3.6.4 Evaluation of grain crops for fodder and silage production - Perth, Tas

Location: Symmons Plains, Perth, Tas

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Take home messages:

- A range of field pea, vetch, oat, triticale and wheat varieties were grown to compare dry matter production and feed value.
- Cereal and pea mixtures increase the crude protein and metabolisable energy content without reducing yield.
- Growing cereals with peas appears to help reduce lodging in the peas.

Background/Aim:
There is increasing demand for high quality fodder. Field peas are highly susceptible to frost damage at flowering and early podding, but exhibit good early vigour and growth over winter. Trials to measure quantity and quality of pea and vetch hay commenced in 1999 with dry matter (DM) yields of over 9 t/ha from the peas. However a wet spring and drying difficulties in 2002 resulted in commercial crop failures. Cutting for silage would overcome these problems and consequently field trials have recommenced.

The aim of this trial was to compare several field pea and vetch varieties and triticale, oat and wheat varieties for dry matter production and feed value. A further trial examined optimal densities of field pea/cereal mixtures.

Sowing date: 28th May 2008

Harvest:
The peas were cut when the largest seeds reached 3-4mm and cereals cut when at the milky dough stage. Cereal pea mixtures were cut as a compromise between the earlier maturing peas and later maturing cereals.

Measurements:
Dry matter cuts, whole plot harvest and dry matter was determined from sub samples. Feed analysis for metabolisable energy (ME), crude protein (CP) and neutral detergent fibre (NDF) were conducted on pooled sample of each variety.
Plot size: 8m x 1.5m x 4 reps

Rainfall: G.S.R. (Apr-Oct): 202mm

Fertiliser: 4:11:13:9 + Mo @ 360kg

Herbicides:

- Flumetsulam (800g.kg) @ 25g/ha on 22 Aug (legumes)
- epoxiconazole (125g/L) @ 500 ml/ha on 15 Sept
- azoxystrobin (250g/L) @ 250g/ha
- alpha-cypermethrin (100g/L) @ 100 ml/ha

	Single Varieties	Sowing rate kg/ha
Vetches	Morava	95
	Rasina	68
Peas	Morgan	145
	AP2	179
	Kaspa	179
Oats	Targa	111
	Bass	100
	Saia	51
Wheat	Brennan	93
Triticale	Breakwell	133

Mixtures	Morgan kg/ha	Targa kg/ha	Breakwell kg/ha
¾ Morgan ¼ Targa	109	28	
½ Morgan ½ Targa	73	56	
¼ Morgan ¾ Targa	36	83	
½ Morgan ½ Targa @ 1.33 sowing rate	97	74	
½ Morgan ½ Breakwell @ 1.33 sowing rate	97		89

Results and discussion:
The yields of the cereal and cereal and pea mixtures were all equally high with an average of 13.5 t/ha dry matter (Table 1). Breakwell, the only triticale was the exception, where the yields were significantly reduced by about 2 t/ha compared to the cereal and cereal and pea treatments. In previous trials with a March sowing, dry matter yields of this variety have been over 20 t/ha. This difference is attributed to the breakdown of stripe rust resistance in Breakwell (Jacky pathotype) which reduced the vigour and the dry season. The peas tended to yield more than the vetch varieties but only AP2 was significantly higher in yield than the vetches.

Table 1: Dry matter yield of legume and cereal components and total and Metabolisable energy (ME), Crude Protein (CP) and Neutral Detergent Fibre (NDF).

Variety or Mixture	Legume t/ha		Cereal t/ha		Total t/ha		ME MJ	CP %	NDF %
Rasina	7.13	b			7.13	c	12.3	19.4	28.0
Morava	7.11	b			7.11	c	11.3	17.2	34.0
Morgan	8.40	ab			8.40	c	11.1	21.2	34.7
Kaspa	8.36	ab			8.36	c	10.7	17.1	35.8
AP2	8.98	a			8.98	bc	10.4	14.4	37.7
¾ Morgan ¼ Targa	4.57	c	7.51	c	12.08	a	10.0	13.6	43.3
½ Morgan ½ Targa	2.06	d	11.50	b	13.56	a	9.6	10.8	46.5
¼ Morgan ¾ Targa	0.71	e	13.57	a	14.27	a	9.4	9.5	47.9
½ Morgan ½ Targa @ 1.33 sowing rate	2.62	d	10.61	b	13.22	a	9.7	11.4	45.8
½ Morgan ½ Breakwell @ 1.33 sowing rate	4.71	c	6.53	c	11.25	b	10.3	14.4	41.8
Targa			14.87	a	14.91	a	9.3	8.9	48.6
Bass			14.05	a	14.05	a	8.9	9.4	52.3
Saia			12.41	a	12.41	a	8.1	9.2	54.5
Brennan			13.42	a	13.42	a	9.3	9.1	48.1
Breakwell			11.60	b	11.60	b	9.7	9.3	47.2
LSD	**1.43**		**2.85**		**2.87**				
F prob	**<0.001**		**0.001**		**<0.001**				

The pea dry matter proportion in the cereal/pea mixtures did not increase in proportion to the pea sowing rate but was always lower than the ratio of sowing rates. Adding peas to cereals will give a modest increase in CP and ME without greatly reducing the yield.

Metabolisable energy values were highest for the vetches and peas with the vetches having slightly higher ME values than the peas. Of the peas, the later maturing Morgan had higher ME and CP values.

The cereals were lower in ME than the legumes with an average of about 9.0 MJ/kg. Breakwell was again an exception where, due to the later maturity, the pure Breakwell and the Breakwell/Morgan treatments tended to have a higher ME than corresponding cereal and cereal/pea treatments. Neutral detergent fibre contents were lowest in the legumes, with Rasina having a very low value of 28%, and higher in the cereals and cereal/pea mixtures.

Pure stands of Morgan peas and both the vetches can be prone to lodging and some collapsing of the lower stems was observed in these varieties in this trial. The semi leafless peas Kaspa and AP2 showed minor lodging in some plots. Considerable lodging of Morgan was observed in the cereal/pea mixtures with ¾ Morgan and some in the ½ mixture. The peas Kaspa and AP2 both have a narrower pod filling period compared to Morgan and the vetches. The timing of the fodder cut with Kaspa and AP2 is therefore more critical to avoid lost yield from cutting too early or lost quality from cutting too late.

Summary:
The peas were marginally higher in yield but tend to have a slightly lower ME and CP than vetch. The cereals yielded substantially more than the legumes but had a lower ME and much lower CP. Cereal/legume mixtures offer a good compromise, yield is not reduced yet ME and CP are increased.

More work is required to better match the maturities of the cereals and the peas. In this years trial the peas reached maturity one to two weeks ahead of the cereals.