Comparison of cereal forage

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Key findings

- Greater variation in dry matter production at the water ripe sampling time was observed compared to milky-soft dough
- Dry matter production was highest at milky-soft dough and Moby barley consistently had the lowest.
- Majority of cereal forage varieties had NDF and NDFD levels to meet grade 1 and 2.
- Feed quality did not decline significantly with later cutting.

Why do the trial?

Hay producers now have the opportunity to supply Moby barley hay into the export market through Balco Australia. Moby forage barley is a white seeded awnless barley bred for high quality forage. Although Moby barley has been around for a number of years it is relatively new to farming systems in the Mid-North. This trial was designed to evaluate different commercially available forage crop varieties for dry matter production and feed quality.

How was it done?

Plot size	1.4 m x 10 m	**Fertiliser**	DAP (18:20) + Zn 2% @ 60 kg/ha
Seeding date	18th May 2013		UAN (42:0) @ 75 L/ha, 11th July
			UAN (42:0) @ 70 L/ha, 29th August

The trial was a randomised complete block design consisting of three replicates, and nine crop varieties. Dry matter cuts and feed quality analysis were sampled and analysed at growth stages watery ripe and milky-soft dough.

The first dry matter cut was taken at the watery ripe growth stage. Due to the difference maturities of the varieties selected the date of sampling ranged from 18th September – 1st October. Similarly, for the milky-soft dough cut dates ranged from 1st – 9th October.

Results and Discussion

Dry matter production

At the first time of sampling the average dry matter production for all crops was 7.0 t/ha (Table 1). Tungoo oats, a mid-late maturing variety produced the highest dry matter, 9.1 t/ha, and Buckley wheat also mid maturing variety produced the second highest biomass, 8.1 t/ha. The remaining oat varieties Mulgara, Wintaroo and Yallara all had similar dry matter production > 6000 kg/ha. Commander barley also produced similar dry matter compared to these oat varieties. Both Rufus triticale and Moby barley had the lowest dry matter production at water ripe growth stage.

Dry matter production at milky-soft dough sampling time was less variable compared to the early sampling date and averaged 8.14 t/ha across all the crop types (Table 1). Commander barley, Mulgara and Yallara oats had the highest dry matter production (greater than 8635 kg/ha). The remaining cereal forage varieties did not significantly differ in dry matter production expect for Moby barley (6546 kg/ha) which produced the lowest biomass.

Table 1. Dry matter production for cereal forage crops sampled at growth stages watery ripe and milky dough. Values within a column appended by different letters are significantly different (P≤0.05).

Crop	Variety	Maturity	Dry matter (kg/ha)	
			Watery ripe	Milky-soft dough
Barley	Commander	mid	7100^{c}	9232^{a}
	Moby	early	5589^{e}	6546^{d}
Triticale	Rufus	mid	6085de	8005^{bc}
Wheat	Buckley	mid	8146^{b}	7989^{bc}
Oats	Mulgara	mid	6677^{cd}	8635^{abc}
	Tungoo	mid-late	9113^{a}	7920^{c}
	Wintaroo	early-mid	6417^{cde}	8098^{bc}
	Yallara	early-mid	7122^{c}	8676^{ab}

Feed quality analysis

At the watery ripe sampling time Buckley was the only variety to have a NDF level less than 54% (G1). By the second sampling time almost all cereal forage varieties met the NDF level for grade 1, except for Rufus triticale, Wintaroo and Tungoo oats.

The only varieties to make G1 or G2 based on WSC were Buckley wheat sampled at watery ripe and Rufus triticale sampled at milky-soft dough. All remaining varieties ranged from 10.5-14.2% which placed them in grade 4 (>/=12%) or 5 (not applicable). WSC was higher for most varieties when sampled at milky-soft dough stage, the exceptions being Yallara and Tungoo oats and Buckley wheat. Both Buckley wheat and Moby barley had 18.9% and 18.4% WSC, respectively required for grade 3 (>=/18%).

All the first sampling time the NDFD values were higher (55-68%) compared to the second sampling time (46-59%). At the watery ripe sampling time all varieties meet the NDFD level (>/=55%) required to make G1. At the milky-soft dough stage many of these varieties (Rufus, Mulgara, Wintaroo, Buckley and Tungoo) NDFD level had decreased and placed them in G2.

Table 2. Feed quality assessments of dry matter produced for all cereal forage varieties at watery ripe and milky-soft dough at Hart 2013.

	Variety	% Crude Protein	% Neutral Detergent Fibre (NDF)	% Water Sol. Carbs (WSC)	% Simple Sugars (ESC)	NDFD 48hr (%)
Watery Ripe	Rufus	12.0^{a}	64.5^{a}	11.1^{d}	7.7^{c}	60.3
	Commander	12.1^{a}	59.4^{b}	11.3^{d}	6.6^{c}	68.3
	Moby	12.8^{a}	55.1^{cd}	14.2^{c}	7.6^{c}	66.3
	Mulgara	11.6^{a}	57.7^{bc}	12.8^{cd}	7.6^{c}	67.0
	Wintaroo	12.6^{a}	54.7^{cd}	10.5^{d}	6.6^{c}	66.7
	Yallara	10.2^{b}	55.6^{cd}	17.5^{b}	9.7^{b}	62.3
	Buckley	8.4^{c}	53.4^{d}	21.6^{a}	12.7^{a}	55.3
	Tungoo	9.8^{b}	56.0^{bcd}	13.3^{cd}	7.6^{c}	59.3
	LSD (P≤0.05)	1.31	3.43	2.83	1.59	
Milky-Soft Dough	Rufus	7.3^{b}	57.4^{ab}	25.2^{a}	18.5^{a}	52.3
	Commander	9.0^{a}	51.9^{de}	14.7^{c}	9.0^{cd}	59.0
	Moby	8.8^{a}	53.0^{cd}	18.4^{b}	10.2^{c}	55.3
	Mulgara	9.1^{a}	53.7^{bcd}	14.7^{c}	8.2^{de}	51.7
	Wintaroo	8.6^{ab}	56.6^{abc}	14.5^{c}	8.3^{de}	53.0
	Yallara	8.6^{ab}	48.0^{e}	14.8^{c}	7.3^{e}	46.3
	Buckley	8.5^{ab}	54.2^{bcd}	18.9^{b}	11.9^{b}	50.3
	Tungoo	7.8^{ab}	58.7^{a}	12.8^{c}	7.0^{e}	54.0
	LSD (P≤0.05)	1.31	4.14	2.58	1.55	

Cells shaded are for those varieties which met the general criteria for grades 1 or 2.

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