

## The nutritional value of *Lathyrus cicera* and *Lupinus angustifolius* grain for sheep.

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### Summary

*Lathyrus sativus* and *L. cicera* have recently been found suitable as multipurpose legume crops in the southern Australian dryland regions, with a potential growing area of 100,000 to 300,000 ha. However, their use is limited by the presence, mainly in seeds, of 3-(*N*-oxalyl)-L-2,3-diamino propionic acid (ODAP), an agent which causes lathyrism. Research at CLIMA has produced a high yielding variety of *L. cicera* (cv Chalus) which contains consistently low levels of ODAP. The aim of the present study was to

assess the nutritional value and animal health aspects of *L. cicera* grain as a feed for sheep. Comparisons were made against lupin grain (*Lupinus angustifolius*), which is commonly used in Australia for supplemental feeding of sheep.

One hundred individually penned Merino wethers (35 ± 0.3 kg) were allocated to 5 treatment groups of 20 sheep. Following a 4 week adjustment period, sheep were fed *ad libitum* the following treatment diets for up to 13 weeks: basal (oaten hay plus 2.5% urea), 35% lathyrus, 35% lupin, 70% lathyrus and 70% lupin. The remainder of the diet was oaten hay and minerals. After 10 weeks on treatments, 14 sheep per group were killed for carcass assessment. The remaining 6 sheep were fed to maintenance metabolisable energy (ME) requirements for one week followed by a 10 day faecal and urinary collection period.

Chemical and *in sacco* analysis of the grains showed that lathyrus contained less protein (28% vs 36%), fat (0.7 vs 4.1%) and fibre (25% vs 36% NDF) but more starch (42% vs 1%) and antinutritional compounds (ODAP, tannins, trypsin inhibitor) than lupin. Essential amino acid composition was similar for the two grains, as were *in sacco* degradabilities of dry matter (84 vs 81%) and protein (92 vs 94%).

The feeding experiment showed that lathyrus had a higher nutritional value than lupin in terms of voluntary feed intake, liveweight gain ( $P < 0.01$ ; Fig.1), carcass weights ( $P < 0.05$ ) and feed efficiency ( $P = 0.05$ ). Wool growth reflected ME intake, and there was no independent effect of grain type ( $P > 0.05$ ).

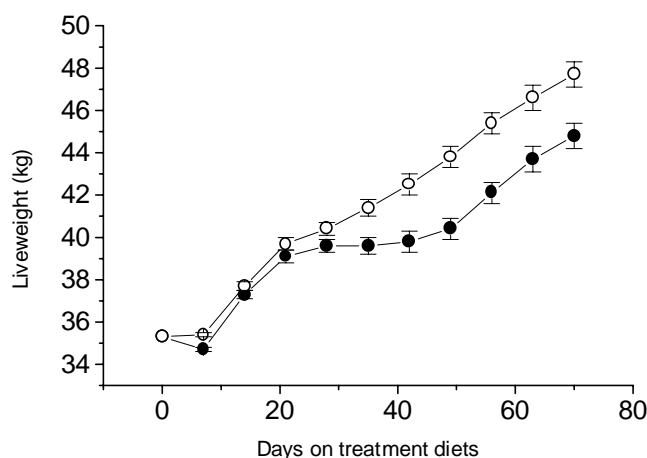


Fig 1. Growth of sheep fed diets containing *Lathyrus cicera* grain (open circles) or *Lupinus angustifolius* grain (closed circles). Values are mean ± SE, combined for the two inclusion levels of grain (35% and 70%).

Results from the balance study showed that ME concentration was the same for both grains (14 MJ/kg dry matter).

There were no visible or biochemical signs of ill health (inappetence, lethargy, shaking or instability) in any sheep fed lathyrus. Several sheep fed the 70% lupin diet had mild diarrhoea, and two were eventually removed from the experiment due to anorexia.

Meat from sheep fed lupin tended to be yellower than that from those fed lathyrus ( $P = 0.05$ ). Apart from this, there were no differences in meat quality due to grain type (e.g. redness, pH, taste or tenderness).

In conclusion, compared with lupin grain, low ODAP *Lathyrus cicera* grain appears to be of high nutritional value for sheep, with no evidence of adverse effects on sheep health.