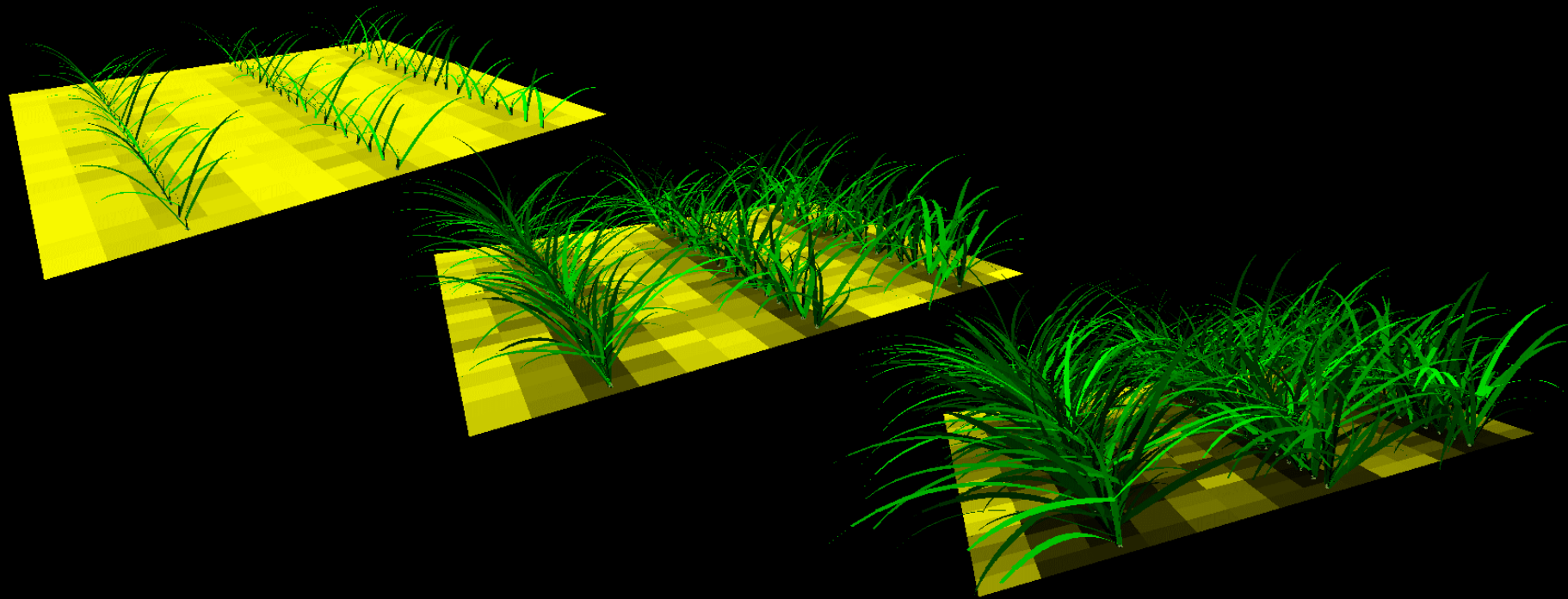


Simulating light interception in Australian wide-row canopies



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Background

- Water availability is main resource limitation in Australian wheat systems
- Delay water use and avoid terminal stress: wide rows (up to 50 cm)



Problem

- Wide-row systems hard to simulate using crop models

Aim

- To improve calculation of light interception in crop models using wheat FSPM



Methodology

- ADEL wheat
- Implementations in GraphTal, L-studio, GroIMP, OpenAlea



Methodology

- ADEL wheat
- Implementations in Graphical, L-studio, GroIMP, OpenAlea
- Established model

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- Fournier C, Andrieu B, Ljutovac S, Saint-Jean S. 2003. "ADEL-wheat: a 3D architectural model of wheat development". In Hu BG and Jaeger M, eds. 2003' International Symposium on Plant Growth Modeling, Simulation, Visualization, and their Applications. Beijing, China PR: Tsinghua University Press / Springer, 54-63.
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Methodology

- Focus on light extinction coefficient

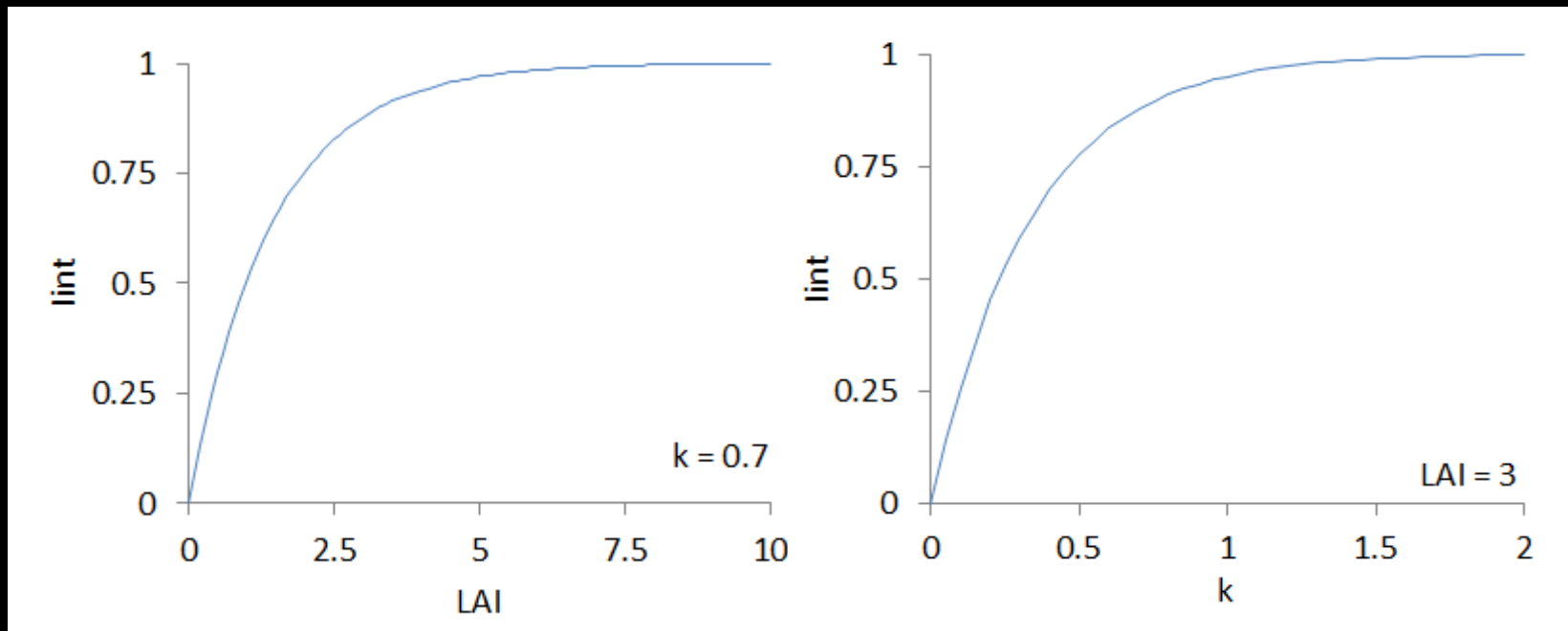
$$I_{\text{int}} = I_m \left(1 - e^{-k \cdot L} \right)$$

I_{int} = fraction light intercepted

I_m = maximum fraction of light intercepted

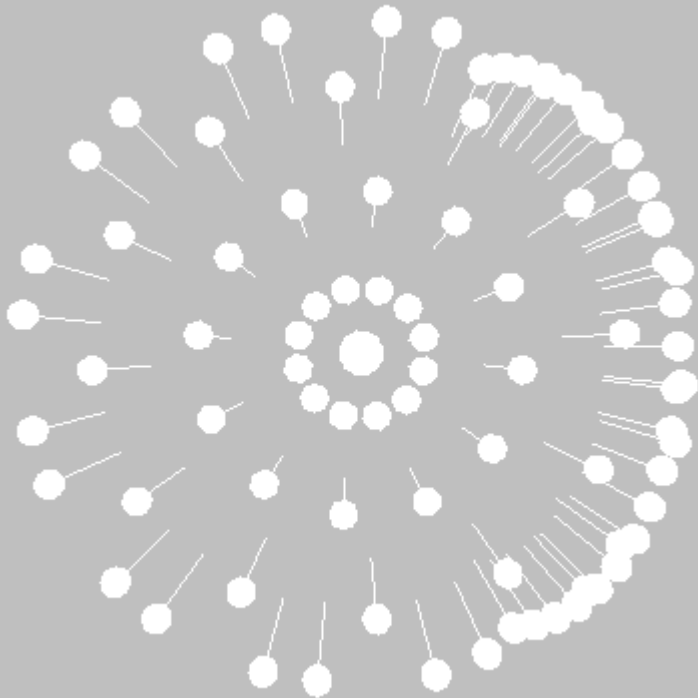
k = extinction coefficient

L = leaf area index



Methodology

- Diffuse light approximated by a dome of 72 light sources
- Direct light represented by an arc of 24 light sources



Preliminary results



Preliminary results



Preliminary results

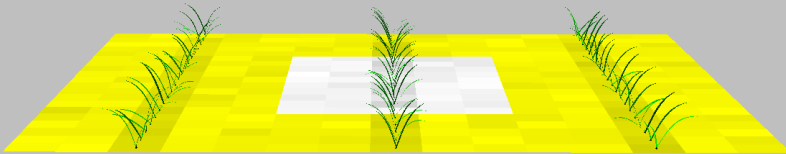


Preliminary results

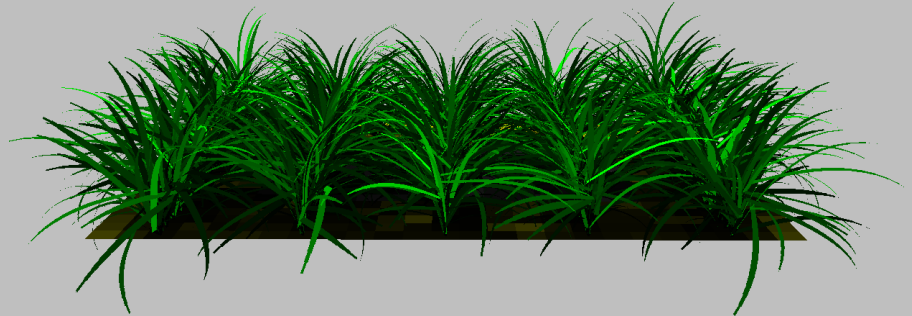
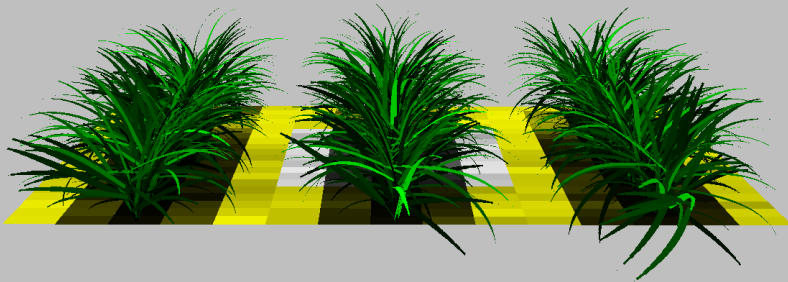
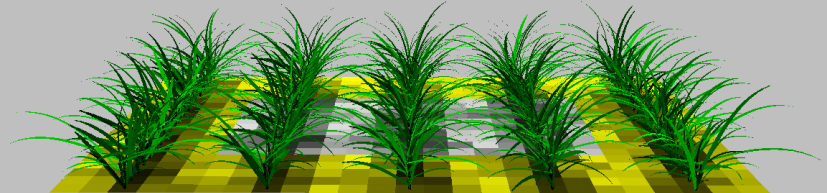
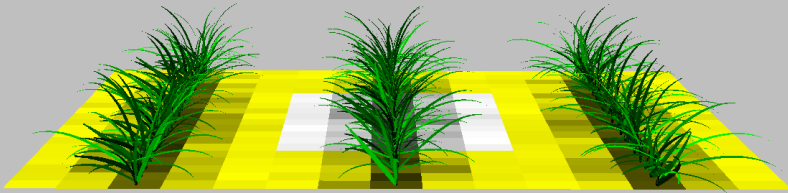
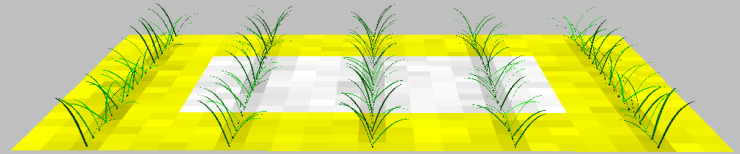


Preliminary results

50 cm



25 cm



Preliminary results

