# WHICH VETCH IN MY FARMING SYSTEM?

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## TAKE HOME MESSAGES

- Vetch is a multi-purpose crop; its versatility allows decisions about its end-use to be made during the year (grain, hay/silage or green manure/grazing) and also can be used as a management tool against resistant weed development.
- Vetch can improve soil fertility by returning organic matter to the soil, increase yield in the following crop by means of nitrogen fixation and reduce disease and insect risk for the following crop.
- Two new varieties; SA-34823 and SA-35103 are set for release in spring 2013.

## BACKGROUND

Vetch has great versatility on the farm as it can be used as grain, hay, silage, early pasture or as a green manure. A decision about the end-use of a vetch crop can be made during the season based on the seasonal outlook.

During numerous field days/meetings/expos and other events, the Australian National Vetch Breeding Program (ANVBP) has gathered information about the demand for vetch use in crop rotations. In higher rainfall areas (>400mm/year), most farmers prefer to produce grain; in drier areas (350-400mm/year) farmers like to use vetch crops for hay or silage. In lower rainfall regions vetch is commonly grown for sheep grazing and green manuring.

ANVBP collaborates with scientists and agronomists in SA, Victoria, NSW, WA and Tasmania, running trials aimed at identifying the best performing varieties and end-uses for vetch in particular areas. The ANVBP allows producers and end users in different regions to observe how present varieties are performing and to evaluate potential new varieties that could be suited to those areas.

ANVBP focuses on breeding varieties with:

- high yields of grain and dry matter
- resistance to rust, ascochyta and botrytis
- soft seed to avoid weed problems in following crops
- lower toxins in the grain for inclusion as a stock feed
- varieties adapted to lower rainfall areas where other crops are performing poorly
- non-shattering pods.

## AIM

To assess the performance of current vetch varieties and ANVBP lines.

# METHOD

In 2012, BCG conducted a vetch variety trial at the main research site just west of Birchip to assess the performance of current and new ANVBP lines under local conditions. The trial was also established as a demonstration site for the BCG main field day in September 2012.

| | | |
|---|---|---|
| Location: | Birchip | |
| Replicates: | 4 | |
| Sowing date: | 13 April | |
| Fertiliser: | at sowing | MAP (25kg/ha) |
| Herbicide: | IBS | Simazine (700g/ha) + Roundup PowerMax® (2L/ha) + Triflur X® (1.5L/ha) |
| Seeding equipment: | BCG Gason parallelogram seeder (knife points, press wheels, 30cm row spacing) | |
| Harvest date: | 16 Novemeber | |

# RESULTS AND INTERPRETATION

## *Where are we now with vetch varieties?*

ANVBP released two common vetch varieties: Morava in 1998 and Rasina in 2000. Both are very resistant to rust, have significantly lower grain toxin levels (0.65% compared with Blanchefleur 1.12%), and >98% soft seeds. Morava is better performing in higher rainfall areas (>400mm/year) especially in dry matter production, but Rasina is a preferable variety in areas with <350mm/year, especially for grain production. Yield data from the Birchip trial was combined with other ANVBP trials run over the past five years in four states, and the collective data is presented in Table 1 along with information about the characteristics of current varieties and advanced breeding lines. In the 2012 trial at Birchip the overall mean grain yield was quite low at 1.17t/ha, and there were no significant differences between any varieties (P=0.43, CV20.7%).

Two new lines will be released by ANVBP this year: SA-34823 and SA-35103. Both of these lines are high yielding, show good adaption to legume growing areas in Australia, are resistant to rust, have better tolerance to ascochyta and botrytis than Morava and Rasina, have low grain toxin levels (0.40-0.65%) and are soft seeded.

- SA-34823 is earlier than Rasina in flowering and maturity, and out-yielded Rasina and Morava in grain production in four states for the last five years.
- SA-35103 is 5-7 days later than Rasina and 7-10 days earlier than Morava in flowering and maturity, and out-yields Rasina and Morava in dry matter production in rainfall areas of 380-450mm/year.

**Table 1. Characteristics of current vetch varieties and advanced breeding lines.**

| Variety/ breeding line | Production (t/ha) | | Maturity (days from seeding to flowering) | Main diseases | | | Shattering (% at harvesting) | Hard seeds *** (%) |
|---|---|---|---|---|---|---|---|---|
| | Grain * | Dry matter ** | | Rust | Asco | Botrytis | | |
| Blanchefleur | 1.98 | 3.94 | 95-105 | VS | M | M | 10-15 | 2-10 |
| Morava | 2.46 | 4.37 | 110-115 | R | S | VS | 0 | 0-2 |
| Rasina | 2.76 | 3.94 | 90-105 | R | MS | M | 0-2 | 0-5 |
| **SA-34823** | 3.42 | 4.82 | 80-100 | R | MR | M | 0-2 | 2-5 |
| **SA-35103** | 2.81 | 5.09 | 95-110 | R | M | S | 0-2 | 2-5 |
| SA-34748 | 3.43 | 4.19 | 80-100 | MR | MS | M | 5-10 | 0-2 |
| SA-34822 | 2.97 | 5.15 | 80-95 | MS | VS | VS | 5-10 | 2-7 |
| SA-34848 | 2.79 | 4.19 | 95-105 | MS | S | VS | 5-10 | 5-10 |
| SA-34883 | 2.78 | 5.12 | 80-95 | MR | S | S | 10-15 | 10-15 |
| SA-34884 | 2.79 | 4.78 | 95-105 | MR | S | S | 5-10 | 2-7 |
| SA-35019 | 2.89 | 4.48 | 90-100 | MS | MS | MS | 10-15 | 5-10 |
| SA-35036 | 2.92 | 4.26 | 85-95 | MS | MS | MS | 10-15 | 5-10 |

Note: Bolded varieties are to be released in 2013.*Grain yield data is combined from trials spread across four states over five years (2008-2012): SA – Lameroo, Peake, Blyth, Charlick and Kingsford; Victoria – Walpeup, Ultima and Birchip; NSW – Rankins Springs and Wagga Wagga; WA – Cunderdin and Kojonup (trials were not conducted at all sites in all years; 50 trials in total). **Dry matter yield data is combined from trials in SA at Lameroo, Blyth, Kingsford, Charlick and Minlaton across five years (2008-2012; 25 trials in total). ***Per cent of hard seeds varies from year to year or from site to site, but these seeds will not be dormant and appear in following year.

## *Vetch end-uses*

### Grain

Grain or common vetch (*Vicia sativa*) varieties Morava, Rasina, Blanchefleur and Languedoc are grown for forage, hay, grain, green manure or grazing. Common vetch grain is rich in the following main characteristics: crude protein 28-32%; digestibility 71-89% and metabolisable energy 9.8-13.7MJ/kg DM. Grain from common vetches can be used without limit in rations together with cereals to feed ruminants, or in cereal grain mix up to 25% for pigs.

### Dry matter

Vetch hay and silage are highly palatable for all ruminants. To achieve the best balance of tonnage and feeding value, hay and silage producers should cut common vetches at the flowering – early podding stage. Cutting vetch at this point also involves cutting many weeds before they begin setting seed, which reduces weed populations in the following crop, saves herbicide applications and decreases the risk of herbicide resistance development. Vetch hay is a very rich source of protein and metabolisable energy and is highly digestible for all ruminants (Table 2). Australian dairy farmers are increasingly adopting vetch hay as one of the main forage sources to increase milk production. Vetch hay or silage has been reported to have increased milk production per cow by more than 12% compared with meadow/grass or cereal hay (G. Zweck, dairy farmer, Blyth, SA; presented at Hart Field day 2010).

**Table 2. Hay samples measurements of quality***

| Hay | No. of samples | | Crude protein (%) | Metab. energy (MJ/kg DM) | Dry matter digestibility (%) |
|---|---|---|---|---|---|
| Oaten | 870 | Mean | 7.2 | 9.1 | 63.0 |
| | | Range | 1.7-17.9 | 5.6-11.4 | 41.3-78.0 |
| Lucerne | 273 | Mean | 19.6 | 9.4 | 65.4 |
| | | Range | 9.6-26.3 | 5.3-11.1 | 39.2-75.7 |
| Clover | 40 | Mean | 17.5 | 9.1 | 66.9 |
| | | Range | 10.6-24.0 | 7.7-10.5 | 57.5-79.4 |
| Medic | 67 | Mean | 19.3 | 9.5 | 65.6 |
| | | Range | 13.7-23.9 | 7.5-11.2 | 53.4-76.2 |
| Vetch | 229 | Mean | 20.2 | 9.0 | 62.9 |
| | | Range | 15.6-26.2 | 7.2-11.0 | 51.2-74.9 |

*Data from DPI Hamilton Pastoral and Veterinary Institute (1999-2005) and Agrifood Technology (2007-2011).

### Green manure

Vetch has the ability to offer substantial benefits to soil fertility and can contribute to improvements in soil structure and organic matter. It also provides a weed and disease break for cereals in a crop rotation. ANVBP results across five sites over three years have shown after a vetch grain crop, total nitrogen in the soil increased by 56kg/ha. After vetch hay production 94kg/ha of nitrogen was returned to the soil, and after green manuring there was an increase of 154kg/ha of soil nitrogen. Cereal yields following vetch are usually at least 30-50% higher than continuous cropping cereals (Unkovich et al 1997; Rochester 2004).

### Pasture/grazing

All common vetch varieties and advanced lines from Table 1 are similar in palatability for green grazing. Common vetches can be grazed from 10-15cm high to the end of pod maturity.

### Vetch agronomy

Weed management in vetch is problematic, with few herbicides registered for in-crop weed control. Management of broadleaf weeds is especially difficult. Several grass herbicides are available and most of these can be tank mixed with insecticides (check labels). Avoid herbicide spraying at flowering. Further recommendations are available from the 'Grains Legume Handbook' and 'Vetch the Ute Guide', both available through the GRDC website.

## COMMERCIAL PRACTICE

### *Environmental and economic benefits*

Disease-resistant varieties can be successfully grown without fungicide use. As a legume component in the farming system, vetch can provide assistance in managing disease and weed resistance in following crops and returns significant amounts of nitrogen to the soil. Research has shown:

- two sprays of mancozeb for rust, ascochyta or botrytis cost $27-$34/ha and did not always reduce diseases to a satisfactory level (R. Matic pers. obs.)
- vetch increased nitrogen by 50-60kg/ha which meant a 30-50% input reduction of mineral fertilisers to reach the same yields in cereals (*Grain Business* 21/2008, 'Do-it-yourself nitrogen more than pays its way', SA farmer Neil Smith).
- diseases, especially rust, can reduce grain and dry matter production and quality by 30-100%. If a disease resistant variety can increase hay yield by 1.0t/ha, this equates to a $160-$220/ha gain. If grain yield is increased by 0.5t/ha at a price of $420/t, the producer gains $210/ha.

## REFERENCES

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Unkovich MJ, Pate JS, Sanford P (1997) Nitrogen fixation by annual legumes in Australian Mediterranean agriculture. *Australian Journal of Agricultural Research* 48, pp. 267-293.

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