Title: Leaf canopy architecture determines light interception and carbon gain in wild and domesticated *Oryza* species

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Leaf canopy architecture determines light interception and carbon gain in wild and domesticated *Oryza* species

Running title: Light capture and carbon gain in wild and cultivated rice

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Highlights

- We digitized mature leaf canopies of two contrasting Australian wild *Oryza meridionalis* accessions and a cultivated *O. sativa* ssp. Indica after plants had been grown in individual pots arranged in dense stands. Plants were supplied unrestricted nutrients and water.
- The hypothesis was that contrasting crown densities and canopy architecture between the three rice genotypes might impose variations in the efficiency of light capture. Efficiency of light capture and canopy leaf area determined total light capture, with self-shading in dense canopies compensated by greater light capture and larger rates of carbon gain per day.
- Canopy leaf area was made larger by growing plants in elevated carbon dioxide atmospheres in order to re-test the relationship between of leaf canopy architecture, self-shading and rate of carbon gain. Genotypic ranking remained the same at high CO_2 even though canopies were denser.
- Digitized canopies enabled simulations varying the azimuth of the Sun, showing efficiency of light capture by canopies at the Solstice and Equinox. Genotypic ranking