crc•si *Spatially Enabling Australia and New Zealand*

P4.18 | Real-time biomass estimation in pastures

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Objectives We are assessing the potential for active optical sensors (AOS) to provide estimates of pasture green dry matter (GDM). A mobile device application will provide the estimates of GDM in real-time.

Outcomes

- We are establishing a series of regional, seasonal and species specific calibrations that graziers can use to infer pasture GDM based on pasture height and NDVI. The first two years' calibrations will be validated and refined by the final year's data.
- We are providing calibrations to graziers via an App that provides GDM estimates in real time. The App also allows graziers to develop specific calibrations and accumulate farm history data, while providing an avenue for crowd-sourced data to upgrade the calibrations.

Introduction

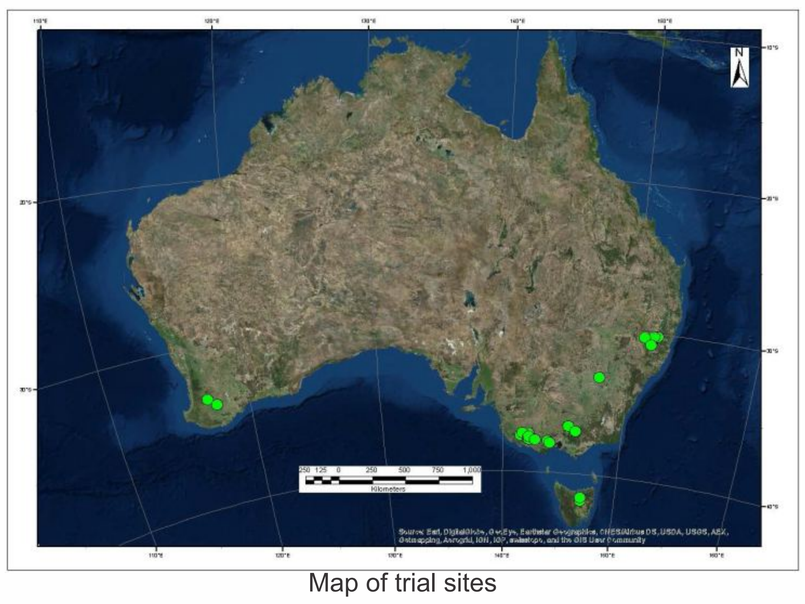
Accurate and reliable assessment of pasture biomass remains one of the key challenges for grazing industries. Livestock managers require accurate estimates of the grassland biomass available over their farm to enable optimal stocking rate decisions.

A common surrogate measure of 'greenness' in a pasture is the NDVI. Preliminary analyses have shown consistent relationships between GDM and a combination of NDVI and pasture height. The relationships appear to group differently for grasses than clover pastures, and the seasonal pattern appears to differ in the various regions we are working.

Background

Inaccurate biomass estimates can prove costly by increasing the need for supplemental feeding, penalise pasture regrowth, or result in stock weight loss.

We are working in a range of pastoral regions throughout Australia to improve GDM estimates to increase pasture utilisation



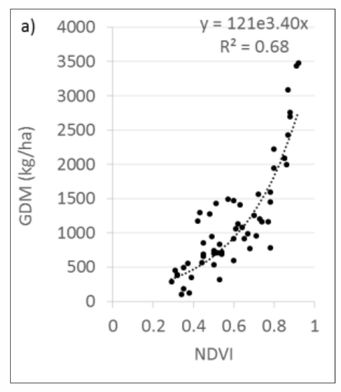
Map of trial sites

Results

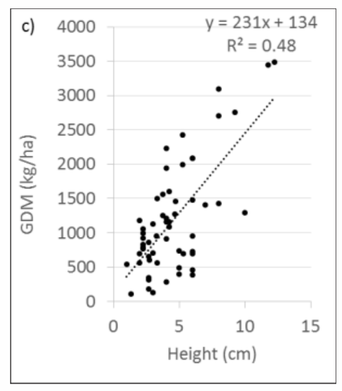
Summary of analyses for grouped winter-spring grass-based pastures in selected regions. Correlations are of GDM against NDVI x pasture height.

Region		Combined
		Winter+Spring
NSW Northern Tablelands	r^2	0.7
	n	289
	Mean	2191
	RMSE	982
Central Victoria	r^2	0.77
	n	66
	Mean	1373
	RMSE	541
Southern Victoria	r^2	0.62
	n	82
	Mean	1743
	RMSE	375
Western Victoria	r^2	0.77
	n	326
	Mean	1206
	RMSE	469
Tasmania	r^2	0.66
	n	82
	Mean	1189
	RMSE	403

An example of GDM response against a) NDVI, b) height, and c) combined NDVI x height



A common problem with NDVI is 'saturation', when leaves obscure each other as biomass increases.



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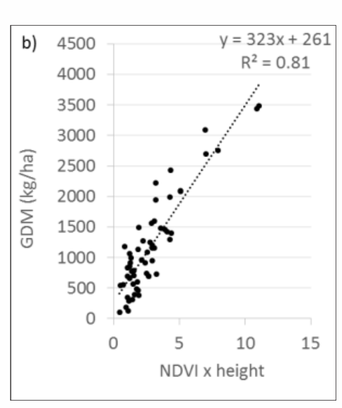
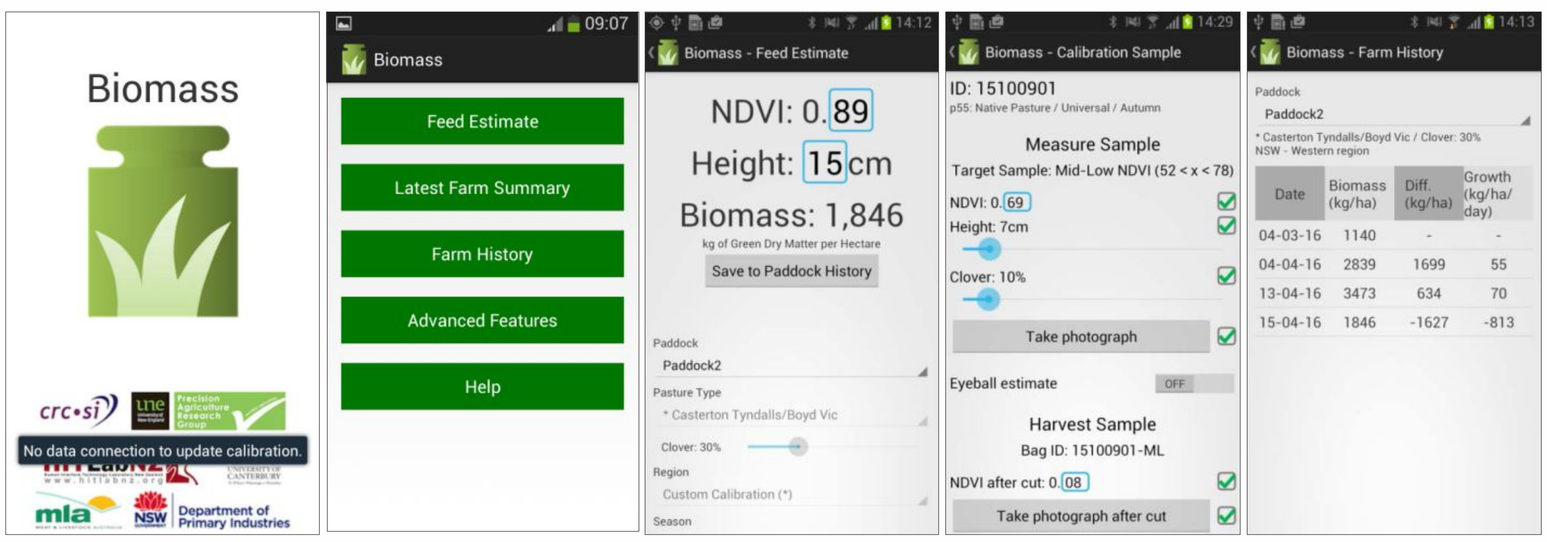


Combining NDVI with height commonly improves the correlation with GDM.

Mobile Device Application

App features: Feed estimate Self-calibration Farm history



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