



SOIL TREATMENT

Standard half treatment 40kg of nitrogen plus phosphorus and potassium Cost: £95/ha	Albrecht half treatment 30kg of nitrogen plus trace elements Cost: £103/ha
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Soil test lifts grass yield and lamb output

A Scottish farmer has seen a production boost after using a novel soil test, Gemma Claxton reports

Analysing soil using a novel technique and addressing soil micronutrient balance has improved lamb output by £54/ha and upped grass yields by 15% on a Scottish beef and sheep farm.

Duncan McEwen, Amprior Farm, Stirlingshire, began looking for possible explanations on farming forums for why his crop yields continued to worsen, despite receiving tonnes of manure. This is when he came across the Albrecht soil test - an in-depth test looking at soil nutrient balance.

The test identifies which nutrients are needed to ensure the soil is balanced and there are no limiting factors to production, explains Mr McEwen.

In the problem field, the standard soil test identified high levels of magnesium at index 4 (index 2 is considered normal), but the Albrecht test showed the opposite result - a 124kg/ha deficit.

“We added a magnesium spray and the crop greened up over the next two to three days.” David Franklin of Franklin Soil Fertility explains how differences in soil tests can occur. Cation exchange is a process that takes place in the soil to allow plant roots to absorb many nutrients required for growth (calcium, magnesium, potassium, sodium and trace elements).

The total exchange capacity (TEC) reveals the soils potential to hold and exchange these nutrients.

Soil TEC can vary from 3% to more than 40% in the space of a few fields, says Mr Franklin. It is this variation that can lead to inaccurate test results and unbalanced soil, as most standard UK soil test guideline levels are based on every soil having the same nutrient holding capacity of 15% TEC.

Dr Albrecht, the researcher who the test is named after, believed soil needed to be balanced in every element, not just M, P and K. The optimum soil has 68% calcium, 12% magnesium, 4% potassium and 1% sodium, says Mr McEwen.

“There are 16 known trace elements that affect plant growth and nitrogen is the driver of the system. But if the trace elements aren’t concentrated on and balanced, you won’t get efficiency and you have to put more nitrogen on to compensate for this, further pushing things out of balance,” he adds.

Albrecht Trials

After the success of the poorly yielding field, the 323ha Forth monitor farm ran a trial treating half of one 5.6ha field with a standard NPK programme and the other according to the Albrecht soil sample results. Sixty finishing lambs were introduced into each half for 40 days and were weighed on entry and exit.

Grass yields were 15% higher in the Albrecht half when measured as the lambs were taken off. From the remaining covers, Mr McEwen calculated the Albrecht half would support 12 lambs for 28 days.

Lamb daily liveweight gains were also 15% higher on the Albrecht half. This is due to the higher quality of the swards. Crude protein was 274g/kg, D value was 73% and sugars were 114g/kg. This compared with the standard half analysis of 226/kg crude protein, 68% D value and 79g/kg of sugars. Metabolisable energy also increased by 0.8MJ/kg, to 11.5MJ in comparison to the standard half of the field. “A far higher proportion of the lambs were actually fat and ready to sell after the trial,” adds Mr McEwen.

The improvement in grass quality was clearly highlighted by the difference in liveweight gain between the two batches over the trial period. The Albrecht half averaged 0.8kg heavier, equating to £1.39 a lamb at a selling price of £1.74/kg.

The treatment of the standard half consisted of conventionally addressing pH. P and K deficiencies. The Albrecht test showed moderate P and K deficiencies and satisfactory pH, but levels of the trace elements boron, manganese, iron and iodine were low.

Although there was a 25% reduction in nitrogen use on the Albrecht half, the targeted use of fertiliser and trace elements on the trial plot was £8/ha more expensive than the standard NPK treatment.

However, the uplift in lamb value grazed on the Albrecht side was still £54/ha more than the standard side, even taking into account the additional cost of soil rebalancing.

So while the alternative soil treatment has not saved any money at the moment, Mr McEwen believes that more precise use of products to balance out soil nutrients will enable him to reduce nitrogen costs further in future.

Next Steps

Following the successful trial, Mr McEwen has now Albrecht tested half the farm and is about to have the other half tested. However, the test is considerably more expensive than the standard soil test.

“It costs £15 - £20 per standard sample and £80 - £90 for the Albrecht sample, which should be carried out every four years, but you get the benefits so it’s worth it,” says Mr McEwen.

Mapping out all the fields is also clearly highlighting those used for hay or silage have very low potash levels. “Historically there was P and K in the soil, but this won’t last forever. It’s like a bank account, you can’t keep withdrawing funds,” he says. “Now we’re trying to put back what P and K we take off, plus a bit more by spreading dung on the hay and silage fields in late winter to early spring,” he adds.

Mr McEwen recognises the farm is fortunate its soil nutrient balance is not far off the perfect soil, so costs reflect this. “At least if you test, you understand what limiting factors there are. We never considered magnesium to be the limiting factor and were lucky it could be easily fixed. The aim of the game is to provide more nutritious food for humans. If we can maintain grazing quality and growth rates throughout the season, we can finish as much as possible off grass alone,” says Mr McEwen. He also believes if the plant is healthier, the animals immune system will be stronger, leading to lower disease levels and reducing pesticide and vet medicine use.

**LESS NITROGEN
MORE GRASS
HIGHER NUTRIENT CONTENT
INCREASED LWG**

**25% Less nitrogen applied
Grass yield 15% higher**

	STANDARD	GLENSIDE ALBRECHT®
CRUDE PROTEIN	22-6	27-4
D VALUE	68	73
SUGAR	79g/kg	114g/kg
ME	10-7	11-5