

Lupins a UK produced protein source to replace imported soya in Poultry, Ruminant and Aquaculture feed.

A three year research project into the use of home grown yellow and narrow leaf lupins as a soya replacement in animal feeds is nearing completion. The project which was part funded by the Technology Strategy Board, the UK's innovation agency, and a consortium of industry partners was lead by Tony Burgess of Birchgrove Eggs. In addition to leading the partnership Tony undertook a full commercial trial on a flock of 3,000 Bovan layers as part of the project.

The project brief was to investigate a home-grown protein source, in this case edible or 'sweet' lupins, as a soya replacement in livestock and fish diets. Project activities include looking at innovative approaches to breeding, agronomy, feed processing, nutrition and the development of a market for yellow and narrow leaf lupins as sustainable protein sources for UK agriculture and aquaculture. The partners hope that by working together they can develop ways to overcome technical and economic barriers and provide incentives for lupin use in terrestrial and aquatic farm animal production.

Following a series of successful experiments at Aberystwyth University, feeding different diets using the yellow and narrow leaf lupins to layers, Birchgrove undertook an 18 week commercial trial on a flock of Bovans. The experimental feed, supplied by Wynnstay, was a balanced layers feed which included a protein replacement source of 15% whole (hulls intact) yellow lupin, in part replacement for soya protein. This was fed to the flock from week 16 through to week 36, a period covering the important phases of onsite bird relocation and growth stage, through to maximum production. The housed weights of the birds averaged 1300g at 17 weeks. The yellow lupins used for the layer trials were grown in Devon and supplied by Soya UK, the Bovans were supplied by Joice and Hill.

In line with the findings of the earlier experiments at the University, the commercial trial at Birchgrove Eggs was successful. That is, the incorporation of yellow lupins at 15% of dry matter had no negative effect on bird growth, live weight, health and egg production. The table below compares key indicators from the 18 week commercial trial period in 2013 at Birchgrove with those from a more standard commercial flock at Birchgrove in 2012.

A comparison of results between birds fed a standard soya based feed in 2012 and those fed a lupin-based feed during the trial in 2013.

	2012 Bovans/soya fed	2013 Bovans/Lupin trial flock
Production wk 20	86%	82%
Production wk 24	86%	90%
Production wk 37	90%	90%
Body weight average wk 37	1935g	1950g
Feed consumption wk 37	125g	117g
Egg weight wk 37	64g	66g
Water consumption	Breed guidelines	Breed guidelines

*figures are estimates using standard commercial data collection methods

It was also observed that that birds fed on lupin had 100% feather cover at week 37.

Tony explained that several concerns before the commercial trial have been laid to rest; concerns such as palatability of lupins to poultry, feed consumption, general overall bird health and egg production, but all have exceeded expectations.

Similar positive results were found in both the ruminant and the aquaculture feeding trials and overall Tony believes that so far home grown lupins have ticked all the boxes as a soya replacement. In addition the project has also raised a number of new questions based on observations. Tony is keen to point out that there are also possibilities that lupins can offer other benefits in animal and fish feed diets such as improved amino acid content and lower cholesterol levels, however, he emphasises that more specific research needs to be carried out to investigate these potential factors. Tony is also keen to look further into the potential benefits of lupins crude fibre content which is 18% where soya is 3-6%. Again this is not something the partners have been able to explore through the current project but could be a valuable direction for further detailed investigation.

The most difficult aspect of using home-grown lupins in animal feed in the UK is the availability and supply of lupins. At the current time lupins grown in the UK amount to around 4,000ha. Richard Flack, Nutritionist at Wynnstay PLC states that if demand arose from e.g. the supermarket sector, for eggs produced from a lupin based protein diet, Wynnstay alone would be looking for about 200-300 tonnes of lupin per month. This equates to about 3,000 acres of lupin sown. Richard has also calculated that lupin as a break crop could, under the right market conditions, produce in the region of £630 gross margin per hectare for growers. With increasing pressures on current high value crops such as oil seed rape predicted into the future, now is perhaps an opportune time for growers to consider lupins in their rotation.

Some components of the project are still ongoing, in particular the agronomy trials where approaches to weed control are being further evaluated. An improved agronomic package for narrow leaf and yellow lupins in the UK will be important to improving productivity. The project hopes to be able to offer updated advice to growers on the ideal conditions for growing, weed control, crop reliability and value of home grown lupins in the rotation as a spring break crop.

Tony recognises that perhaps the next hardest part of the whole exercise is to now convince supermarkets, caterers, farmers, growers and feed mills of the benefits of using a home grown lupin as a soya protein replacement. The partners realise that despite these favourable results the success of lupins in the UK will rely heavily on demand from consumers, retailers and caterers, this demand will then translate through the much shorter supply chain than soya - to producers and growers.

After speaking to many end user groups, Tony believes that home grown lupins as a soya replacement will be hugely welcomed, which will confirm his description of lupins as the new super cereal.

An overview of the project as a whole is available online at:

http://www.aber.ac.uk/en/ibers/research/major_research_projects/lukaa_project/.

This three year, business-led project brings together ten industrial partners and two research research institutes (Birchgrove Eggs, Alltech, Alvan Blanch, Ecomarine, Germinal Seeds, Kelvin Cave, PGRO, Soya UK, The Arable Group (TAG), Wynnstay PLC and the Universities of Aberystwyth and

Plymouth). The project is funded by the industry partners together with co-funding from the Technology Strategy Board, the UK's innovation agency in collaboration with the Biotechnology and Biological Sciences Research Council.

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