

# IN FIELD FOCUS

— AGRONOMY THAT DELIVERS —



## ALL PRIMED FOR SOLAR-POWERED BEET

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

The farming business of FS Brettell and Son, Smethcote Manor near Shrewsbury, doesn't milk any cows of its own. However, with an interest in helping other dairy farms maximise milk from forage, it is well-equipped to grow an energy-rich feed for them: fodder beet. And all within an organic system with a focus on its carbon footprint.

*(Continued on page 2)*

### IN THIS ISSUE:

Combinable care | Protection planning | Trials expansion



PROCAM



# All primed for solar-powered beet

Continued from page 1

Run by brothers Chris and Ed Brettell, along with their parents plus Chris and Ed's wives, the business covers 1,200 acres (486 ha) over four farms.

Thirty heifers are reared on contract on one unit, which also hosts 12,000 organic free-range laying hens.

Meanwhile, a five-year rotation comprises two years of organic red clover leys, winter oats, fodder beet, then spring oats. Most of the fodder beet is lifted and sold to local organic dairy farms, although some is grazed. The oats go for organic porridge, while the clover leys are sold for silage.

"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."

## Good establishment

Introduced four years ago, around 90 acres (36 ha) of organic fodder beet are now grown across three of the farms. But with fodder beet not easy to grow organically – not least because its planting time coincides with rapid weed growth – good establishment is key.

Accordingly, the Brettells use

multiple methods to reduce weed burdens. These include ploughing and power-harrowing to create stale seedbeds – in which weeds are cut off at their roots using a cultivator with duck foot tines – before power-harrowing again, then drilling. Once the crop reaches a suitable size, mechanical hoeing is used, and the Brettells have also recently tried a gas weed burner.

However, things were transformed in 2021 when the business took delivery of a solar-powered FarmDroid.

An automated self-propelled robot, this uses GPS technology to precision plant each fodder beet seed, explains Chris. Then, by 'knowing' each seed's location, he says it is able to travel along the crop rows guided by GPS and mechanically hoe out weeds – all driven by solar power.

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

"Because the robot knows where the plants are, we could hoe straight away. This avoided the weeds getting ahead of the beet. Without this, we might be waiting 2-3 weeks after planting before we see the rows to put the hoe in with confidence."

Chris says it took two people

just half an hour to swap the droid from drilling to hoeing mode. The main weed problems are poppies and fat hen.

"We set the droid to travel at about 600 metres an hour and to hoe to between 25-30mm before and after each plant in the row. Between the rows we set it 10mm. We could have adjusted it closer. The slower it went, the more accurate we could be.



The critical point was we didn't have to wait for the beet to have emerged before we started hoeing with the FarmDroid, says Chris Brettell, which avoided the weeds getting ahead of the beet

"Once the plants were touching in the rows, we stopped using the in-row knives and just kept hoeing between the rows, increasing to 800 metres an hour. Once the beet



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



reached a size where we couldn't see between the rows, we stopped."

### Geronimo comparison

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



Geronimo fodder beet precision drilled by the FarmDroid

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

Additionally, the Brettells used primed 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're onto a winner for weed management," Chris continues. "With the FarmDroid, we went through hoeing the crop about five times, but the number of passes



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, explains Chris Brettell

## Prime position for better beet

The last 4-5 years have seen increased interest in growing fodder beet organically, says Rhys Owen of Field Options, part of ProCam, who supplied the Geronimo seed to the Brettells.

Having grown Geronimo and another variety Summo in the past, Rhys says the Brettell's organic fodder beet had already yielded on a par with beet grown conventionally. But test digs by Rhys, comparing Geronimo established using the FarmDroid with three fields of Geronimo established using the Brettell's traditional approach, revealed the droid-planted field yielded an additional 5-6 t/acre (12-15 t/ha) of root fresh weight.

"This is a very decent yield uplift," says Rhys. "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 3-4 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, Geronimo is a dual-purpose variety, suited to lifting and grazing. 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 revealed the droid-planted field yielded an additional 5-6 t/acre of root fresh weight, says Field Options agronomist, Rhys Owen

would depend on the situation.

"It was also working 24 hours a day using no diesel. It only weighs 950 kg. 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, Chris says simply required taking it to each corner of the field and pressing a few buttons so it could log the field boundary locations. The same process was used to allow it to navigate around trees and other field obstacles. "As leaves came out on the trees we learned these could shield the GPS signal,

so we had to account for this. You can also programme in how big you want the headland rows."

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.





# Carving a cost-effective path for combinable crops

With good grain prices and crops looking well, how should they be managed through early spring – especially with high fertiliser costs?

## Northern Scotland

With plenty of value in winter combinable crops, there is an opportunity to make the most of their good yield potential and ‘dilute’ fertiliser costs over more tonnes, says ProCam’s Phil Smith who covers Aberdeenshire.

The same could apply to spring barley, he says, although it will need particularly careful management.

“Cereals coming out of winter have been as good as you’d want them to be,” says Phil. “Generally we’ve had healthy crops and good rooting. But we have to protect yield proactively.”

Phil’s early-season winter cereal agronomy will focus on heading off potential losses from diseases, lodging and micronutrient deficiencies.

Levels of Septoria and Rhynchosporium have been average, he says, while net blotch isn’t expected until later and rust in his area is normally easily managed within fungicide mixtures. Nevertheless, he urges a maximum three-week gap between T0 and T1 fungicides, and says correcting micronutrient deficiencies may justify a separate application.

His biggest challenge, however, is Ramularia – particularly since spring barley makes up 60-70% of

his area and with malting premiums at stake. Because it is stress-induced, as well as using fungicides, he says it is an added reason to avoid nutritional stress.



Winter oilseed rape has the potential to provide one of the best gross margins on the farm if managed properly, says Aberdeenshire’s Phil Smith

“As well as covering all macro- and micronutrient bases, we’ll consider including seaweed extract with sulphur or a multisite. One of the key triggers for Ramularia is crop stress, so in order to delay its onset and reduce its severity we want to keep spring barley as de-stressed as possible.

“Despite talk of £250/t for malting crops, many spring barley growers will have paid £600/t for nitrogen (N) fertiliser. The profit potential will be there, but higher growing costs will mean less margin for error. We’ll need to avoid anything impacting on its healthy development. Accurate input timings will be crucial, and it may even be worth leaving poorer areas of fields unplanted.”

With winter oilseed rape (WOSR), Phil says the picture looks rosier. Despite high cabbage stem flea beetle incidence last autumn, he says crops came through winter well, and WOSR has the potential to provide one of the best gross margins on the farm. “We are targeting 5 t/ha.”

To make the most of WOSR prices, besides keeping pigeons off crops and correcting micronutrient issues, particularly boron, Phil says “holding back” light leaf spot will be key. “Many varieties are rated 5, 6 or 7 against the disease, but high pressure in the region means they can all need managing like a 5.

“After this, we need to focus on protecting against Sclerotinia, Alternaria and Botrytis through OSR’s long flowering period, lasting at least a month from late April.”



## Yorkshire

Strong grain prices mean there is everything to play for this season, agrees ProCam agronomist Jim Calvert, who covers the eastern side of North Yorkshire.

“There are a lot of good winter wheat and barley crops, and fungicide prices haven’t gone up excessively. So farmers should optimise yields.”

With most of his growers having bought N at reasonable prices, Jim envisages sticking largely with his usual N programmes. To safeguard winter cereal yields, he also expects to maintain his ‘prevent rather than cure’ approach to controlling disease. This typically involves front-loading programmes at T1 with an SDHI + triazole plus folpet.

Last season, low disease pressure in April lulled some growers to trim back on early fungicides, only for disease to



To safeguard winter cereal yields, Yorkshire-based Jim Calvert expects to maintain his ‘prevent rather than cure’ approach to disease control

hit hard later. But Jim’s approach of getting ahead of infection early has paid off, he says, even in seasons like this year, when Septoria and rust levels after winter have appeared low.

“In early spring, crops are largely in a protective situation, so I like to keep them that way. I don’t like to scrimp.

“It’s at T2 where you can reassess disease risk and adjust if needed. You normally know by GS37 if you’ve done a good job against Septoria. By T3, I’m mainly targeting Fusarium and brown rust.”

Also to protect output, Jim expects to treat winter cereals with a decent plant growth regulator (PGR) programme, which typically includes a GS37 PGR in winter barley to prevent late brackling.

Where possible, one place he is looking to save on bagged N is later in the season on WOSR – using liquid N instead as an efficient way of getting N into the plant.

“Often, the last time you can travel through WOSR with a spreader is mid-April. But it’s a long time from then until pod fill. I’ve used liquid N at pod set previously and yields have been good.”

## South-east England

ProCam agronomist in South-east England, Mark Burgess, also agrees that good grain prices offer opportunities.

Although some late-drilled winter cereal crops needed encouraging to tiller during February, he says the mild winter meant most “pushed on well”.

“Overall, crops have been looking good, so we don’t want a yield penalty by starving them. Crops planted after beans even needed slowing down.

“Fortunately, a lot of my farmers bought N early. With most of my winter wheat in milling varieties,



Septoria is always there, but there are also a lot of yellow rust-susceptible varieties, says Mark Burgess

we plan to apply N as normal. But we will monitor crop and field fertility through the season to see if N doses need adjusting, and will decide between granular or liquid N at later timings. If liquid N, I’m considering pulling the final timing slightly earlier than an ear treatment, to ensure that it’s utilised fully.

“I’m also not holding back N on hybrid barley, because most of it is on light land.”

Even where growers are having to cut back on N, Mark believes it will remain vital to avoid yield slipping away, given the decent grain prices. Accordingly, despite winter cereals having appeared relatively clean of disease, he sees it as important not to compromise green leaf area protection at T1 and T2.

“Septoria is always there, but there are also a lot of yellow rust-susceptible varieties. In barley, net blotch and Rhynchosporium are my biggest concerns, and rust earlier in the season.

“Disease management has to be about prevention. Even with newer fungicides, we need to be mindful about resistance if using them curatively. Decisions about including a multi-site fungicide will assess Septoria and Ramularia risks,” he notes.

Although many winter cereals have rooted well, Mark says it will be important not to risk lodging – given the yield and quality losses at stake and PGRs not being expensive. “PGR timings and doses need judging on a field-by-field basis. Micronutrient use will also be based on leaf analysis, rather than prophylactic applications,” Mark adds.

## Southern WOSR

Unlike winter cereals which have looked well, WOSR crops in Southern England have been variable, says ProCam head of crop production, Mike Thornton, so may need careful nursing through spring.

“Only in crops free from cabbage stem flea beetle larvae and with a high green area index should growers consider reducing N doses or delaying N until the green bud stage, and even then not if P and K indices are compromised,” Mike says.





# Protection planning for veg, pulses and sugar beet

As another busy spring gets underway, ProCam's non-combinable crop experts offer some timely weed and aphid control advice.

## Protecting pulses



Kevin Pearcy

With bentazone the only active ingredient currently approved for use as a post-emergence herbicide against broad-leaved weeds in spring beans, a well-timed pre-emergence treatment will be required to ensure crops are adequately protected. For best results, robust residual treatments such as a pendimethalin and imazamox co-form should be applied onto a firm, settled seedbed within 48 hours of drilling.

In spring peas, the options for post-emergence weed control are a little better thanks to the ongoing approval of MCPB and bentazone. With both available for use later in the season, a pre-emergence treatment of straight pendimethalin will be sufficient to provide an early weed control foundation.

Beyond herbicide planning, the early season focus for pulses should be on providing adequate crop nutrition to keep plants green and healthy. In my experience, winter beans will benefit from an application of manganese, zinc and molybdenum (Legume Mix), and sulphur (Thiotrac 300) at the early flowering stage, with a second application made three weeks later to ensure the crop remains green and healthy as the growing season progresses.

Spring beans can benefit from a similar programme, albeit with the addition of a phosphate supplement prior to flowering: not only to aid the crop's growth and development, but also to elevate the crop's ability to cope with downy mildew later on.

## Aphid enemies



Ashley Cooley

At this time of year, I always remind myself that no two growing seasons are the same. This is particularly true in terms of aphid pressure in vegetable crops: while last April's dry, cold conditions reduced aphid numbers and delayed migration, we have seen very few frosts this winter and reduced aphid mortality as a result. This year's crops could therefore face increased aphid populations, which is why growers and





## Aphid enemies (cont'd)

agronomists not only need to have a plan in place, but also the products ready to be applied as soon as population thresholds are reached.

Mitigating the threat of an amplified aphid population starts with crop hygiene and ensuring spring seedbeds are devoid of green bridges. This can be tricky in some rotations, making it imperative to monitor for pests at least once a week.

In addition to regular field walking, aphid traps and modelling tools should also be used to

assess threats. Accurate species identification is needed to ensure the correct pesticide mode of action is selected and applied at an appropriate dosage and water rate, and using a spray nozzle that delivers maximum target coverage.

The time of day of insecticide application is also important as different pests will be active at varying times. For example, onion thrips hide within leaf sheathes during cooler hours, only coming out to feed once the ambient temperature has risen. Sprays

should therefore be applied in the afternoon for maximum effect.

With fewer post-emergence herbicides available this year (following the revocation of bromoxynil and chlorpropham), the approval of alconifen pre-emergence and post-emergence is a welcome addition to vegetable growers' arsenals. As an industry, we're still learning how to get the most from this new active, so it's imperative that agronomists and growers work closely to share experiences to maximise its benefit.

## Sugar beet strategies



Rob Adamson

While the extremes of the last few seasons have taught us that weed control strategies in sugar beet need to be flexible – so they can be adapted to the season – one lesson has prevailed: no matter how unpredictable the season turns out to be, pre-emergence herbicide applications are always an important foundation.

This remains true even when conditions are dry, as residual actives such as ethofumesate and metamitron not only provide early season activity against broad-leaved weeds and grasses (including blackgrass), but can also sensitise weeds to later herbicides when moisture arrives.

Flexibility is key, and even if a frequent low dose (commonly referred to as a FAR programme) is intended, in wetter conditions, adjusting the programme towards a 'broadacre' approach might become more appropriate. This not

only helps to control weeds which have grown away quickly, but also to compensate for situations where the ability to make multiple passes is limited and the likelihood of well timed, more frequent applications is low. Robust broadacre tank mixes are also helpful when an extended application window is required to enable applications of blackgrass graminicides to be made.

If weeds start to get ahead, adding lenacil and triflurosulfuron can help to control larger weeds, and will also broaden the spectrum of the core phenmedipham, ethofumesate and metamitron actives. A word of caution though: the broadacre approach shouldn't be used where crops are stressed or if late season frosts are present as the mix of actives will be too strong for the crop.

To mitigate aphid risk, growers should consider the proximity of new crops to host sources such as ground keepers, leaf material on storage clamps, and neighbouring fields of oilseed rape. Cover crops can also form a green bridge if not destroyed five to six weeks prior to beet drilling.

As the window for aphid migration approaches, twice weekly crop inspections will be needed to ensure insecticides are applied as soon as treatment threshold is reached, and crops in proximity to hosts treated as a priority.

Beyond the use of cultural aphid controls, population thresholds

have been reached in the UK which means an emergency authorisation has been granted to allow growers to use seed treated with Cruiser SB in 2022. This comes with strict usage guidelines, including a prohibition on any flowering crop being planted in the same field for the next 32 months. Careful consideration about the rotation should therefore be given before committing to this option.

Elsewhere, the insecticide acetamiprid has been given full approval and is useful for preventing early season virus build-up. It is also a useful precursor to flonicamid which can be used as a follow-up later in the season if aphid numbers rebound. Alternatively, where seed treated with Cruiser has been used, flonicamid should be used in advance of acetamiprid to avoid sequential neonicotinoid applications. Flonicamid is also useful as part of a resistance management strategy as it introduces another mode of action.



Flexibility is key to effective weed control

# Trials expansion continues

ProCam has expanded its UK trials network. Herbicide trials alone have increased from nine to fifteen this season, and have trebled over the last three years.

This comes on the back of an enlargement in ProCam's fungicide testing during 2021, when new fungicide trials hubs were established in Cambridgeshire and Dorset to complement the main research hub in Yorkshire.

"This trials expansion is in response to an increased number of new cereal fungicides and herbicides in development or that have recently been introduced," explains ProCam trials officer, Rebecca Tunnicliffe.

"As well as testing the efficacy of these to identify how they might fit into programmes, we also evaluate their performance in mixtures, sequences and at different locations with different disease pressures. Our herbicide trials now stretch from Devon to North Yorkshire and Essex to Wales. Fungicide trials expand further on this to Aberdeenshire. In total across the UK we have 2,748 individual small plots."

## Road-testing

The aim of this work is to ensure ProCam agronomists are equipped to advise on new treatments. While road-testing new products is key, this is the tip of the iceberg. Often of more immediate interest to farmers, says Rebecca, is research into solutions to farming's wider agronomic challenges and opportunities. "We do this by tailoring trials to reflect what farmers are doing."

"With the withdrawal of certain crop protection products we actively look for alternatives. For example, with azole fungicide withdrawal, we're exploring replacements in trials."

"Allied to this, we evaluate wheat and barley varieties



The trials expansion is partly to evaluate new crop protection treatments, but also to focus on solutions to farming's wider agronomic challenges and opportunities, says Rebecca Tunnicliffe

alongside other cereals, to assess their performance over different drilling dates – not only for yield but also how drilling date affects disease and the time it takes to reach key growth stages. This is important because varieties aren't always drilled when planned, or drilling might be purposely delayed to reduce grass weeds.

"Also, with reduced curative activity among fungicides, knowing how to react if fungicide spraying intervals become lengthened has become increasingly important."

With growing interest in biostimulants and micronutrients, Rebecca says ProCam also has a programme to evaluate these treatments. Similarly, as interest in cover crops has grown, there is a testing programme for these.

"Working with our specialist

forage and cover crop seeds division, Field Options, we evaluate various cover crop species and mixtures for short and longer-term benefits, as well as looking at cover crop management.

"Field Options also has its own comprehensive trials programme evaluating forage crops. These include multi-year grass and clover leys, maize and fodder beet variety trials, but also beet grazing systems and use of primed fodder beet seed.

"We also conduct trials on vegetables and in innovative areas including tailored

nutrition and nitrogen use efficiency. Plus, we road-test upcoming technologies, such as disease detection tests, to evaluate their potential on-farm."

## Example crops where ProCam undertakes trials and evaluations

- Wheat
- Barley
- Rye
- Oilseed rape
- Sugar beet
- Maize\*
- Fodder beet\*
- Grass mixtures and clovers\*
- Cover crops\*
- Potatoes
- Vegetables e.g. carrots, brassicas
- Salad crops e.g. lettuce, celery

\* With Field Options division



## ProCam UK Limited

2020 Cambourne Business Park, Cambourne, Cambridge, CB23 6DW

Tel: 01954 712150

www.procam.co.uk



@ProCamUK

The ProCam orb and 'Agronomy that Delivers' are trademarks of ProCam Europe Ltd.