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Proximal sensing of *Urochloa* grasses increases selection accuracy

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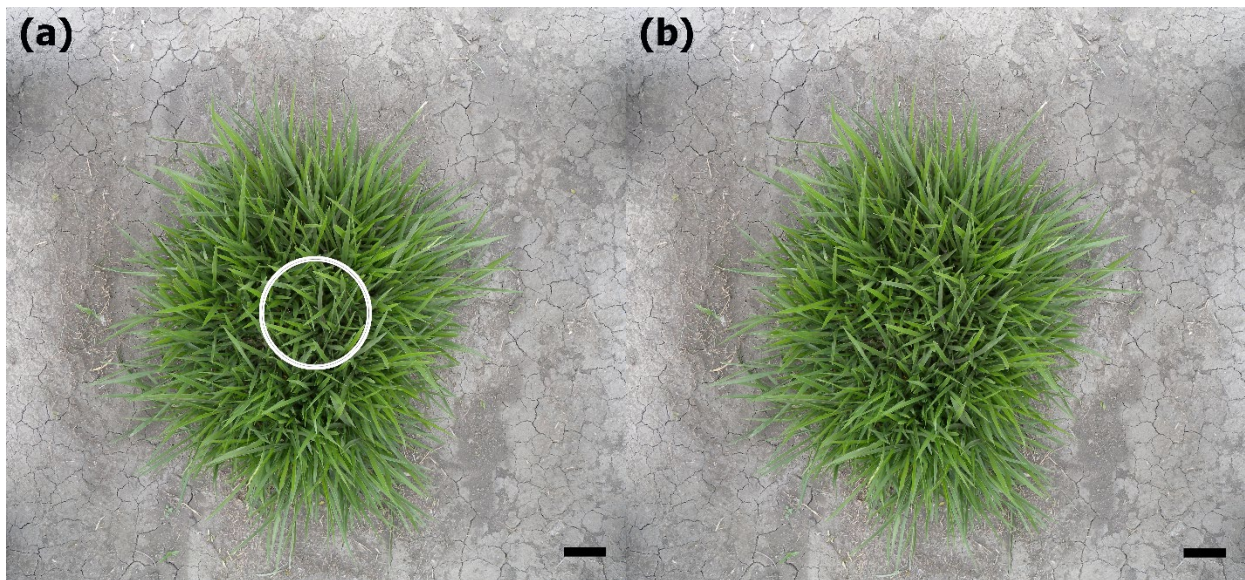
Supplementary information

Supplementary Table S1. Different protocols of spectral data collection and their respective root mean squared error of prediction (RMSEP) for crude protein, dry weight and chlorophyll content.

Collection	Trait	Factors¥	RMSEP
Day 1*	Dry weight (g plant ⁻¹)	4	9.23
	Crude protein (%)	11	1.29
	Chlorophyll (mg g FW)	4	0.49
Day 2*	Dry weight (g plant ⁻¹)	4	8.20
	Crude protein (%)	10	1.26
	Chlorophyll (mg g FW)	7	0.50
Day 3**	Dry weight (g plant ⁻¹)	4	7.63
	Crude protein (%)	11	2.07
	Chlorophyll (mg g FW)	5	0.54
Day 4**	Dry weight (g plant ⁻¹)	6	8.14
	Crude protein (%)	2	1.21
	Chlorophyll (mg g FW)	3	0.58
All days	Dry weight (g plant ⁻¹)	6	7.90
	Crude protein (%)	5	1.63
	Chlorophyll (mg g FW)	5	0.55

Fifty plants were evaluated daily * One scan collected per plant. ** Ten scans collected per plant. ¥ Number of factors for which the root mean squared error of prediction was minimized in the model prediction.

Supplementary Fig. 1. Schematic representation of the observation geometry of hyperspectral analysis (a) and digital image analysis (b) techniques evaluated in 200 *Urochloa* hybrids. White circle positioned at the center of the plant canopy in figure (a) represents the 23-cm field of view of the spectroradiometer at a distance of 50 mm from the plant canopy. For the digital image analysis (figure b), the whole plant, and not the 23-cm section, was used for segmentation and further analysis. Scale bar = 10 cm.



Supplementary Fig. 2. Binary relationships and Pearson's correlation coefficients between seven plant traits extracted from digital images of 200 *Urochloa* hybrids. CC= canopy cover, NGRDI = normalized green red difference index, ExG = excess green index, ExR = excess red index, ExGR = excess green minus excess red, GR= green ration and GLI= green leaf index. Pearson's correlation coefficients are indicated with their statistical significance as follows:

* $P \leq 0.1$; ** $P \leq 0.01$; *** $P \leq 0.001$.

