

Farming 1600 acres at Jacobshall, near Gardenstown, Douglas Duncan has over the last few years developed a low input, high output system for feeding his Aberdeen-Angus and Continental cross cattle to produce consistent, evenly split R and U grade carcasses.

"About seven years ago, I was feeding a very traditional diet with grass silage, barley, a protein concentrate and mineral," Douglas recalls. "It was producing good results but was becoming increasingly more expensive as fertiliser and fuel costs escalated."

After speaking to his local supplier, Eric Mallarkey, Douglas decided to plough up more grass and devote the extra spring barley acreage to produce fermented wholecrop.

Lupins and Triticale whole-crop halves feed costs at Jacobshall

"The same acreage produced more tons of dry matter at a cheaper cost per tonne," says Douglas. "Although I had to continue to supplement the protein, I was able to almost halve the amount of barley fed and still achieve the same performance from the cattle. One very useful side effect was a drier dung and the halving of the amount of straw required for bedding."

The next step was to produce a forage which would allow him to reduce,

or preferably eliminate, the need for a protein concentrate. Biotal regional sales director, Chris Totten, suggested Lupicaleage, a bi-crop of lupins and triticale, might fit the bill and produce a starchy wholecrop with good quality protein levels.

Pleasantly surprised

"We grew a modest five acres in 2006 to try out this new alternative and wrapped it into bales," says Douglas.

"I was pleasantly surprised at how easy it was."

By 2008, Douglas had decided that this was definitely the way forward and built a 1000 tonne clamp to hold the 75 acres which he currently grows.

"I now feed a maximum of 3kg of mineralised home-grown barley to the finishing cattle and as much Lupicaleage as they can eat," he says. "The feed is in front of them 24 hours a day and their level of contentment is impressive. I find that cattle on grass silage are much more restless and noisy and a lot more bullying takes place."

The principle behind this feeding regime, according to Chris Totten, is the maximisation of rumen function. Many growing and finishing cattle are fed high levels of cereals with the result that the rumen experiences a frequent drop in pH from the ideal of 6.5 to a low of 5 or less.

As the rumen microbes which are responsible for the digestion of fibre are inhibited by a drop in pH, feed conversion efficiency suffers badly as cattle become acidotic and exhibit signs of sub acute rumenal acidosis. High cereal diets are more akin to feeding monogastrics like pigs rather than ruminants like cattle or sheep.

Promotes cudging

"Not only are modest amounts of barley fed to all animals but the structure of the lupin emulates lucerne and provides a superb source of long stems and scratch factor," Chris explains. "This acts to stimulate the rumen wall, adds significantly to the fibre mat and promotes cudging in a spectacular fashion."

"Enhanced cudging frequency produces copious quantities of sodium bicarbonate through increased salivation and this acts as a very efficient buffer against an acidic rumen."

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Lupicaleage, a bi-crop of lupins and triticale, produces a tall, bulky crop

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Douglas has found that growing the crop is very straightforward. He doesn't try to plant into a stale seedbed but spreads farmyard manure at about 10 tonnes per acre and then ploughs. The premixed seed is drilled to about 1½ - 2 inches deep. No lime is applied as lupins prefer acidic soils. If soil reserves are low, a dressing of phosphate and/or potash may be necessary to bring them up to a satisfactory level, as with any crop.

"If a weed challenge is expected, I apply a pre-emergence herbicide unless the crop is being undersown with grass," says Douglas. "Then I close the gate and wait for harvest."

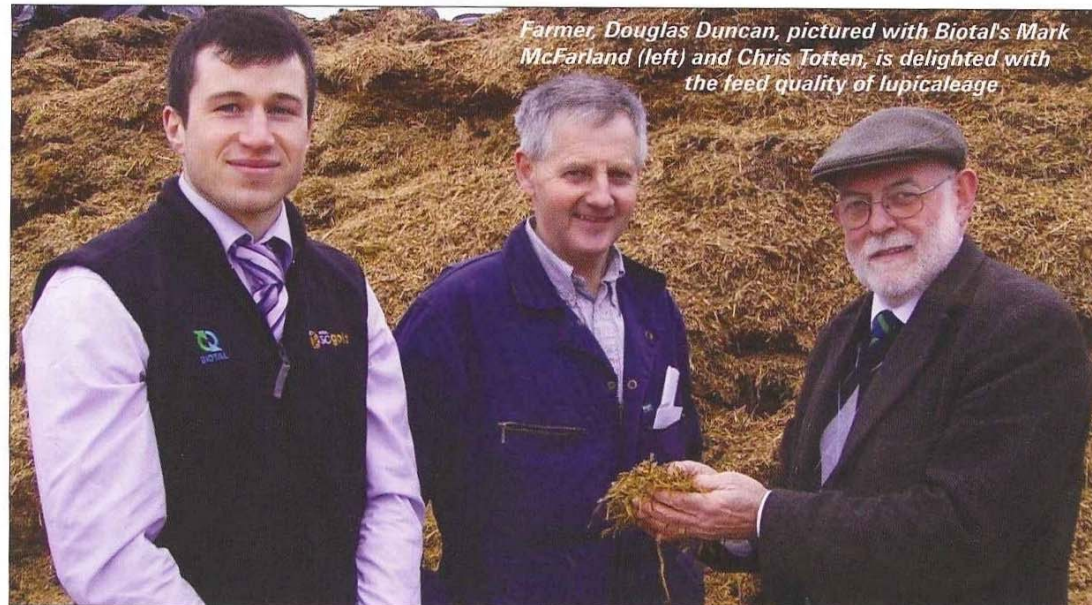
During the first few weeks, it has been found necessary to monitor the crop for pigeon activity and, as with spring rape, control measures may be required. A management technique being considered is to spray the emerging crop with sulphur which can deter pigeons and also aids protein production. Rabbits, grazing deer and leatherjackets also need to be considered.

Later harvest

Harvest is later than typical whole-crop and will run into September when the lupin is well developed. At this stage, the triticale will be close to combine ripe and although the grain will appear to be too hard for animals to digest, the lupin juice produced in the clamp will re-soften the triticale grain so that none passes through into the dung.

Douglas admits this forage is difficult to preserve and has a fairly low natural energy density. So Biotal's wholecrop legume containing a straw-degrading enzyme system and specific bacteria which produce five different antimicrobial compounds, is applied to the crop at harvest.

"Although a crop of 19t/ac has been recorded locally, yields similar to English maize-producing farms are



Farmer Douglas Duncan, pictured with Biotal's Mark McFarland (left) and Chris Totten, is delighted with the feed quality of lupicalcage.

achieved - it may only be half the height but it's twice as dense!" Douglas points out.

Chris Totten adds: "The resultant crop contains all the components required in a balanced ration, except for the mineral content. As with most Scottish soils, there are deficiencies such as selenium, copper, cobalt and vitamins which must be addressed."

The main component of the whole-crop is NDF, both digestible and structural. Starch is supplied by the triticale grain and sugar is present in the stem and leaf. Lupin is an oilseed where RDP is supplied by the leaf while the whole seed in the forage produces quality protein (UDP) with an amino acid profile as good as soya.

The addition of barley to the ration supplies quickly fermenting starch which ensures that the rumen microbes are supplied with plenty of energy but this must not be overdone or the main function of the rumen is impaired.

Douglas is convinced that the benefits of the bi-crop do not end there. In the growing crop, the lupin would be very uncompetitive on its own, like maize. However, triticale has a small weedseed suppressing ability. The

lupin plant prefers to keep its leaves in the sunlight and as the triticale stretches upward, the lupin will follow, resulting in a tall, bulky crop.

No nitrogen

As a legume, the lupin has no nitrogen requirement in its later stages and will be able to take the bi-crop through to harvest with no requirement for a top dressing of nitrogen. The resulting bulky crop will lean heavily. However, as the two species are structurally dif-

ferent, they will keep the crop from going flat and will always be capable of being harvested, short of flooding or other natural disasters.

"The advantages just keep building up," says Douglas. "During lambing, ewes occasionally succumb to twin lamb disease. When supplementing the diet with Lupicalcage, the mono-propylene glycol content produced by the additive in the forage enable the ewes to bridge the energy gap at lambing. No more twin lamb disease (we hope!)."



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