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Ross Barclay-beuthin



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Sustainable soil health is now firmly on the agenda. Michael Gove is driving forwards with his 'Green Brexit', growers are spending more on mechanical weeders and less on herbicides, under vine and interrow cultivators are being put to use, and it is becoming increasingly common to see cover crops, such as Red Clover, among alleyways providing both nitrogen and deep spanning roots to help aerate the soil and alleviate tractor compaction.

But it is not just compaction and herbicides which are preventing UK viticulturists from getting the most out of their vines; synthetic fertilisers and foliar feeds, once seen as the solution for improved growth, are now causing more damage than good in vineyards within our shores.

Vineyard editor Victoria Rose met with soil health guru, and founder of Cloud Agro, Ross Barclay-beuthin and Richard Lewis, head of viticulture for Chapel Down, at the Kent producer's Court Lodge Farm vineyard in Boxley to get to the root of the problem.

Quadrupling output

In his formative years, Ross was a large-scale arable and livestock farmer in South Africa. Having always taken a scientific approach to agriculture, he became involved in a prominent government programme looking at the development of farming operations in the country, mainly focused on soil health.

"I was working with the UN and various aid organisations who were trying to find ways to rehabilitate African soils which had been badly degraded over the years due to poor farming practices," said Ross. "I started looking at vineyards, where only 20% of the land is 'in use', and I thought it was such a big waste of productive space so I wanted to see what we could do in between the vines. I found a vineyard owner who no matter how much fertiliser he applied, the vines weren't improving and were just getting worse."

After he was given the green light to experiment on the 200-hectare vineyard, Ross set about planting Lucerne and spreading chicken manure, waiting to see what would happen. In just one season, the vineyard had "quadrupled its output on grapes", sparking further questions in Ross' mind.

"We quickly realised that over the years, the soil health had been destroyed by chemical fertilisers," said Ross. "The application of synthetic products had caused salts to build up in the soil and this was preventing the vines from accessing essential nutrients. The Lucerne had broken up all the soil compaction and flushed these salts away, while the manure had reactivated the soil life, and with the right bacteria, fungi and mycorrhiza now present, the vine was suddenly thriving."

In this eureka moment, Ross realised that he had found both the problem of why soils had become so degraded and the solution as to how they could be rehabilitated. From this Cloud Agro's Smart Feed system (the process of looking at what a vine requires and feeding the soil accordingly) was born.



Improving the soil

In a bid to develop this solution into a product which could be rolled out across the rest of Africa, in 2013, Ross relocated to London to be closer to Westminster, the UN and a range of high-profile NGOs in the food and agricultural development sector.

It was at this time that Ross discovered the UK's viticulture sector and the potential benefit of introducing Smart Feed to growers. He started working with manufacturers in Europe on a pelleted soil conditioning product, called Futuregro, and after securing a warehouse at Tilbury Docks, his company Cloud Agro now distributes pellets nationwide.

"Improving soil health is something which I have been driving for a long time and it wasn't until I moved to the UK that I could see a commercial potential," said Ross. "It wasn't long after that, Michael Gove launched his new agricultural policy and soil health became a real part of the directive going forward. The whole world seems to be making a turn around and it is encouraging that we all seem to be swimming in the same direction."

Based on the original Lucerne and chicken manure combination, the Futuregro pellets, provide a natural source of nitrogen that has a slower release than chemical alternatives and has already been composted to ensure that they actively improve the soil from the moment they are applied.

"Most growers who are already thinking about feeding their soils have been applying green waste compost," said Ross. "It is encouraging that there are so many vineyard managers looking at positive ways to make improvements to the soil, but green waste can take five years to break down and provide nutrients to the vines."

As well as getting to work quicker, the pellets are also much easier to manage than compost. Instead of attempting to broadcast 40 to 50 tonnes of green waste per hectare, which can be challenging to do effectively once vines are established and trellis work is in place, Futuregro can be spread at a rate of around one tonne per hectare with a small tractor and spreader, which also minimises the rate of compaction.

"I have designed a protocol which growers can follow to calculate how much Futuregro they need to apply," said Ross. "By combining a number of factors, such as soil type, the potential for leaching and yield from the previous harvest, we can calculate what nutrient replenishment is required."

Unlocking nutrients

As well as looking at what nutrients the vines have used in a season, Ross also compares soil analysis with signs of deficiency and petiole analysis to check whether nutrients are being locked up in the soil instead of being released to the vine.

In order for vines to absorb the nutrients in the soil, good bacteria and fungi need to be present. Mycorrhizal fungi act as an interface between the soil and the vine, helping to mineralise and supply nitrogen and phosphorous, which the plant cannot process alone, in exchange for carbon which the fungi cannot produce itself. The fungi can also reach deeper into the soil, picking out minerals and supplying them to the vine.

Over the years, essential mycorrhiza can be killed off through extensive herbicide use, tractor compaction, which leads to a lack of oxygen in the soil, as well as the build-up of unnatural salts from chemical fertilisers, as Ross discovered at the vineyard in South Africa.

Without good bacteria and fungi present in the soil, it doesn't matter how much fertiliser is applied to the soil, the vines won't reap the benefits. With growers desperately looking for ways to feed the vines, it appears that to compensate for this, an over-reliance on foliar feeds became the norm.

"Foliar feeding has definitely been over used in the UK and is holding the industry back in terms of yield potential," said Ross. "Vine leaves are designed to respire; to photosynthesise. They are not there to take in food. The roots are where vines take in and store nutrients, but instead of looking at the soil, the industry has been force feeding vines through a leaf which is neither effective nor sustainable."

As well as ineffectively delivering nutrients to the plant, Ross also discovered that these foliar feeds were also further contributing to the build-up of salts in the soil, perpetuating the vines' nutrient deficiency problems and providing misleading data to vineyards carrying out soil tests.

"I was invited to see some vines at Chapel Down which varied from exceptional to abysmal yield performance in just a few metres," said Ross. "Richard Lewis wanted answers because they were applying the same fertilisers, the soil visibly looked the same and analysis showed that all the right nutrients were present, but the vines at the top of the slope were massively outperforming the ones at the bottom." >>





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Approaching things from a different angle, Ross started to think not about what was wrong with the vines, but what was happening deeper underground.

“One of the first things I noticed was the variation in worm numbers,” said Ross. “The top of the slope was averaging about 250 worms per cubic metre, and at the bottom there was only about two! I took some soil samples to assess under the microscope and it was clear that over the years, where the chemical fertilisers and foliar feeds had been running down the hill, the salts had been pooling up and killing off the bacteria and fungi at the bottom of the slope.”

While the surface soil samples had suggested good nutrient levels, lower down where the roots are, the soil’s B horizon, was desperately depleted of nutrients, and, more concerningly, due to these salt deposits, there was a lack of microbial activity.

To ensure that the soil is as healthy as possible across all its vineyard sites, Chapel Down is steering away from spraying herbicides and synthetic fertilisers and are instead focusing on mechanical weeding methods, cultivating and natural fertilisers such as Futuregro.

“We are in a transitional phase at the moment,” said Richard Lewis, at Chapel Down. “We have been using a Rinieri Rollhacker for light soil cultivations and weed control under the vine and this is probably the last season we will use herbicide alongside that system. We are focusing very much on the soil health and while we will not stop using pesticides for disease control, we will be moving away from foliar applications and are doing what we can to minimise the use of chemicals in the vineyard.”

Controversial discovery

Growers are increasingly focused on developing and nurturing the relationship between vines and essential microbial life in the soil, and with the growing popularity of Futuregro, Ross decided that he wanted to take things one step further by looking at optimal soil nutrition for vines.

Traditionally, farmers have paid to have their soil sent away to various laboratories in the UK for analysis. In return, the laboratories provide a nutrient signature for the soil, along with a list of recommendations for what that farmer can do to rectify nutrient levels based on the crop they are growing.

Trusting these laboratories, growers have followed the advice, however, after repeatedly finding that petiole and grape analysis were not matching up to the nutrients which were being depleted in the soil, Ross began to question what this advice was based on.

Controversially, Ross told Vineyard that he had discovered that the laboratories had been knowingly supplying growers with incomplete advice on soil nutrition.

“About 25 years’ ago, DEFRA produced a document called RB209 which set out which nutrients each crop needs,” said Ross. “Back then vines were a marginal, unimportant crop and so weren’t included. Subsequently, when the laboratories referred to RB209 there was no information and they were told to use the information for strawberries and hops instead! This is not only absurd but they were taking people’s money for this service.”

Concerned that the industry has been “paying for technical advice and being given misinformation”, Ross teamed up with the UK’s largest independent laboratory in Reading, NRM, to find out which nutrients a vine actually requires.



Futuregro pellets

Field trials

Working in partnership with NRM, Cloud Agro launched its first Futuregro field trials in October 2018. Prominent growers Chapel Down, Gusbourne and Rathfinny have all dedicated a selection of trial plots spread across various sites with different soil types, vine varieties and rootstocks. Ross is also working closely with membership organisation WineGB and Plumpton College on the project which will run for three years.

“Everyone involved in the field trials has embraced the soil health protocol and have all put a huge amount into developing this,” said Ross. “It takes a lot of courage for the big players, like Chapel Down, Gusbourne and Rathfinny, to embrace something like soil health because you can’t turn a big ship round on a six pence; it takes time to change operations. Chapel Down and Gusbourne have both embraced Futuregro across their entire farming operations which enable the phasing out of chemical fertilisers, and for me it is a very brave and forward-thinking decision to make.”

At Chapel Down, the trials have been spread across the 110-acre Court Lodge Farm vineyard in Boxley, Kent, which was planted in 2015 with Chardonnay and Pinot noir.

Combined with its partner growers, Chapel Down will soon be sourcing fruit from almost 1,000-acres. The Kent-based producer is set to significantly expand the plantations under its own management, with 300-acres due to be planted at Boarley Farm in the next two years taking total area under vine up to 750-acres.

While it is too early to start talking about the impact of using a natural fertiliser like Futuregro on vine yield, with this growth in mind, it is easy to see why Richard is keen to find the best way to guarantee the long-term sustainability of the vineyards’ very foundations, the soil.

“Instead of trying to improve productivity by applying something ‘on top’ of the vine I am looking at what’s happening in the ground and that seems to be a much better way of moving forward,” said Richard. “If you can apply something which adds organic matter at the same time as building fertility, you are not only replacing the nutrients the vine has taken out, but you are creating an environment where the nutrients become more available to the vine over a longer period.” >>>



Richard Lewis and Ross Barclay-beuthin

GRAPE GROWING

Engine room of the plant

As well as looking at which nutrients are needed to build a strong, productive vine, Ross is also using the trials to identify the optimal timings for the application of these nutrients.

“People usually apply fertilisers in the spring, when new vineyards are being planted, or after bud burst on established vineyards,” said Ross. “However, I have always been of the strong belief, from what I have witnessed underground, that the greatest root activity takes place post-harvest, when the vines are desperately trying to replenish all the nutrients they have lost after harvest and leaf drop.”

It is hoped that the trials will confirm that natural fertilisers should also mainly be applied to the soils in October or November, so that the vine is able to replenish its reserves which it can then use as and when it needs them.

“If you feed after harvest, then the plant can decide when to use the nutrients and you are letting the plant drive itself,” said Ross. “By looking after the soil, you are really looking after the engine room of the plant.”

Future growth

While foliar feeds are out of fashion, the biostimulants market is growing rapidly and Ross is currently developing a new partnership between Cloud Agro and AlgaEnergy, a world leading biotech consortium to incorporate a range of biostimulants in the Smart Feed offering.

“Biostimulants are essentially vitamins, amino acids and phytohormones which the plant produces naturally,” said Ross. “They are the growth generators, the building blocks of the vine, and by supplying them at the right time the plant can use its energy to produce better crops rather than for general growth purposes.” As well as helping to facilitate grape production, the biostimulants also help to build a healthier plant, and with a robust immune system in place, the vine is likely to be less prone to diseases.

Looking to the future, Ross Barclay-beuthin is confident that old, harmful farming methods will eventually be forgotten and that out of all the agricultural sectors in the UK, the viticulture industry has the greatest hope of implementing sustainable management practices.

“All the people who have entered the sector from other careers, who have gone out and got a fresh education, don’t have a die-hard view about what grandad and dad have ‘always’ done to the land,” said Ross. “They are pretty savvy and have a greater understanding of the importance of soil health. From what I can see, there is a genuine interest to try and improve in the vineyard.”

While not wanting to preach to other growers, Richard Lewis has spent much time over the last 18 months researching soil health and said: “It is something I am passionate about, and the more growers who understand the theory, the more will want to look at alternative approaches. Anyone looking to go down the route of improving the soils can speak to Ross, who has a lot of knowledge and advice to give. We are confident that Futuregro is going to deliver for us.”



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