Modelling peanuts for nut-in-shell and fodder yield in the northern Australian tropics

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Take home messages

- Peanuts are valuable food legume due to protein and oil rich kernels that develop in the soil
- Their biomass is rich in N and can enrich soils with significant quantities of N. It is usually returned to soils
- In favourable environments excessive green biomass can be partially removed from the field to serve as a source of green fodder with crude protein of >12%
- The crop can therefore be grown as a dual-purpose crop. This potential is being determined in experiments conducted in the northern tropics
- We have attempted to determine this potential using APSIM Classic leveraging data from these experiments.
- Cutting at 30 cm height leads to only a small (~10%) reduction in yield but a significant amount of forage yield

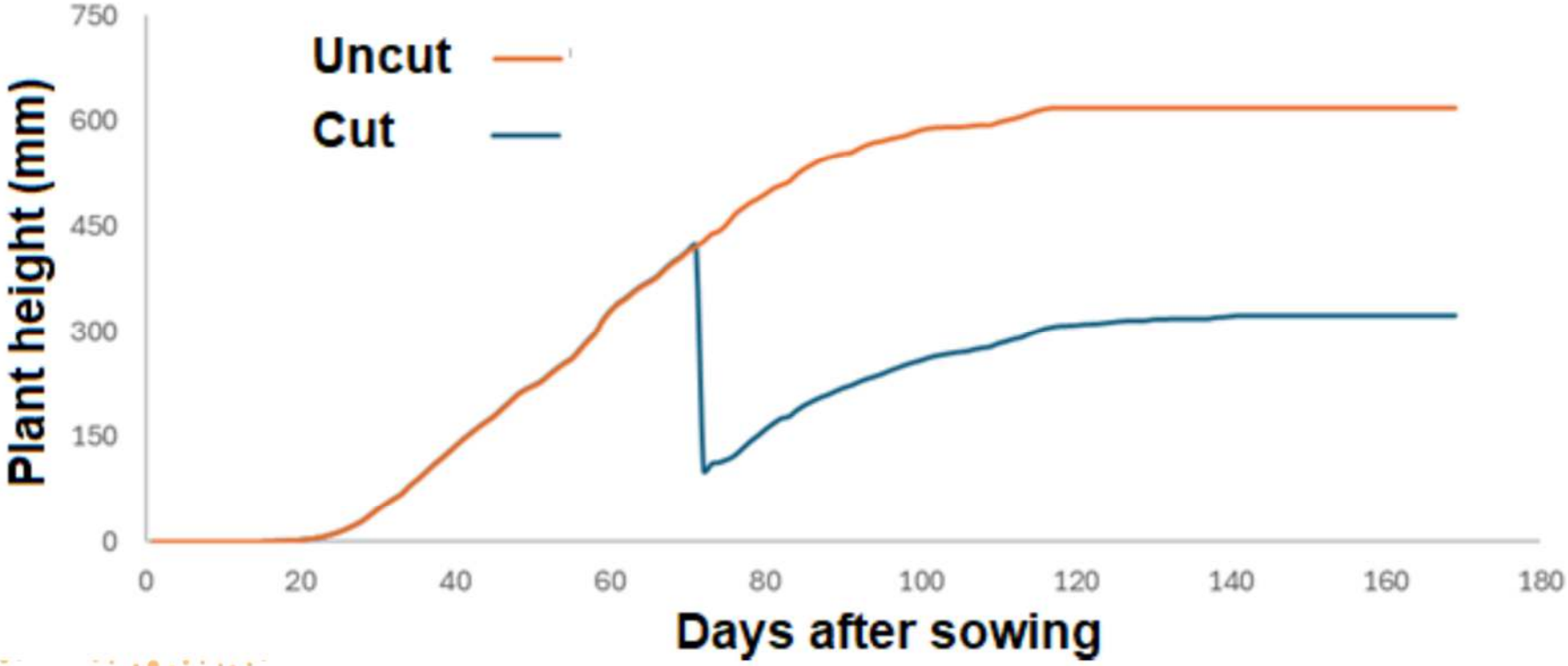
Peanuts grown in Central Queensland used for training the APSIM model

Cutting peanuts for forage

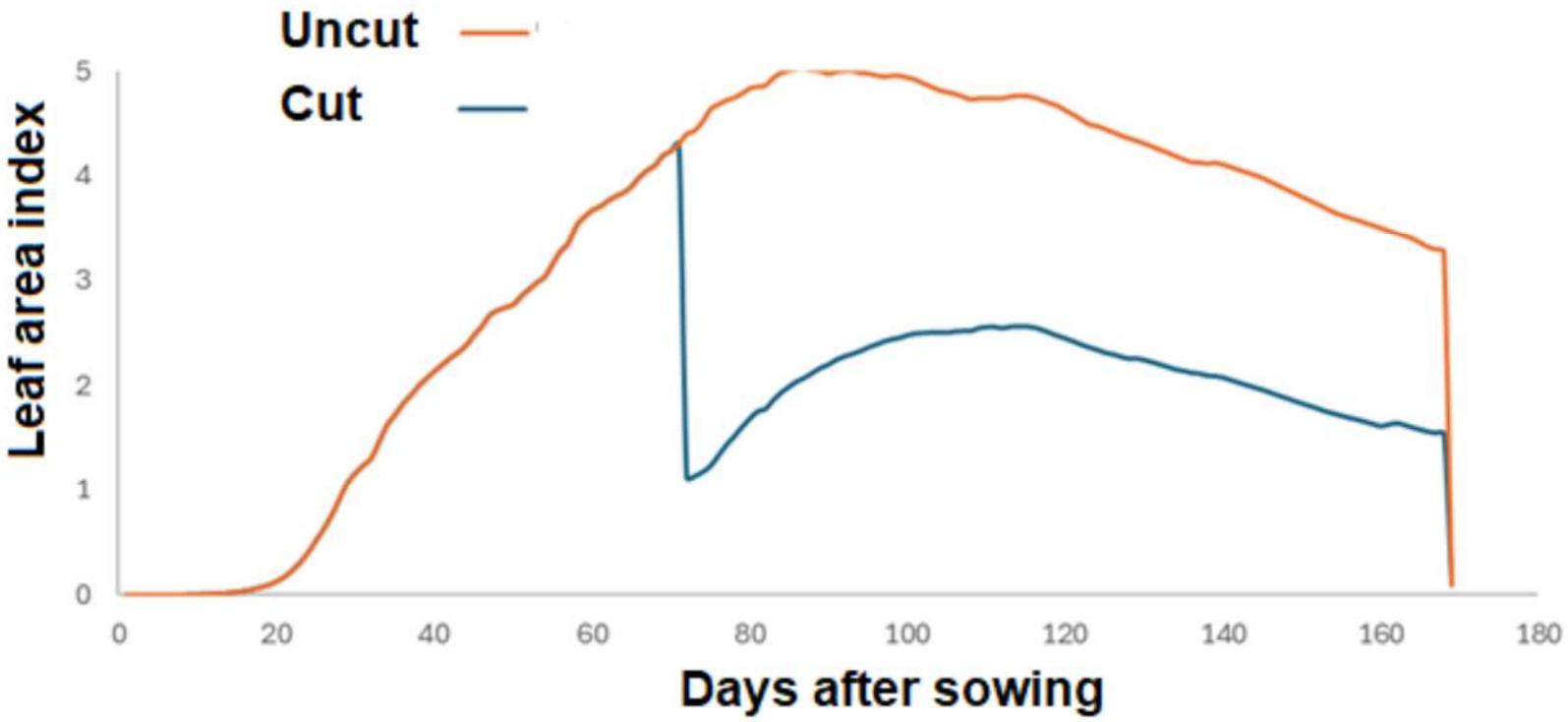
Dual purpose peanut model performance

	Canopy height (cm)		Leaf area and cover		Total dry matter		
	Before-cutting	After-cutting	Leaf area index	Canopy cover (%)	Weight (t/ha)	Weight removed (t/ha)	% removed
Observed	38.4	9.6	4.7	91.7	6.7	2.5	40
Simulated	44.6	10.0	4.6	87.4	6.7	4.3	60

Effect of cutting on peanut height of a full season cultivar



Changes in the leaf area index due to cutting treatment imposed at 75 days after sowing on a full season cultivar



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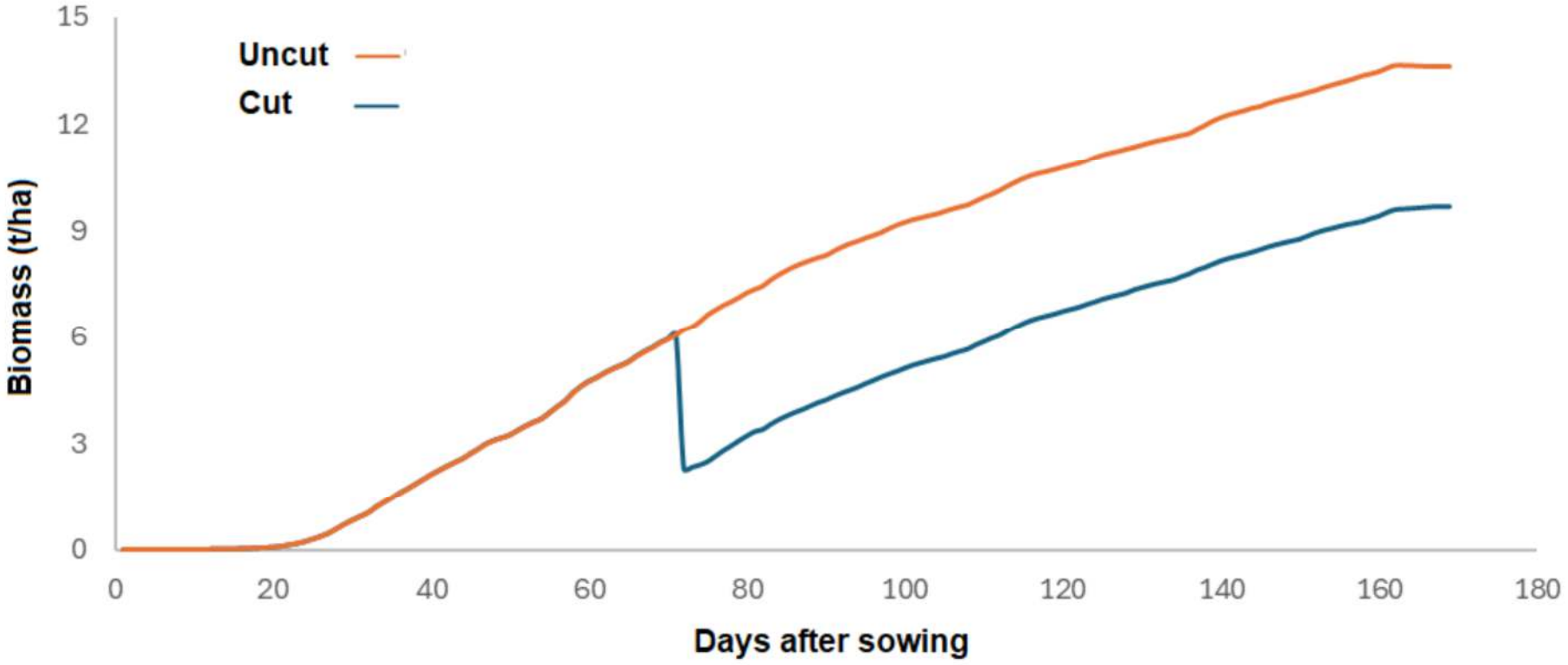
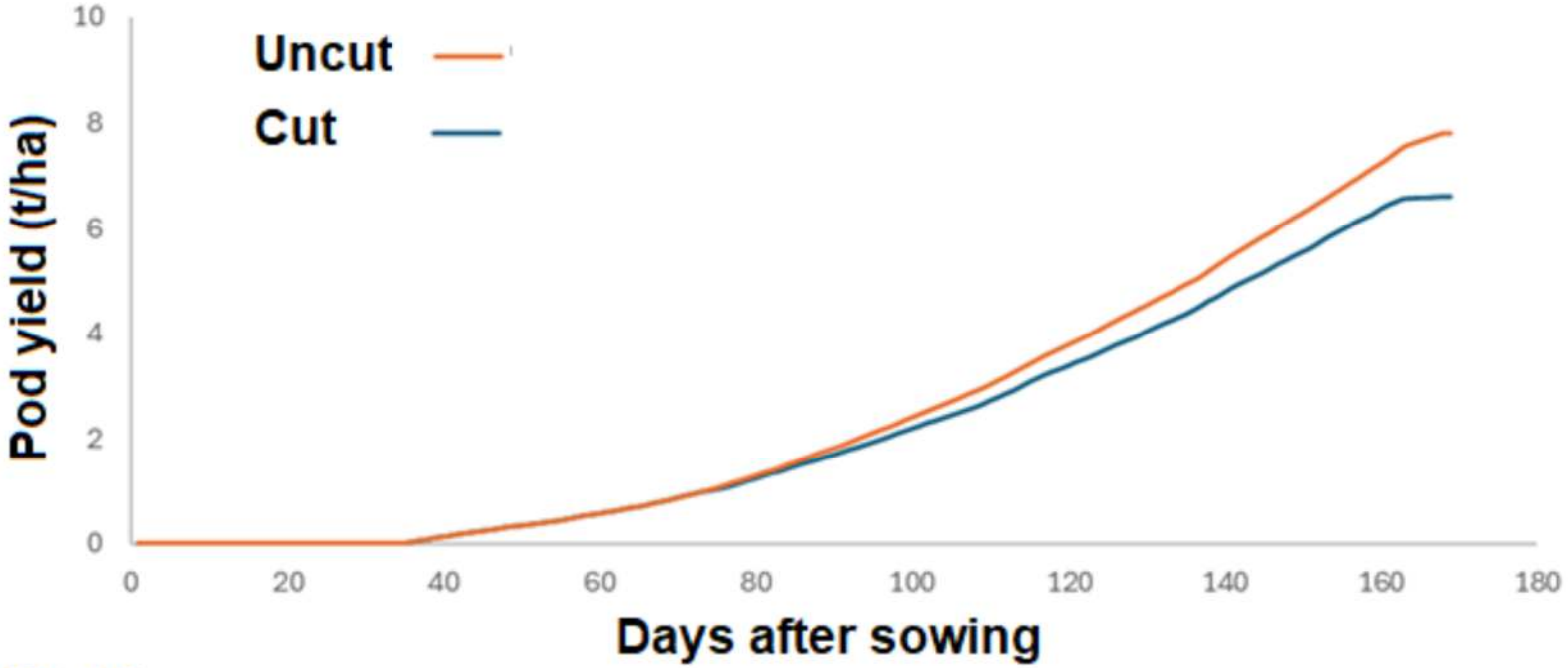
Changes in biomass from a cutting treatment imposed at 75 days after sowing on a full season cultivar



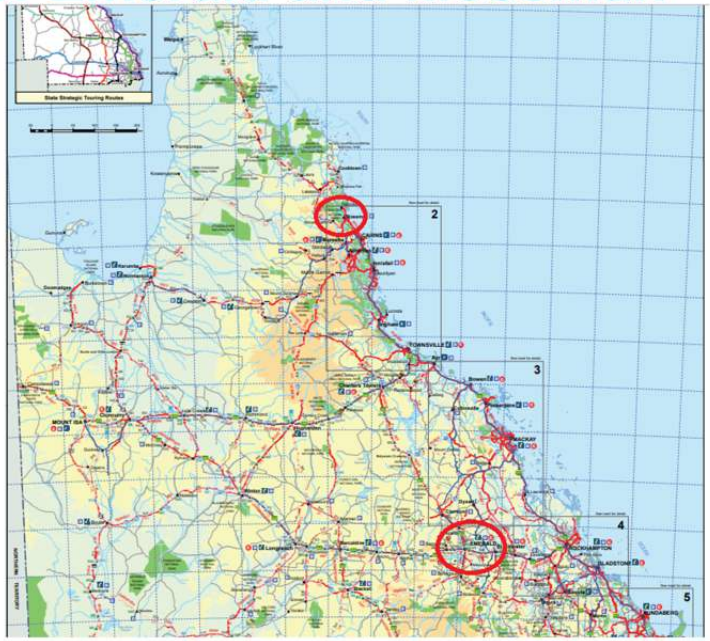
The effect of cutting for forage removal at 75 days after sowing on pod yield of full season cultivar



Long-term scenarios of dual-purpose peanuts for two environments

- Emerald (Central Queensland)
- Mossman (far north Queensland)

ations of Emerald and Mossman



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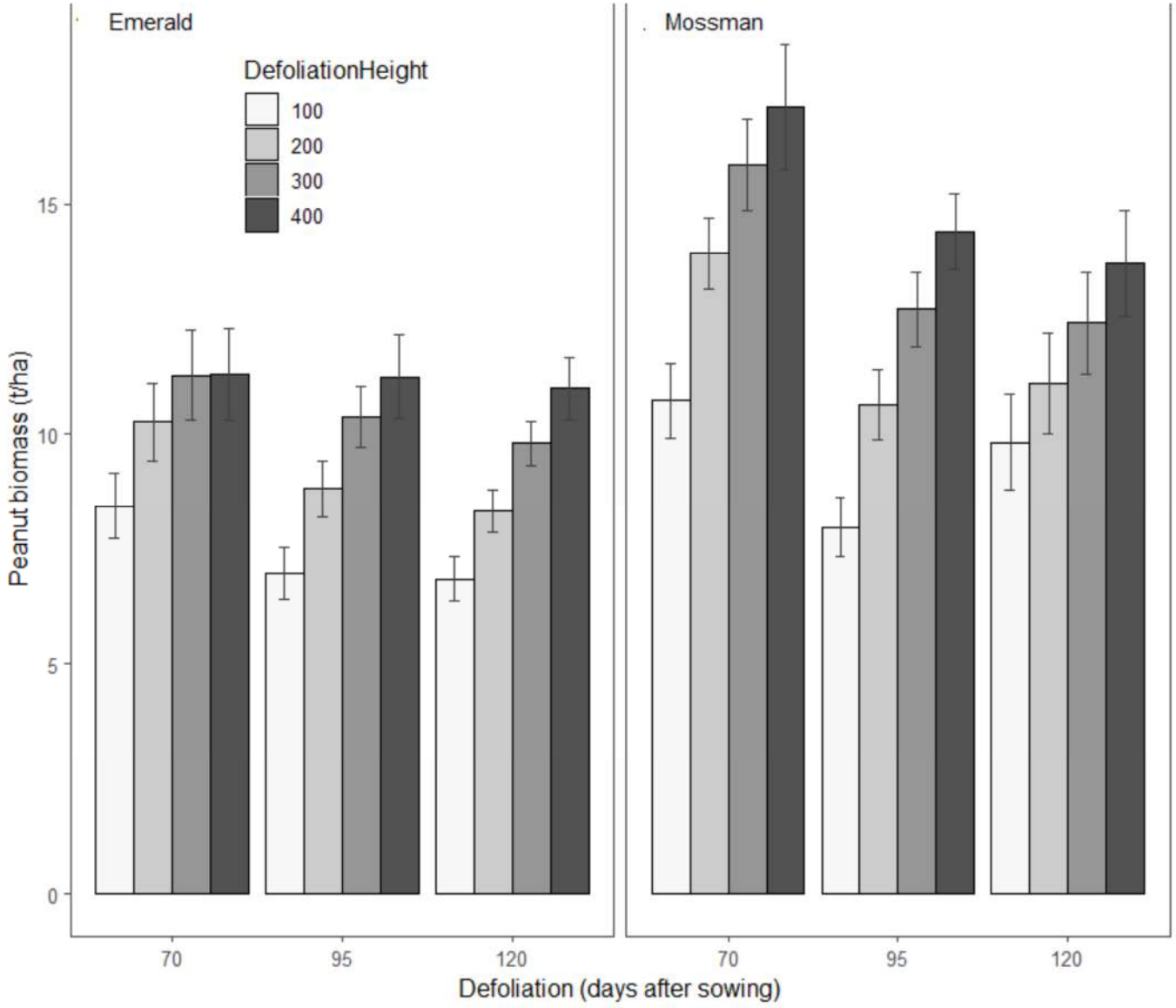
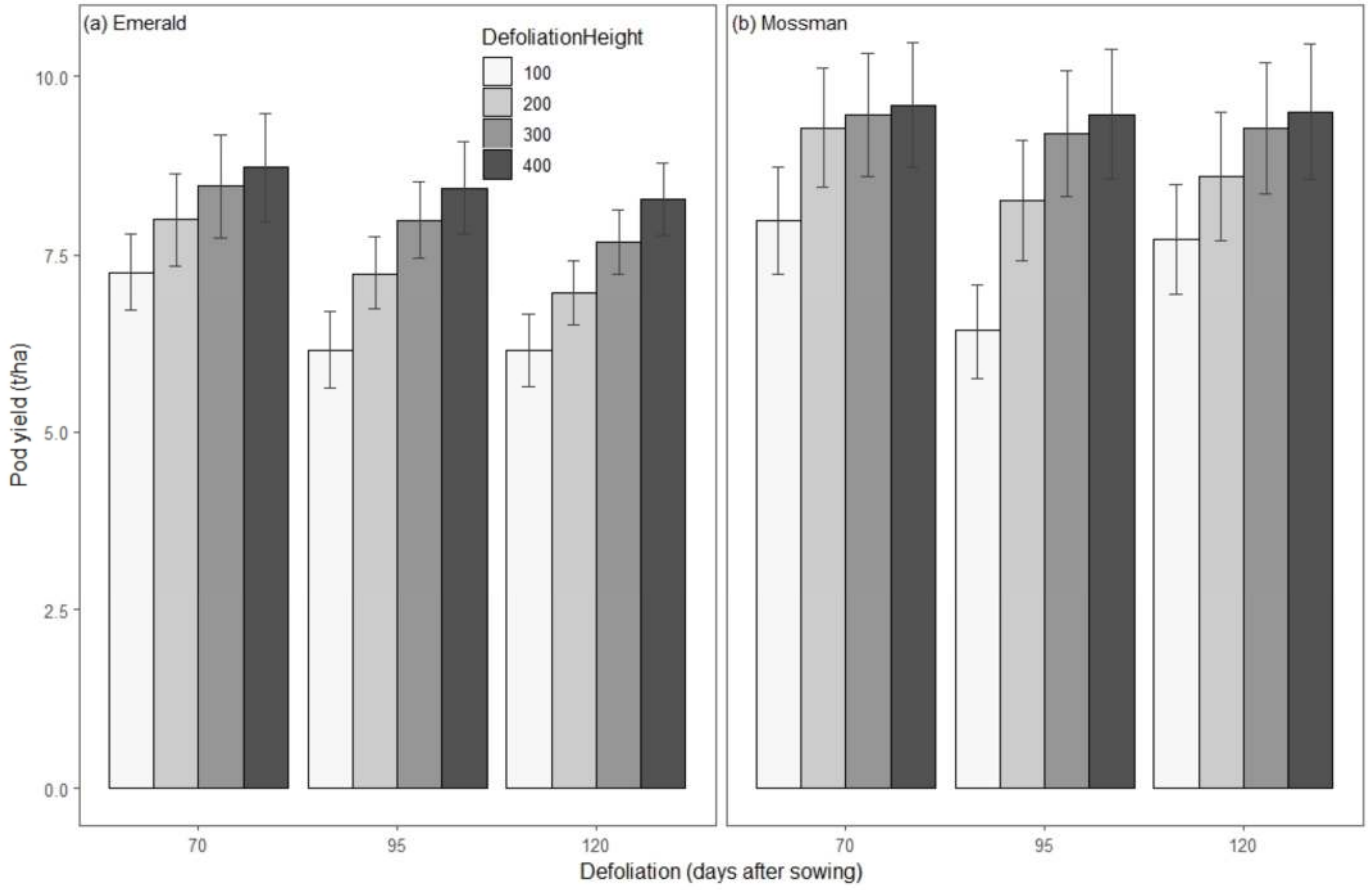
The crop view in Emerald (23.5° S, 148.2° E)

Peanut at Mossman (16.5° S, 145.4° E) in North Queensland

The simulated effect of cutting height on peanut biomass at Emerald and Mossman



The simulated effect of cutting height on peanut pod yield at Emerald (a) and Mossman (b)



Conclusions

- A new model has been developed in APSIM Classic to simulate peanut cultivation for dual purpose.
- Preliminary model's testing is generally satisfactory.
- We found that up to 4-5 t/ha forage can be removed with a minimal effect (10% loss) of pod yield.
- It was observed that the pod and forage yield potential simulated by the model was greater in a coastal region than a inland region.
- Testing over a range of northern Australian environments is in progress.
- We will update the peanut next gen model with this feature after this testing.

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