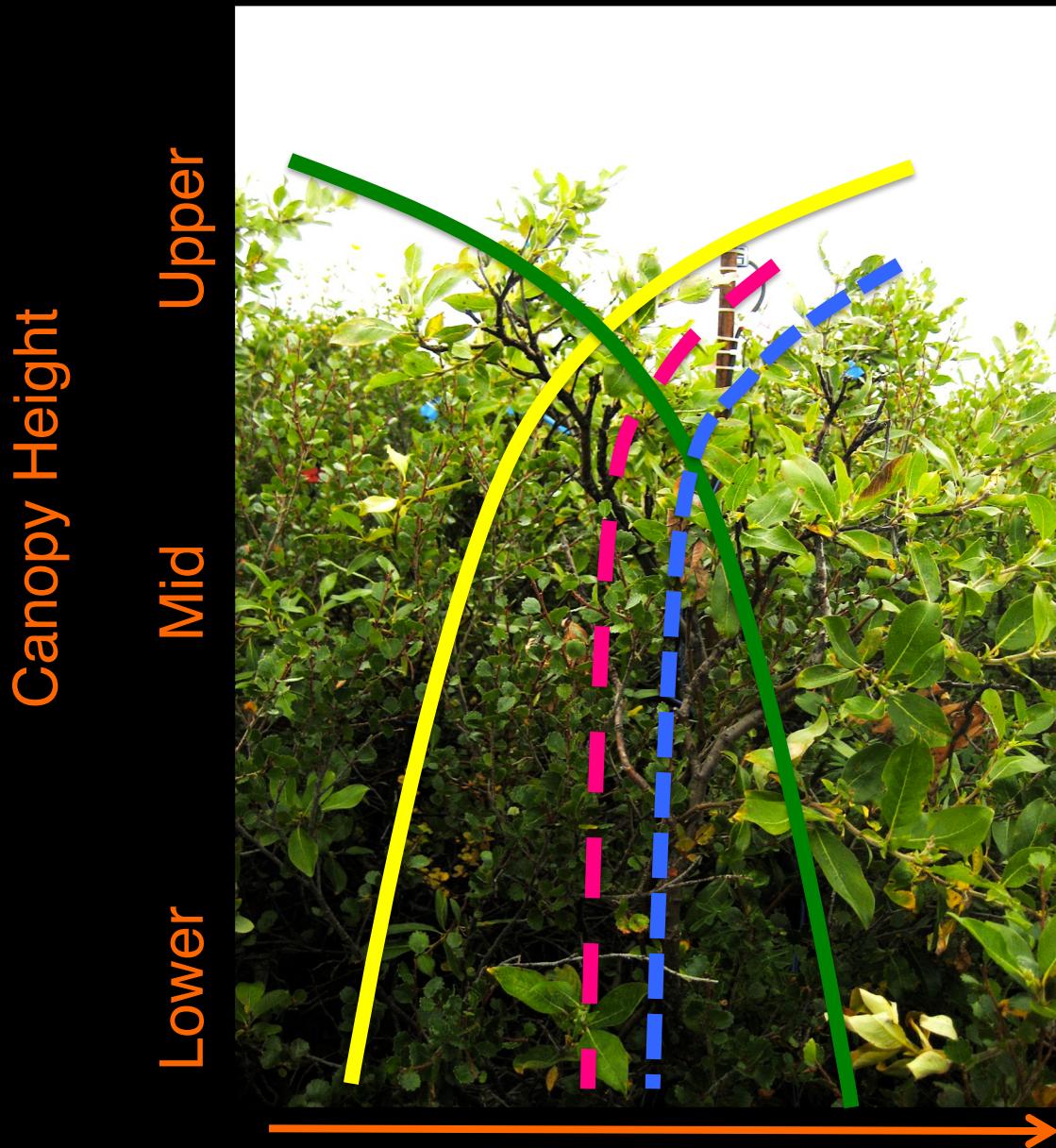
Mary A. Heskel, Matthew H. Turnbull, and Kevin L. Griffin\*



Myers-Smith *et al.* 2011

- Shrub canopy height increase (Walker et al. 2006; Elmendorf et al. 2012)
- Can influence climate (Loranty et al. 2012; Bonfils et al. 2012)
- Increased complexity, and intra-canopy variation not yet addressed

# Light-driven resource allocation in a canopy



**Light**  
**Cumulative LAI**  
**Foliar N**  
**Photosynthesis**

Do shrub canopies  
exhibit canopy  
optimization?

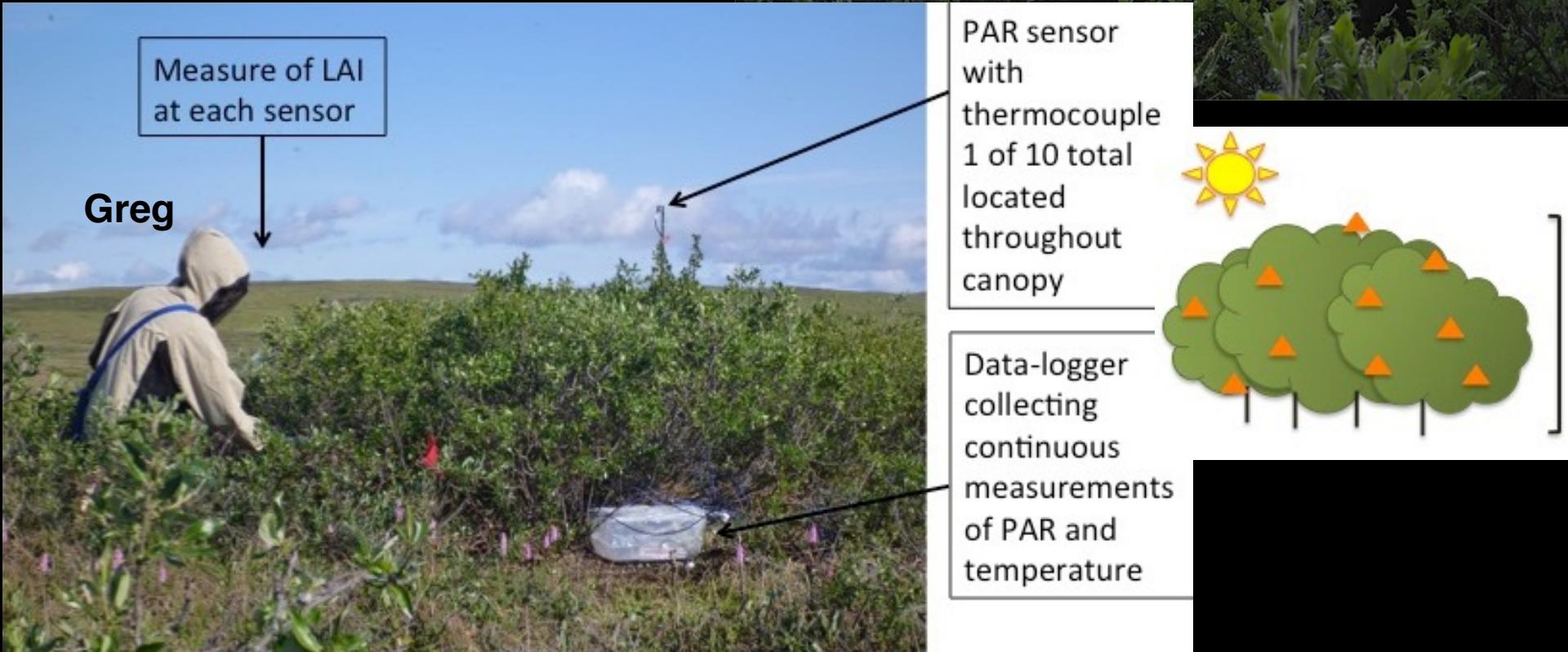
How does the light  
inhibition of R  
behave?

# Chapter 6 -Methods

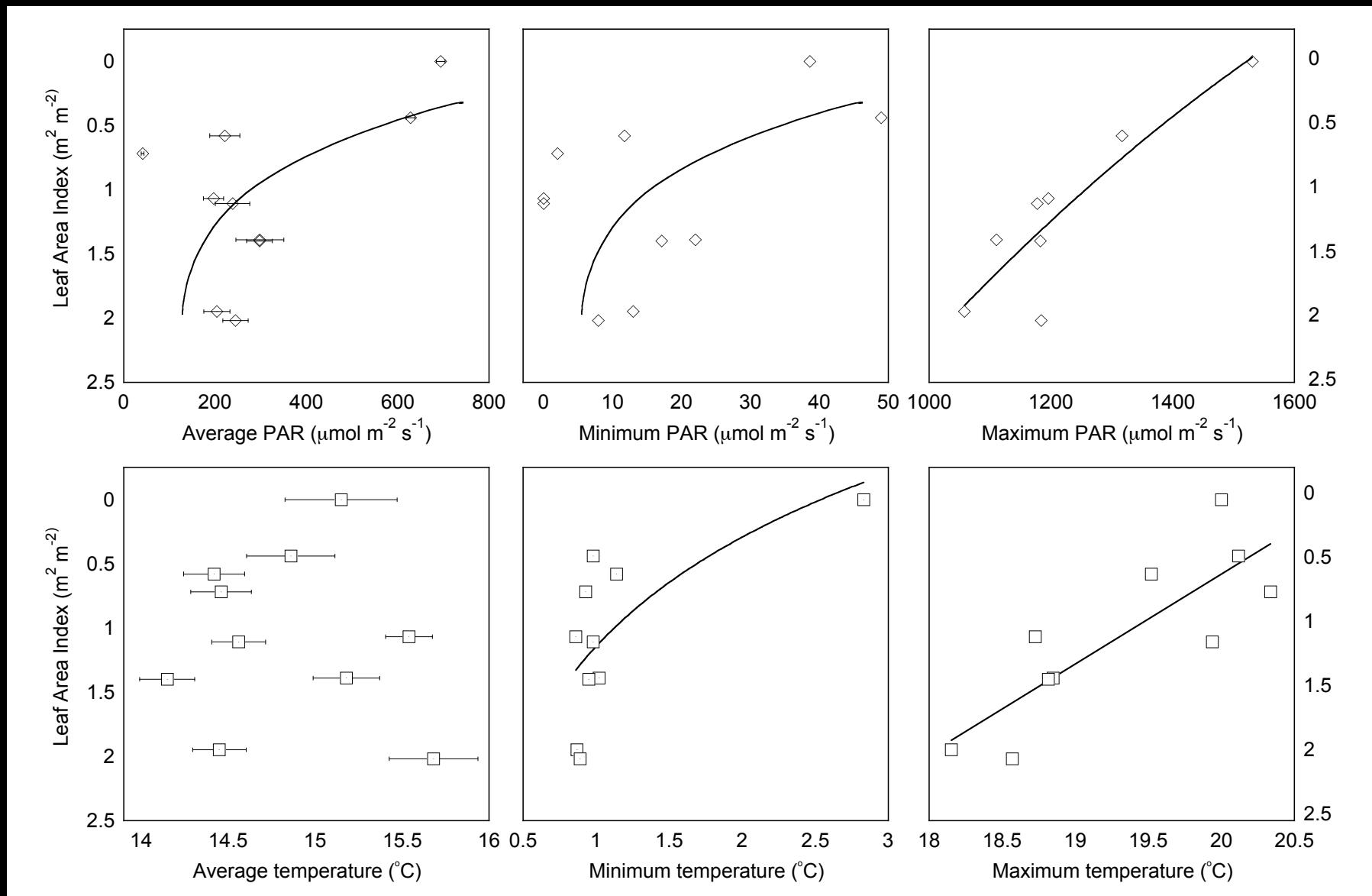
- 2010 and 2011
- 3 shrub sites
- *Salix pulchra, B. nana*



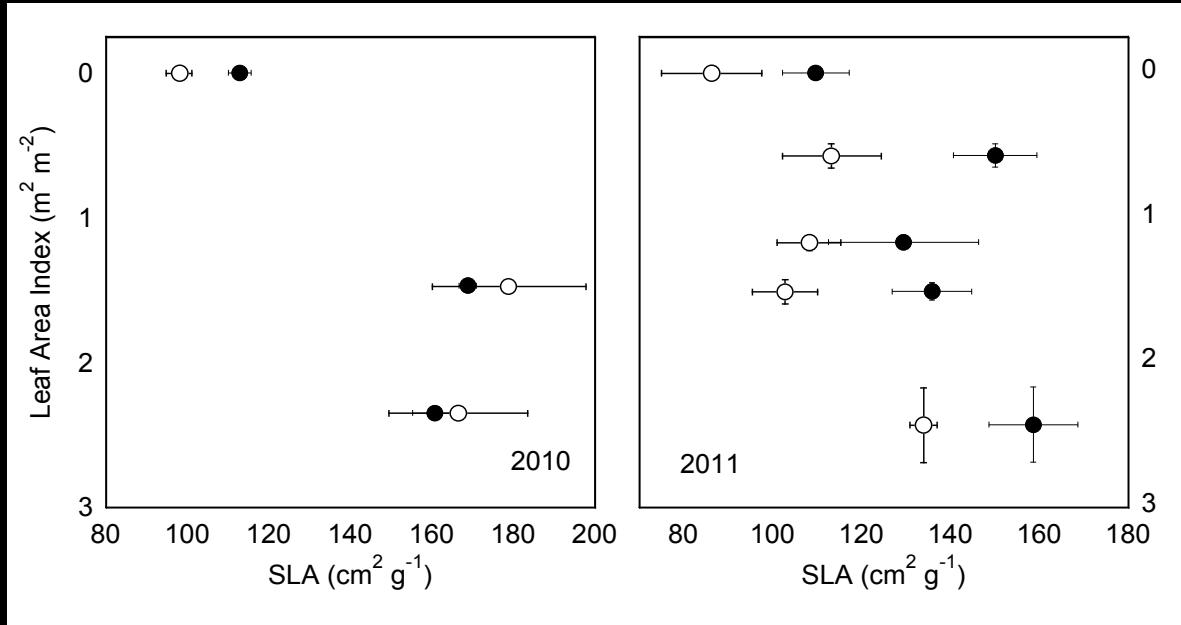
Jen



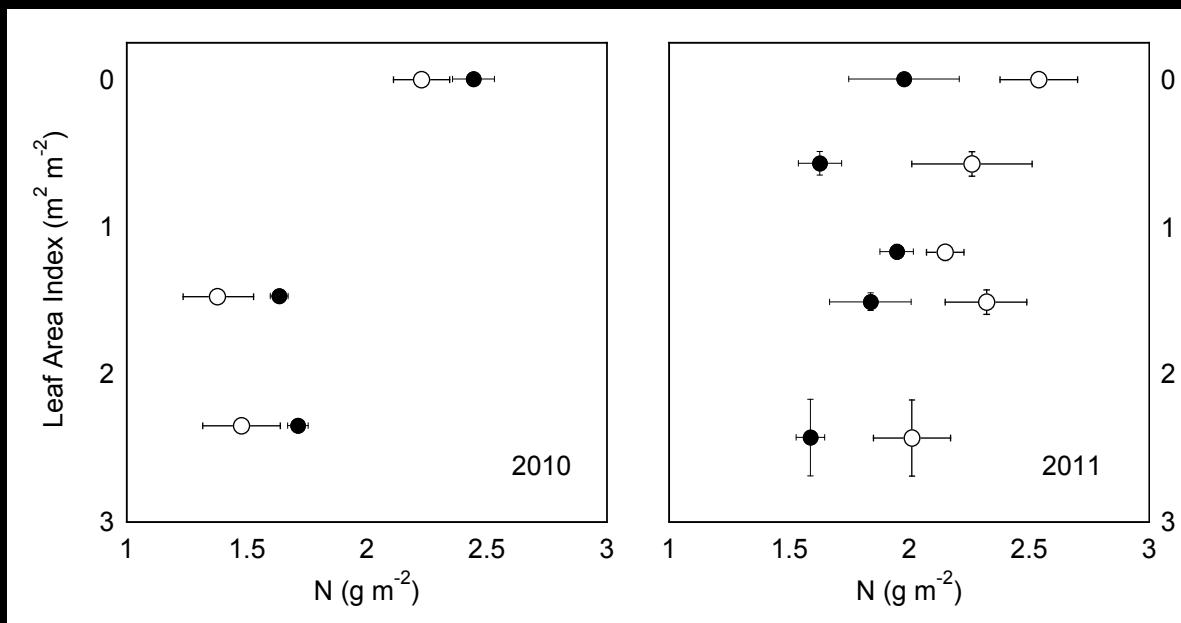
# Shrub canopy micro-environmental variation



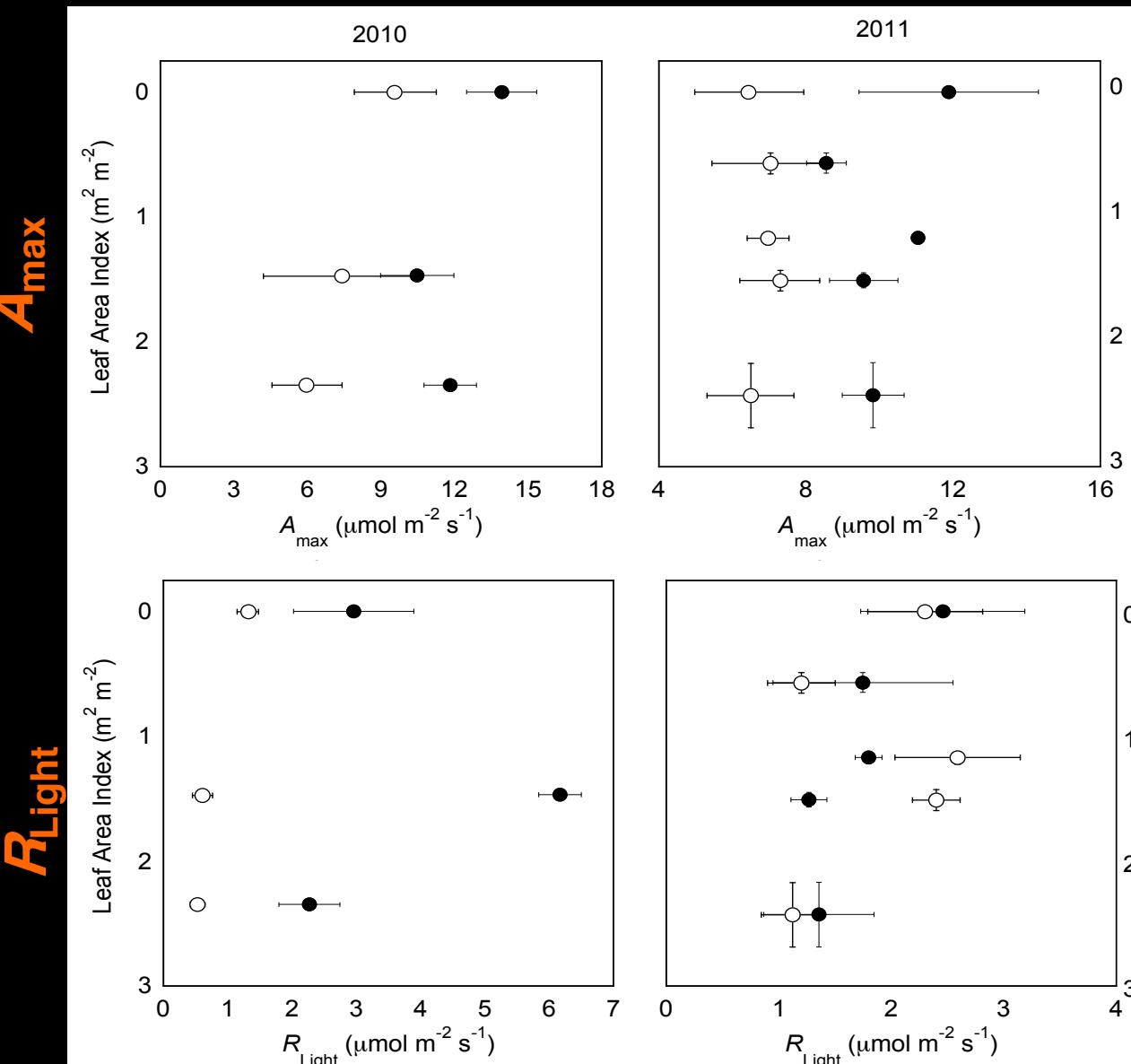
## Leaf traits



- SLA increases with depth in both species

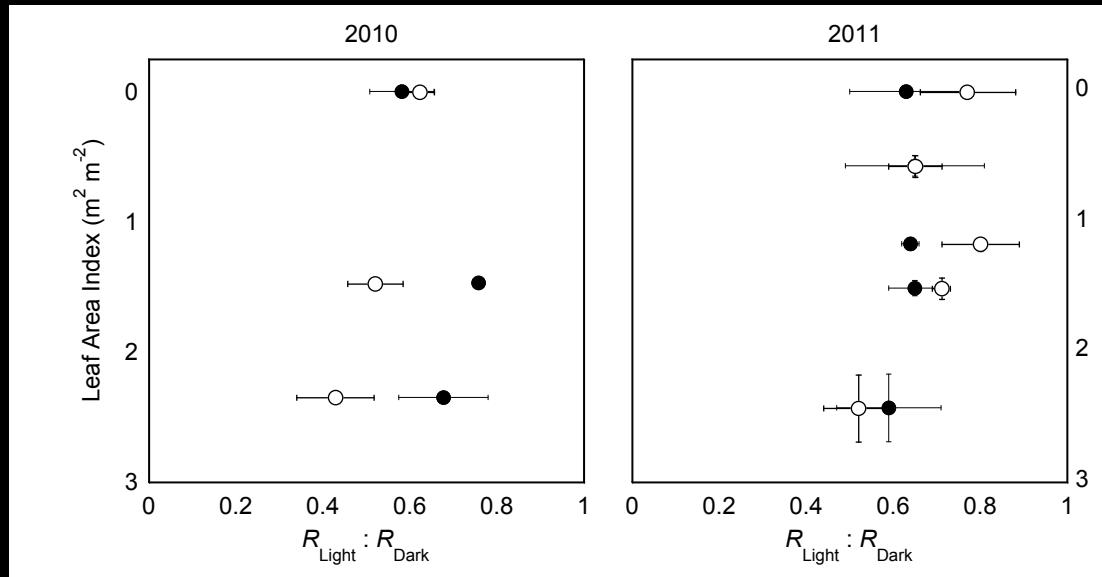


- Nitrogen higher in leaves at top of canopy\*



- LAI  $\sim A_{max}$  not significant
- Nearly significant relationship with LAI  $\sim R_{Light}$

# Light inhibition of Respiration $R_{\text{Light}} / R_{\text{Dark}}$



- No significant change in  $R_{\text{Light}} / R_{\text{Dark}}$  through canopy

### *No clear indication of canopy optimization*

- Potential photoinhibition
- Leaf age / reallocation tradeoff
- Clumped distribution, edge effect



Canopy density / height threshold?

No benefit to optimization within season