Nature **NATTERS**

WITH MARTIN LINES

From dust to robust: Papley Grove Farm's soil journey

With this month's issue focusing on soils, I thought I'd reflect on my own farm's journey. Papley Grove has seen some changes during the past few decades, and I've done a lot of learning, made a lot of mistakes, but overall, I've improved the health of my land and the farm bank balance.

I'm old enough to remember burning stubble to remove crop residues – we'd create a fine tilth in the soil afterwards. When burning was banned in the early 1990s, we went back to ploughing the whole farm instead of just the odd field here and there. This more meant investing more – bigger ploughs, bigger tractors, bigger machines to break down our sticky, clay-based soils after ploughing. During a number of years, the soil we used to plough over became more workable.

Several years ago we employed a student and they kept complaining that the plough wasn't working properly – it was repeatedly coming out of the ground and not ploughing straight behind the tractor. So I spent several hours walking alongside it while in action, trying to work out what was wrong and making adjustments. I was becoming increasingly frustrated that I couldn't figure it out.

It was only when I sat on the beam of the plough going back up the field that I spotted the student moving the steering wheel a lot. Instead of looking to the horizon to keep a straight line, he was looking down at the tyre and steering to every little wiggle; these movements also moved me side-to-side as I sat on the back. It was then I realised there wasn't an issue with the plough, but an issue with the driver.

Before hopping off at the end of the track, I was absent-mindedly gazing into the bottom of the furrow, watching the soil heave and turn. I was surprised to see tractor-tread prints in the bottom of the furrow from when we last ploughed the field a year ago. Surely not?

My soil was compacted! My brain started whirring – I thought about everything that happens to our fields. This was my fault – we were using heavy machinery and running in the furrow, repeatedly compacting and masking it with a bit of loose soil.

That was a lightbulb moment for me – we were causing most of the soil compaction on our farm, it wasn't the soil type making it tricky. The following season we dragged an old Dowdeswell DP2 crawler plough out of the nettles and began using that instead. Gradually, the layers of compaction we'd forced into the soil loosened as we ploughed the soil over.

My next train of thought was: if I'm causing this myself with our heavy machinery, we have to change some of our wider approaches. It was costing us a lot of money to fix the soil compaction we'd caused. So over a few years, we moved all trailers from super single tyres which used to sink 4-6" into the ground, to floatation tyres which only sink 1-2". We also put our combine onto tracks, and moved to vary-flex tyres on tractors.

It was a comment from our agronomist that made me realise things were improving. He turned up and took off his muddy wellies to put his regular boots on. I said: 'we're going for a walk in the field, not out for coffee!'. To which he replied: 'your soil doesn't stick to my boots like some of your neighbours', so I only need leather boots!'. That sparked me to realise quite how much had changed, and that we were indeed travelling on it much better than we had in the past.

We decided to make a new rule: the spade is the first piece of metal to enter the field after harvest. Digging holes and actually looking to see where we had compaction issues around the farm helped us move less soil and only disturb the areas that needed it.

Digging out a block of soil the depth of a shovel blade and observing its structure and moisture content gives you a good idea of the compaction status of that area. Infiltration tests are another quick and reliable way we've gauged where the problem areas are – using a steel ring hammered half way into the ground to see how long water takes to soak into the ground from the ring.

The next step was to look at machines that could direct drill: we'd get fewer weeds as we hadn't disturbed the stale seedbed. I also wanted to add cover crops into the system. In my head, I likened the use of cover crops to walking across a grass field: it feels spongy underfoot and you don't leave any footprints.

When we walk across bare, fluffy soil that's been cultivated, we often leave footprints, which contributes to the compaction. So I hoped the cover crops would nurture the structure of my soil for me, with deep roots, managing the flow of water through the soil at different depths and drawing up nutrients from the deeper earth.

As our knowledge of sustainable practices increases and our processes have improved, we're now looking at the finer functioning of soil systems. What makes them work and what's holding them back? We're now at the point where we're testing soil for biological indicators like bacteria, fungi and protozoa, as well as nutrient levels. We're aiming for our farming practices and inputs to not deplete, but to build soil biology.

With the research trials we're involved in we're starting to see clear links between a healthy, functioning soil rich in biology, and healthier crops that require fewer inputs... which happily for me, also means cutting costs.

I see soil as a bank account. If we invest in it, it gives us better returns, and we can draw on that investment in challenging years. I'll continue to invest into this account and the biggest asset on my farm: my soil. ●

YOUR CORRESPONDENT

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