

## Ungarie CWFS Site - Vetch Variety Trial

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### Key Points

- *Challus lathyrus* (winter-growing annual grain legume) produced hay that was more nutritious than vetch and field peas.
- Out of the commercial vetch varieties and the SARDI breeding line, Haymaker, produced the most nutritious hay, however it has greater than 5% hard seeds.
- The best alternative commercial vetch variety to Haymaker was Morava as it has no hard seeds.
- The SARDI breeding lines that performed the closest to Haymaker were SA/34433 and SA/33600.

### Introduction

Vetches are a versatile annual winter growing legume. They can be used for grain production, green manuring, hay, silage and as a pasture substitute. Matic & Nagel (2001) found vetch hay to be richer in protein than all cereals, medics and even lucerne (2001). The ability of vetch to adapt to a wide range of soil types and rainfall areas has allowed it to become a valuable crop in cereal rotations. The rotational benefits of vetch include nitrogen fixation, a disease break and easier grass control due to a wide range of herbicides (McMurray & Matic 2002; Seymour *et al.* 2000).

The Ungarie regional site group wanted to conduct a vetch variety trial to look for a dual purpose vetch variety. Due to the issues surrounding hard seeded varieties (i.e. not all seeds germinate in the first season, creating volunteers in following crops) it was decided that we would prevent the vetches from setting seed, so subsequently we cut the varieties for hay and sprayed out the remaining stand.

The aims of the trial were to compare the quality of hay produced from Morgan field pea, *Challus lathyrus* and vetch. *Challus lathyrus* is a winter-growing

annual grain legume with a similar growth habit to field peas (Hanbury & Siddique 1998). Another aim was to compare the quality of hay produced from commercial vetch varieties compared with the South Australian Research and Development Institute (SARDI) breeding lines.

The breeding lines obtained from SARDI were a part of a GRDC-funded vetch breeding program to develop high yielding, disease resistant and low toxin vetch varieties. Subsequently the SARDI lines (coded: SA/) contained in this trial included a mixture of vetches for grain production and vetches for pasture, hay and green manure production. The different lines, where applicable, have been grouped.

### Method

The trial was designed as a randomized block design with each variety replicated three times. The trial was sown into a paddock which had wheat in 2000 and 2001 with a grazed-out lupin crop in 2002. It was dry sown on the 28<sup>th</sup> May 2003, with 80 kg/ha Starter Fos, using a trial plot seeder with narrow points and press wheels, with the plots 15 m long and 1.75 m wide. The herbicides used

prior to sowing, on the 28<sup>th</sup> May, were Roundup Power Max @ 1 L/ha and Treflan @ 1.2 L/ha. The rainfall for 2003 can be seen in Figure 1. The trial began

germinating during June with a slow growth until better rain fell in July/August.

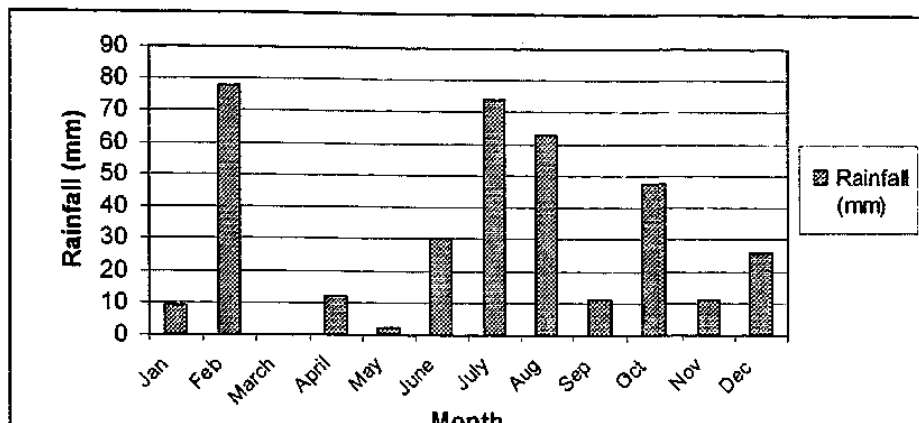


Figure 1. Rainfall for the Ungarie Regional Site

On the 29<sup>th</sup> September 2003, dry matter cuts were taken and the remaining stands of vetch were sprayed out to prevent seed set. The vetch samples were placed in a dehydrator for 3 days at 58°C at the Condobolin Agricultural Research and Advisory Station. Once dried the samples were weighed and ground to pass through a 1 mm sieve and sent to FeedTest® in Hamilton, Victoria. They analysed the following:

1. Crude protein (% dry weight) - the amount of true protein and non-protein nitrogen.
2. Dry matter digestibility (% digestible dry matter) - an estimate of the percentage of dry matter actually digested by animals.
3. Metabolisable energy (MJ/kg DM) - the feed energy used by the animal, calculated from digestible dry matter.
4. Neutral detergent fibre (% of dry matter) - the percentage of total cell wall material or plant structure in a feed. Normally the lower the NDF, the more the animal will eat.

#### 5. Residual dry matter (%)

### Results and Discussion

The dry weight and feed analysis results for the Morgan field peas, *Challus lathyrus* and vetch are shown in Table 1. These results show a significant difference between the three crops. Morgan field peas had the highest dry weight and neutral detergent fibre, whilst Morgan field peas and vetch had the highest residual dry matter.

The most nutritious hay was produced by *Challus lathyrus*. It had the highest levels of crude protein, dry matter digestibility and metabolisable energy, whilst the lowest level of neutral detergent fibre. *Challus lathyrus* also had one of the lowest dry weights (t/ha), which was not significantly different from vetch. Hanbury and Siddique (1998) reported that *Challus lathyrus* had slow growth in winter producing relatively little feed. They recommended if using *Challus lathyrus* for grazing livestock then to do so in late winter and early spring.

### Section 3.

### CWFS Regional Site Results - 2003

**Table 1.** The average dry weight and feed analysis results for Morgan field peas, *Challus lathyrus* and vetch

Crop	Dry Weight	Crude Protein	Dry Matter Digestibility	Metabolisable Energy	Neutral Detergent Fibre	Residual Dry Matter
Field Pea	2.847 b	16.7 a	68.47 a	9.933 a	37.13 c	93.033 b
Lathyrus	0.973 a	28.6 c	79.23 c	11.667 c	27.43 a	92.000 a
Vetch	1.200 a	21.14 b	75.11 b	10.98 b	34.15 b	93.124 b
5% I.s.d between crops	0.3771	1697	1.852	0.2893	1875	0.3462

Note: Numbers with the same letter are not significantly different

The dry weight and feed analysis results for the commercial vetch varieties and the SARDI breeding lines are shown in Table 2. These results show a significant difference between the vetch varieties. Haymaker had a significantly lower dry weight and neutral detergent fibre but a significantly higher digestibility and metabolisable energy. The greatest concern with Haymaker is its level of hardseeds, >5%. Therefore the next best commercial variety is Morava, as it has no hard seeds, is versatile in end use and is resistant to rust and ascochyta (Seymour *et al.* 2000).

Two SARDI varieties performed closely to Haymaker, they were SA/34433 and SA/33 600. SA/3443 3 has a high potential for grain production and a moderate potential for hay. The draw back with this variety is that it has a high shattering percentage and an unknown level of hard seeds (Matic personal communication 2003). SA/33600 has a high grain potential but a low hay potential. It has < 2% hard seed and > 15% shattering and is very susceptible to rust and ascochyta (Matic personal communication 2003).

**Table 2.** Average feed analysis results for the vetch varieties. Hard seeded percentages are also given.

Vetch	Hard Seed	Dry Weight	Residual Dry Matter	Crude Protein	Dry Matter Digestibility	Metabolisable Energy	Neutral Detergent Fibre
<b>Commercial Varieties</b>							
Blanchefleur**	>5%	1.427	93.300	21.10	74.90	10.933	34.23
Haymaker*	>5%	1.757	92.700	25.40	79.53	11.667	30.80
Languedoc	>5%	1.633	93.300	19.10	73.73	10.767	34.57
Morava*	0	0.833	93.200	21.03	76.10	11.133	32.93
Popany vetch*	>5%	1.033	93.033	23.67	76.10	11.133	34.50
<b>SARDI Breeding Lines</b>							
2681 **	?	1.27	93.100	21.13	75.27	11.000	33.43
SA/33600	<2%	1.02	93.033	22.40	76.40	11.200	33.20
SA/34182*	?	1.003	93.167	21.00	74.57	10.900	34.30
SA/34200*	?	0.987	93.067	20.37	75.53	11.033	33.80
SA/34419**	?	0.92	93.400	20.60	74.63	10.900	35.13
SA/34433	?	1.163	93.067	23.33	76.77	11.230	33.13
SA/34462**	<2%	1.13	93.000	19.53	73.80	10.767	35.27
SA/34544**	?	1.403	93.200	19.47	73.33	10.733	34.50
SA/34563	<1%	1.387	93.333	19.03	73.30	10.700	34.37
SA/34606	?	1.157	93.133	21.13	74.03	10.800	35.87
SA/34718*	<3%	1.263	93.067	21.27	74.73	10.933	35.30
SA/34719**	<2%	1.013	93.000	19.80	74.17	10.833	35.17
5% I.s.d between vetches		0.4063	0.4188	2.079	2.011	0.3097	2.354

Note: \* means the particular vetch line has a *high* potential as a hay crop, \*\* means a *moderate* potential as a hay crop.

## Conclusion

In conclusion the most nutrition hay was produced by *Challus lathyras* when compared with vetch and Morgan field peas. Out of the vetch varieties Haymaker (even though it produces less hay) produced the best quality hay, however it has >5% hard seeds. Morava was the best commercial equal to Haymaker and SA/34433 and SA/33600 were the best breeding lines, from SARDI, equal to Haymaker.

## Acknowledgments

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Gordon for offering to have the vetch variety trial located on his property and for providing his help and advice during the growing season. I would also like to thank Rade Matic, Vetch Breeder at SARDI, for providing us with seed and information about each of the vetch varieties. We understand that the seed supply for trials in 2003 was limited and we greatly appreciated being able to have access to some of that seed. We would also like to thank Allan L'Estrange and Nathan Border for their help with the vetch variety trial. Thank you also goes to our major sponsors the Grain Growers Association and GRDC.

## References

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