

# Primed for a solar-powered start to organic fodder beet

**A solar-powered robot has transformed the way one Shropshire farming family establishes organic fodder beet and overcomes weed problems.**

In wanting to help other farms maximise milk from forage, FS Brettell and Son is well equipped to grow an energy-rich feed for them—fodder beet. And this is all done within an organic system that has a focus on its carbon footprint.

Run by Chris Brettell and his brother Ed, along with their mother and father plus Chris and Ed's wives, the business covers 1,200 acres (486 ha) over four farms—a mixture of owned and tenanted land. The farming business, based at Smethcote Manor near Shrewsbury, doesn't milk any cows of its own.

Thirty heifers are reared on contract on one of the units, which also hosts 12,000 organic free-range laying hens with eggs supplied to a leading supermarket.

## Organic fodder supplies

A five-year rotation comprises two years of organic red clover leys, followed by winter oats, fodder beet and then spring oats. The majority of the fodder beet is lifted and sold to local organic dairy farms, although some is grazed. The clover leys are sold for silage—which the Brettells mow, wilt and cart to customers' clamps, while the oats goes for organic porridge.



A large solar panel on top of the FarmDroid provides energy to both drill and then hoe the beet, guided by GPS.

"We've been organic for about 25 years," explains Chris. "Dad decided to go into it. The price of wheat at the time of £60/t wasn't stacking up, so we had to diversify. We went into organic chickens. Eggs provide a regular cashflow which has enabled the business to grow."

Originally introduced four years ago as part of the business's

diversification, around 90 acres (36 ha) of organic fodder beet are now grown across three of the farms.

## Establishing fodder beet

But fodder beet not the easiest crop to grow organically—not least because its planting time coincides with rapid growth of weeds which can easily smother young beet plants. So good establishment is key.

The Brettells use multiple methods to reduce the weed burden—with the biggest problems being poppies and fat hen. Methods include ploughing and power harrowing to create stale seedbeds—where weeds are cut off at their roots using a cultivator with duck foot tines—before power harrowing again and then drilling. Once the crop reaches a suitable size, mechanical hoeing is then used, and the Brettells have also recently tried destroying weeds with a gas burner.

Aiming to improve operations,

things were transformed in 2021 when the business took delivery of a solar-powered FarmDroid. This automated self-propelled robot uses GPS technology to precision plant each fodder beet seed, says Chris.

Then, by 'knowing' each seed's location, he says it is able to repeatedly travel along the crop rows guided by GPS and mechanically hoe out weeds around each seedling—all driven by solar power.

## Weed control benefits

"Because the FarmDroid knows the grid pattern of the seeds across the field, it is able to use this information to cultivate both between the rows and between the plants," Chris explains. "But the critical point is that we don't have to wait for the beet to have emerged before we start hoeing."

"Because the robot knows where the plants are from the outset, we can hoe straightaway. This avoids the weeds getting ahead of





*Chris Brettell says the critical point is that he doesn't have to wait for the beet to have emerged before he starts hoeing with the FarmDroid, which avoids the weeds getting ahead of the beet.*

the beet. Without this, we might be waiting two to three weeks after planting before we see the rows and can put the hoe in with confidence."

Overall, Chris says it takes two people just half an hour to swap the droid from drilling to hoeing

mode. "We can then get on with weeding straightaway."

**Droid work rate**

"We set the droid to travel at about 600 metres an hour and to hoe between 25-30mm before and after

each plant in the row. Between the rows we set it at 10mm. We can adjust it to hoe closer. The slower it goes, the more accurate we can be.

"Once the plants are touching in the rows, we stop using the in-row knives and just keep hoeing between the rows—increasing the speed to 800 metres an hour. Once the beet has reached a size where we can't see between the rows, we stop."

With the FarmDroid delivered in May, a proportion of the Brettell's fodder beet had already been planted. Conveniently, however, this allowed a comparison to be made between beet established using the droid and beet of the same variety—Geronimo—that had already been planted in other fields using the Brettells' traditional approach (see panel).

"Geronimo is a brilliant beet," Chris says. "It's a high yielder, with a good top and early ground cover—important in an organic system for weed suppression."

Hand in hand with this, the Brettells also planted primed



**Ed Brettell.**

Geronimo seed. This is seed that has been pre-germinated, which helps the crop establish faster, and which can also therefore help with weed suppression.

"Once you can no longer see between the beet plants, you know you're onto a winner for weed management," Chris remarks. "With the FarmDroid, we went through hoeing the crop about five times, but the number of passes

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depended on the situation. We could target it to hoe the worst parts of fields more.

"Through GPS, we also know where the droid is in the field. It sends a text message and we can operate it via a mobile phone."

To initially set up the FarmDroid, simply required taking it to each corner of the field and pressing a few buttons so it could log

the field boundary locations, Chris says. The same process was used to allow it to navigate around trees and other obstacles in the field.

"As the leaves came out on the trees we learned that these could shield the GPS signal, so we had to account for this. You can also program in how big you want the headland rows.

"The other thing is that it was

working 24 hours a day using no diesel. It only weighs 950 kg, compared with a 10 tonne tractor and drill.

"We'll keep using the other stages of weed control involved while preparing the land. Ultimately, we want to maximise beet yield on the whole field. Previously with hoeing we could lose beet on the headlands and turns."

Chris' brother Ed agrees that the droid has boosted weed management. "Previously, we've got by with other methods of weed

control but suffered because we were putting weeds back into the seedbank rather than taking them out.

"The FarmDroid has also proven that drilling later is better than drilling earlier, because it gives us longer for stale seedbeds and allows us to get the crop up and away quicker," Ed adds.

As well as establishing fodder beet with the FarmDroid, the Brettells also used it to establish five to six acres of stubble turnips, slotted in after oats.

## Prime position for better beet

The last five years have seen increased interest in growing fodder beet organically, says Rhys Owen of Field Options, part of ProCam, which supplied the Geronimo seed to the Brettells as well as providing agronomic advice.

Having grown Geronimo and another variety Summo in the past, Mr Owen says the Brettells' organic fodder beet had already yielded on a par with beet grown conventionally. But test digs by Mr Owen last season—comparing Geronimo established using the FarmDroid with three fields of Geronimo established using the Brettells' traditional approach—revealed that the droid-planted field yielded an additional five to six tonnes/acre (12-15 t/ha) of root fresh weight.

"This is a very decent yield uplift," says Mr Owen. "I put it down to accurate drilling from the droid and better weed control. The precision of drilling and emergence was something to be seen.

"Primed seed also helps because fodder beet, in general, is uncompetitive against weeds. So, the sooner you can get it to a stage where the canopy closes over to suppress weeds, the better.

"As a rule of thumb, we see primed fodder beet seed emerging three to four days earlier than non-primed seed, which produces more even establishment. Primed Geronimo seed has particularly strong establishment vigour, which suits organic systems but is also a benefit on conventional farms.

"Usefully for the Brettells, Geronimo is also a dual-purpose variety, suited to lifting and grazing. I've never seen any issues with harvesting Geronimo. Root uniformity suits all beet harvesters. It maintains leaf growth into winter, which suits top lifting harvesters, and it is good for grazing because it grows well above ground and the tops provide a balance of protein."



*Test digs comparing Geronimo established with the FarmDroid and Geronimo established using the traditional approach revealed the droid-planted field yielded an additional five to six tonnes per acre of root fresh weight, says Field Options agronomist, Rhys Owen.*