Soil data improves return on investment

SNAPSHOT

Growers: Stewart and Pip Hamilton, John and Hilary Hamilton

Location: Leighview, Inverleigh and Wycheproof, Victoria

Area: 1820 hectares (Inverleigh), 1010ha (Wycheproof)

Annual average rainfall: 550mm (Inverleigh), 400mm (Wycheproof)

Soil types: shallow sandy river flats and loam to heavy volcanic clay (Inverleigh), black self-mulching soils, red rises and sandy dunes (Wycheproof)

Soil pH: 5 (Inverleigh), 7 (Wycheproof)

Crop program (2020): Cereals 70% (Scout and Scepter$^{\phi}$ wheat, Planet$^{\phi}$ barley) canola 30% (Trident$^{\phi}$ and DG 670TT)

Rotation: canola-wheat-barley

Photo: Stewart Hamilton

Stewart Hamilton.

Soil sampling is essential for understanding what you can and can't do with your soils, according to Inverleigh grain and oilseed grower Stewart Hamilton.

Stewart, who farms 2830ha at Inverleigh and Wycheproof with his wife, Pip, and parents, John and Hilary, said they've had success from taking a planned approach to soil testing, using grid mapping.

It's not the cheapest precision agriculture technique, but Stewart said it has produced some of the most valuable information for them.

"And it's not dear in the long run when you look at what you might save or gain by putting your money in a better spot, like blanket applications of lime and gypsum and even urea to a point," he said. "If you're not putting your money where your best bang for buck is, you might spend the same amount, but you'll get a better return on investment if it's put in the right spot."

Originally a self-replacing Merino enterprise with little cropping, the focus has shifted to mainly broadacre cropping with about 2000 Merino wethers grazing on stubble and stony country. The sheep are bought as lambs, grown and shorn of the 21-23 micron wool for four or five years, then sold to domestic abattoirs.

The Hamiltons bought the 1010ha property at Wooroonook, 15km south of Wycheproof, in 2007. They wanted to expand but land near the home farm, Leighview, was too expensive. The Wycheproof block gave them an affordable opportunity to both spread risk and diversify within their area of expertise.

"We grow the same crops, but being so geographically different, that's our risk management," Stewart said. "If we get a dry year at Wycheproof we generally hope to have a dry year at home, which is good at Inverleigh. If we get a wet year at Inverleigh, and a wet year at Wyche, that's really good at Wyche and not so good at Inverleigh. It also allows us to utilise machinery a lot better."

Stewart identifies their two major challenges as soil variability and inadequate organic matter. Both factors affect soil structure which in turn influences moisture retention at crucial times for crops, such as in spring. Low organic carbon means they can "struggle to have much of a bucket of water" at Inverleigh compared to Wycheproof.

"If it rains at Christmas time (at Wycheproof) it'll hold the moisture through till sowing, whereas down here we can be wet in July and have hot crops haying off in September from lack of water," Stewart said. "We've got organic carbons of 1-2 per cent down here and our topsoil ranges from 2-10cm deep. We don't have a lot of topsoil and then we've got some pretty heavy clay. Once it starts to dry out it goes really dry and once it gets wet, everything stops growing because it's just waterlogged."

Stewart said the red ground at Wycheproof produces the most consistent crops, but not the biggest and best.

How it started

Since the mid-1990s, the Hamiltons have addressed waterlogging issues at Leighview by creating a network of drains and developing

Photo: Stewart Hamilton

Our biggest cost in yield is too much water, says Stewart Hamilton.

700ha of raised beds to improve aeration and minimise yield loss rather than increase yield.

"Our biggest cost in yield is too much water," Stewart said. "Having beds has given us the confidence to keep inputs up at the level needed to match the available moisture without worrying about plants shutting down due to waterlogging."

As active members of Southern Farming Systems – Stewart became a director in 2018 and they've hosted many on-farm trials – the Hamiltons are no strangers to testing new techniques and building or commissioning machinery prototypes to suit their needs.

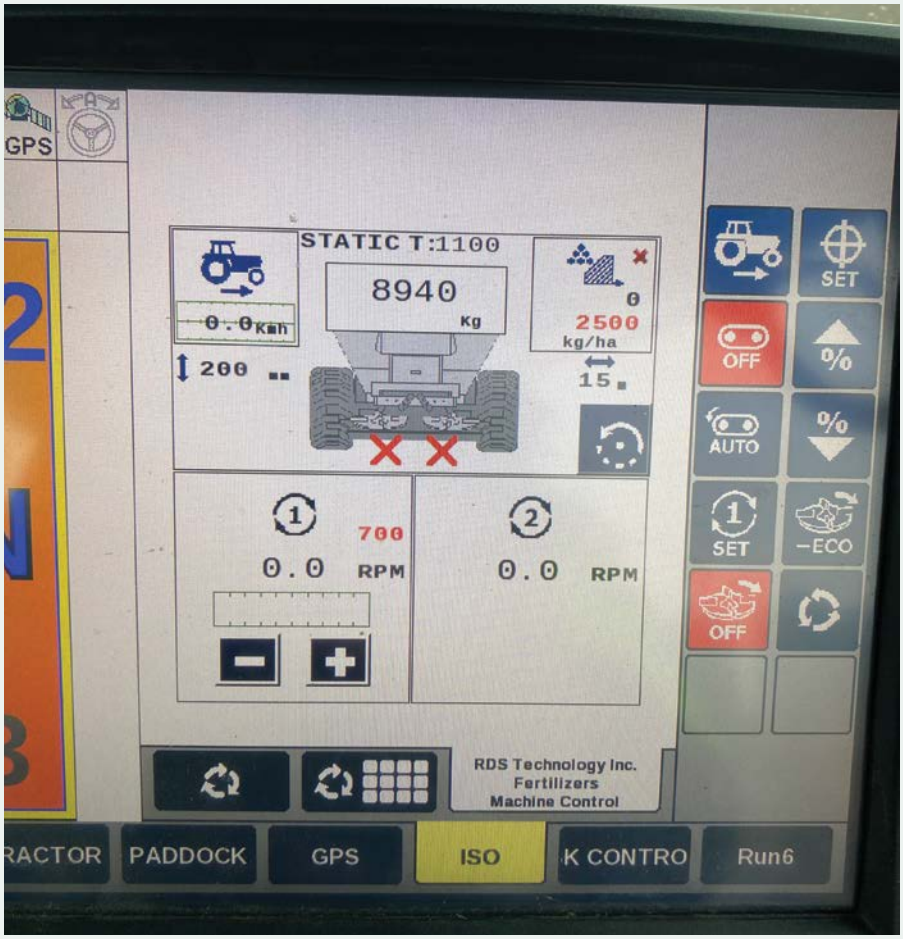
They began direct drilling in 1987. Current gear includes a New Holland articulated T9.505 that pulls a 12m Horwood Bagshaw scaribar with knifepoints and press wheels set at 250mm row spacings. The New Holland CR 9070 and CR 8.90 headers are equipped with IntelliView IV displays for controlling auto guidance, implements and as-applied mapping with RTX yield mapping to within 4cm.

This year Stewart picked up a new Hansa T8 spreader from Southern Spreaders, at Ballarat, for variable rate lime, gypsum and urea

Photo: Stewart Hamilton

A map showing variable rate lime application targeting 5.8 pH.

Photo: Stewart Hamilton



Setting up to use variable rates for spreading lime.

application based on the grid maps. The aim is to increase pH levels from 5.1-5.5 to 5.5-5.9 and boost yields by 10 per cent.

"We've been applying lime for as long as I can remember 20-25 years, possibly longer," Stewart said. "We got lucky with strategic soil tests that show it's definitely working, but the information from gridding is a lot more usable and accurate than the paddock testing."

What's next

Agronomists are encouraging them to start variable rate nitrogen, but Stewart isn't convinced it's the right time.

"I think we've still got some easy gets with our lime and probably even gypsum," he said. "I suspect we're using nitrogen to bandaid a lot of other problems. When we looked at NDVI after grid mapping and soil sampling and a barley crop at late tillering, we found some poor performing areas and some good performing areas. And after gridding it, we found the closest correlation was still the pH even though the NDVI indication was to put more nitrogen on it."

Stewart wants to fix the underlying problems first. With only a small proportion of legumes in the rotation because of their susceptibility to waterlogging and disease under high rainfall scenarios, like many farmers in the region the Hamiltons rely on "bagged fertiliser". Others apply as much as 500kg/ha of urea per crop.

"That's too much," he said. "We're actually affecting the soil by putting that much nitrogen on it: in a good way to grow yield, but in a bad way to make it fairly hostile for the microbes. We cap it at about 270-300kg of urea, while I'm still working on this other stuff, but I think if we can get our soil health better, we can back off on the bagged fertiliser as well."

After chicken manure application and trials of green manure crops didn't deliver the hoped-for results, Stewart said he's now testing deep ripping.

"We work pretty closely with Southern Farming Systems in that respect," he said. "They have a trial farm on our place. So anything they want to do at paddock scale generally gets done on our place. I'm very open o suggestions as well.

MORE INFORMATION

Stewart Hamilton
Phone: 0407 329 019
Email: stewart.hamilton1@bigpond.com

ACKNOWLEDGEMENT

This case study was produced by SPAA Society of Precision Agriculture Australia with funding from the GRDC as part of the Hands on Precision Agriculture Training project (GRDC Code SPA2001-001 SAX).