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Foreword

EIPWALES
Cydweithio er ffyniant gwledig
Collaborating for rural success

Owain Rowlands, EIP Wales Officer

European Innovation Partnership (EIP) Wales is currently supporting a variety of projects that are giving groups of farmers and foresters from across Wales the opportunity to trial innovative ideas, methods or technology at a practical level. There are 46 supported projects, with over 200 farmers and foresters taking part – all investigating something new which could bring real benefits to their business. Bringing these people together creates a great opportunity to draw on different experiences, introduce new ideas and use the latest knowledge to tackle problems. By sharing the results with the wider industry, it allows others to benefit from these projects.

The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) was launched by the European Commission in 2012. The programme is being delivered in Wales by Menter a Busnes on behalf of the Welsh Government.

It's been another great year of working with all of our projects. Despite all the changes and challenges, the farmers, foresters and those involved in our projects have succeeded in providing us with interesting results that we'd like to share with you in this publication. You'll be reading about the updates and lessons learnt so far from seven different projects. There's a variety of topics being covered; however, they're all concentrating on changes that can be done on-farm that will hopefully lead to a more successful business.

One of the featured projects has shown that changing the method of applying fertiliser to grass can lead to significant improvements in efficiency, bringing both environmental and economic benefits. With the increasing price of artificial fertiliser out of the farmer's control, this alternative method of applying nutrients offers real potential.

Finding other income streams that can help support the main farming and forestry business is another popular topic of discussion. There is an update from a project which is one of the first in the UK to focus on birch sap production to supply the birch syrup market. It's considered to be one of the rarest gourmet food products in the world, and could provide a lucrative market for those looking to diversify.

You can find more information on all 46 projects on the EIP Wales page on the Farming Connect website (gov.wales/farmingconnect). We hope you enjoy reading this, and that something will be of relevance to your business.

Owain Rowlands
EIP Wales Officer

Robin Nicolson (left), pictured with Nigel Howells, is switching to foliar feeding permanently.

Foliar feed for grassland

Targeting nitrogen application by applying diluted fertiliser directly to the sward is helping to drive improvements in nitrogen efficiency on Welsh grassland farms.

Nitrogen (N) use is under the spotlight, and pressure is mounting on farmers to enhance its efficiency to reduce fertiliser inputs and alleviate environmental pollution risks.

One of the key findings of the project on foliar feeding has shown that this application method can increase by up to four times the nitrogen use efficiency (NUE) – the relationship between the total input of N to a crop compared with its N output – compared to conventional fertiliser; on average, it was two or three times higher across the project farms.

Humic acid within foliar feed actively carries the N into the plant, so it is more efficient than uptake through roots. However, it is around 25% more expensive, and so is the cost of applying it. Foliar feed requires unprotected urea, which costs around £360/t, and humic acid, at approximately £2.25/ha; it costs in the region of £15/ha to apply, compared to around £7.50/ha for granular fertiliser. The project's advisor, soil and grassland consultant Nigel Howells, says the increased NUE more than compensates for these additional costs.

"On all sites, in all years, the cost of nitrogen per litre of milk was lower in foliar-fed compared to conventional plots," he says.

"The difference varied from site to site, but in most cases, foliar feeding was between 40-50% more cost-effective."

Where conventional fertiliser showed gains was in grass yield: yields were between one and three tonnes higher, although the conventional plots had received significantly more N. There were exceptions, however, with factors including the month of application and the weather conditions thought to influence this.

In 2019, the foliar feed plots grew 0.5–1.0 tonnes dry matter per hectare (t DM/ha) more than the conventional plots up to the end of April, indicating faster early growth. This could be because of more rapid uptake of N through the leaves compared to absorption through the roots at lower soil temperatures.

In 2020, the foliar feed plots on one farm grew 2.5t DM/ha more, and another farm grew an additional 0.8t DM/ha. Mr Howells said soil moisture conditions were likely to be a factor. The application of foliar feed bypasses the need for nutrients to be taken up through the roots, and therefore for high soil moisture content.

"The spring of 2020 was exceptionally dry, and therefore the uptake from the conventional fertiliser through the roots may have been greatly reduced," said Mr Howells.

"The results suggest that foliar feeding may lead to increased yield in cold and/or dry conditions, compared to conventional feeding, due to improved N uptake, but further research is needed to confirm this."

At higher rates of N, foliar feeding was shown to support comparable yields to conventional application systems. In 2021, N applied by foliar feeding was increased from an average of approximately 70kg N/ha to 100kg N/ha. This increase resulted in similar yields in these plots, in both grazed and silage systems, compared to conventional plots.

NUE continued to be significantly higher in the foliar-fed plots, achieving similar DM yields to conventional plots by applying only 40–50% of N. However, Mr Howells cautioned that because of the variation between farms and between years, firm conclusions could not be drawn on the relationship between the concentration of N in the foliar feed and NUE. Yet even at these concentrations, foliar feeding was more cost-effective than conventional N.

Foliar feeding was as low as 1.87 pence per litre (ppl) of milk on one farm, compared to 3.86ppl for prilled N, and even on the farm where the cost of foliar feed was at its highest (at 3.10ppl), it was less than half the cost of the conventional N at 7.34ppl.

Heifers grazing on one of the trial plots

Silage field at one of the project farms

Case study

"I can grow more grass using less nitrogen with foliar application," says Robin Nicolson, who runs a herd of 230 Holstein Friesians and crossbreds.

In an average year, his annual fertiliser use at Pisgah Farm, near Maenclochog, had been up to 300kg/ha. His involvement in the foliar feeding project had opened his eyes to the potential of using a different approach from broadcasting fertiliser onto his grazing and silage leys.

"I have learned that we can grow a lot more grass with a lot less fertiliser," says Mr Nicolson, who farms with his wife, Julie.

The project field at Pisgah Farm was north-facing, at 900 feet above sea level, and had peaty soils; as such, it was one of the most challenging project sites.

In each year of the three-year project, Mr Nicolson was impressed by the performance of foliar feeding compared to conventional application. However, it was the final year of the project, when a higher concentration of nitrogen was used in the foliar feed, that convinced him that it is the right system for his needs.

In the plot where conventional fertiliser was applied, a total of 275kg/ha of N was applied and it grew 2,300kg DM/ha more than the control paddock, where nothing had been applied; this showed a nitrogen use efficiency (NUE) of 8.4%.

In the foliar-grown plot, 110kg/ha of N was applied, growing 2,900kg DM/ha more than the control, giving an NUE of 26.4%. This significantly higher NUE means that, in terms of pence per litre (ppl) of milk produced, foliar feeding costs just 3.10ppl, compared to conventional fertiliser at 7.34ppl.

Going forward, foliar feeding will play a major role in the Nicolsons' business. Not only is this system good for his business, but for the environment too, Mr Nicolson says: "If we are using less fertiliser, then there is less product that needs to be manufactured."

By reducing N usage, he has also noted that his 129ha farm is growing more clover.

The average usage of N on Welsh farms is 250kg/ha, but this level is not sustainable, says Mr Howells.

One consideration of foliar feeding is the timing of application – for optimum uptake, it should be applied in the late afternoon or early evening, but early morning is also suitable.

"The grass plant is more receptive to the foliar feed at these times," says Mr Howells.

Nigel Howells

Asparagus field, Square Farm

Rob Whittal of Square Farm

An examination of the practical and financial potential for growing small-scale asparagus organically at two locations in south Wales

Organic asparagus offers good return, but production comes with challenges.

High-value organically-grown asparagus is delivering good returns for two Monmouthshire growers, but a project examining the potential for growing the crop on a small scale in Wales has shown that several considerations must be taken into account before investing in production.

With organic asparagus having the potential to command prices as high as £18 per kg, Mitchel Troy growers Rob and Ryan Whittal, of Square Farm, and Ruth Tudor, of Trealy Farm, were keen to examine whether the vegetable could be grown successfully under organic conditions.

The crop has added appeal for horticulturists because it falls into the so-called 'hungry gap', from the end of April to 21 June, when few other crops are available. It also benefits from freshness and short supply-chain markets that supermarkets are generally unable to compete with.

Square Farm shop vegetables

One hectare (ha) of asparagus was established on each farm at an approximate cost of £7,900/ha, excluding VAT – a higher than anticipated cost due to a lack of availability of contractors in the area experienced in planting asparagus on a small scale.

Training for contractors was required and this, combined with weather challenges, meant that planting took longer than expected – 16 man days over two weeks – and incurred additional costs. Planting at Square Farm was timely and in reasonable conditions, but rain delayed this slightly at Trealy Farm; 22,000 crowns of asparagus were planted on each farm.

The project demonstrated that asparagus harvested between April and June is easy to market and can generate excellent turnover on a short supply chain.

For Square Farm, return from the organic crop was £21,600/ha in 2020 in the first year of production, but down to £10,700/ha in 2021, largely as a result of poor spring conditions. At Trealy, yields were lower in comparison – in 2020, only 118kg was marketed, excluding some also sold for wholesale, and the 2021 harvest yielded an average of just 5kg/day.

However, a top-end sale price of up to £18/kg was achieved through local direct sales and, with other sales taken into account, approximately 300kg was marketed at an average of £10/kg – sales of £3,000 with minimal costs.

At peak harvest, picking was time-consuming (up to eight hours a day with experienced labour for the crop at Square Farm), and a further two to three hours was needed for washing, weighing and grading into bunches.

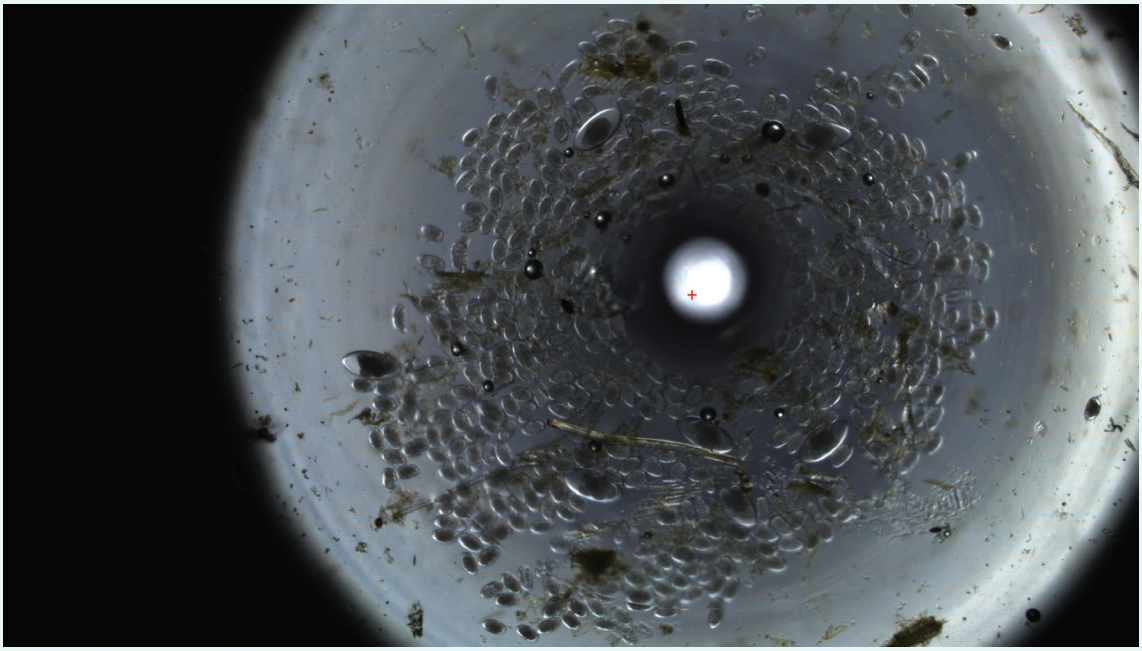
Chris Creed, of ADAS, who provided expert advice for the project, says as a low-input system, asparagus offers a good return on investment – although for Square Farm, some of the financial benefit was achieved by marketing asparagus directly through its farm shop, and that outlet might not be available to all growers. He also cautioned that with its high establishment costs and long lead-in time to first main harvest, the economics of growing asparagus need to be carefully weighed up.

The project has shown that asparagus can be grown successfully under organic management, but it also highlighted several considerations that need to be borne in mind:

- Attention to detail at planting and weed control during the establishment phase is essential – asparagus is a poor competitor against perennial weeds
- The crop is vulnerable to weather extremes – very slow to grow when conditions are cold and fast when it is hot, and it is affected by frosts
- Availability of skilled labour at peak times can be a challenge, and comes at a high cost
- Location, crop management and other factors such as climate can impact on overall productivity
- Marketing routes need to be considered to drive maximum returns

Both growers were positive about the impact of the asparagus on their farm businesses, and Square Farm is looking to increase production.

Targeting anthelmintic use in sheep



Roundworm eggs identified using Techion FECPAK G2 system

Project findings show huge scope for targeted approach to worming ewes.

New evidence emerging on Welsh farms from research into the faecal egg counts (FEC) of ewe worm burdens around lambing time is showing huge scope to reduce reliance on anthelmintics by targeting treatments.

The project is investigating an apparent link between higher FECs and those ewes losing body condition (BCS) around lambing, when they are under nutritional strain; the resultant weakening of the immune system leads to what is known as a peri-parturient rise (PPR) in egg production by worms in the ewe's gut. These eggs, when deposited on pasture, develop into larvae and present a worm challenge to lambs later in the season.

According to the project specialist, independent sheep expert Lesley Stubbings, preliminary results from data collected on five commercial sheep farms in Wales suggests that when BCS loss occurs pre-lambing, the PPR is earlier; in contrast, farms where ewes lose BCS in lactation, the PPR comes after lambing.

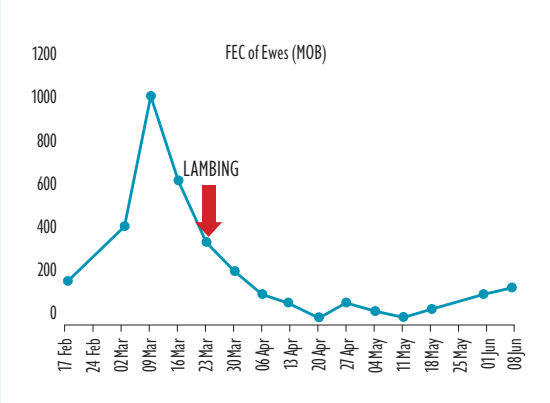
"The variations in the early results indicate that there is huge scope not only to minimise the number of ewes treated on these farms, provided we can identify them in a practical and repeatable way, but also to time the treatments given to maximum effect," says Ms Stubbings.

The data also shows a "significant variation" in the extent, timing and duration of the PPR between farms and between individual ewes, but that each individual farm is comparable between years.

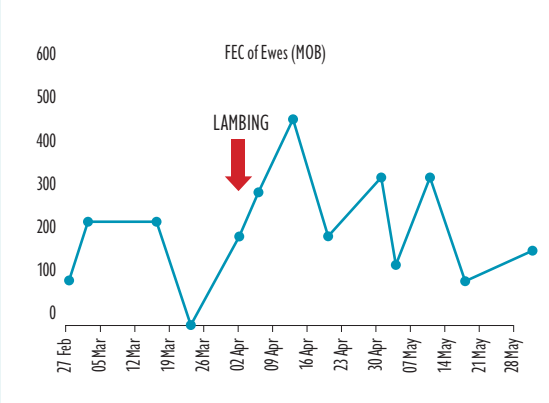
The ewes are sampled for FEC on a weekly basis from six weeks before until eight weeks after lambing to understand the magnitude,

Differences in the timings and magnitude of the peri-parturient rise in 2020.

Figure 1:



Farm 1 – Peak FEC occurs before lambing. Ewes losing condition up to lambing (50% of the mob) were treated. FEC count then remained low for the whole mob.



Farm 2 – Peak FEC did not occur until after lambing, when the body condition loss tends to occur as twin-bearing ewes are under pressure for grazing.

timing and duration of the rise in egg counts around lambing time – on each farm, there are 10 'sentinel' ewes that are FEC sampled and levels of antibodies to worms examined.

Worming ewes around lambing times is a practice carried out by most UK sheep farmers, but blanket treatment of all ewes can be highly selective for anthelmintic resistance. To mitigate this, the current Sustainable Control of Parasites (SCOPS) advice is to not treat at least one in 10 of the fittest ewes. However, as the incidence of anthelmintic resistance is increasing across the UK, minimising the number of ewes treated needs to be a priority, says Ms Stubbings:

"The significant variation in FECs between ewes at lambing shows that some ewes produce very high levels of contamination, but others are low."

"The factors involved in this difference are thought to be BCS, level of nutrition, age and litter size, together with a genetic element linked to the strength of the ewe's immune response."

The project is seeking to isolate factors that identify ewes producing high levels of contamination, to allow the proportion treated around lambing to be minimised without compromising lamb performance.

Body condition and weight are also recorded, and ration recommendations given based on forage analysis and/or feed available outdoors to minimise any nutritional stress. Lamb weights at eight weeks are recorded and lamb FEC counts undertaken to measure contamination levels on the pasture.

Monitoring will continue in the 2021/22 lambing season, as the three-year project has a further six months to run.

For further information on this EIP project, please visit the Farming Connect website:
gov.wales/farmingconnect

Improving fertility and also calving rates of dairy herds in south-west Wales through a method of early pregnancy diagnosis using pregnancy-specific protein B (PSPB)

PSPB is a chemical that is produced by a pregnant ruminant animal, and provides a reliable predictor of pregnancy.

Four dairy farmers in Carmarthenshire, with a total herd size of about 1,700 animals, have been working with Dr Sotirios Karvountzis of Mendip Vets, Llandeilo, to investigate whether PSPB can be used as an early indicator of pregnancy in dairy cows, within 30 and 120 days post-service. Early recognition of infertility in a dairy herd can lead to timely and appropriate treatments in consultation with the farm's vet.

Studies in Idaho in the US have indicated that the PSPB concentration in blood serum is more reliable for testing purposes than those in milk, during the 30- to 120-day post-service period.

At the start of the project, the cows were split at random into two groups: pregnancy diagnosis by ultrasound scanning and pregnancy diagnosis by blood sample. The actual calving dates of the animals were used as the benchmark for comparison with the results of both methods.

From left: Dr Sotirios Karvountzis, Rhys Watkins with his brother Hywel Watkins and mother Janet Watkins of Pantglas farm, Llanfynydd, Llandeilo

Each method returned three results: 'positive' for when a pregnancy was detected, 'negative' for when the animal was either not pregnant or that it was too early to detect a pregnancy, and finally 're-check' for when a suspected embryonic death or foetal reabsorption was taking place.

"PSPB was found to be 94% accurate and ultrasound was 95% accurate in predicting the positive result. Also, PSPB was 87% accurate and ultrasound was 86% accurate in predicting the negative result. The difference between these results was not statistically significant," said Dr Karvountzis.

Putting aside costs, there are advantages and disadvantages to both methods of pregnancy diagnosis. Ultrasound scanning is a relatively quick method to get a reliable result. It also allows farmers to identify multiple pregnancies (twins, triplets and so on), the stage of pregnancy (certain equipment will allow accurate ageing within 7-10 days), and, depending on the image and stage of pregnancy, to gender-determine the foetus.

The disadvantage of this method is operator experience, as there is evidence that the scanning result improves with training and with years of practice. The selected animals also have to have their daily routines disrupted, as they are kept in a pen before or after milking, waiting to be examined.

PSPB allows for a trained farmer to collect the samples at any time that suits their schedule, and that of their cows. It can be implemented as part of the weekly management task, similar to foot trimming, minimising the disruption to the animals'

routine. Once the PSPB results are returned from the laboratory, those that tested negative can be presented to the vet. The vet can then ascertain why they are unable to conceive and administer appropriate treatments.

There are, however, some disadvantages. The collection of a blood sample falls under the remit of the Veterinary Surgeons Act. Therefore, the person who harvests those samples has to be trained in the procedure by their own vet. Secondly, although PSPB predicts a pregnancy result relatively accurately, it cannot ascertain the length of the pregnancy (and therefore works best with a known service date), twinning rate or be used for gender determination.

Hywel Watkins, who farms at Pantglas, Llanfynydd, near Llandeilo with his brother Rhys and mother Janet, is one of the four farmers taking part in the project. The family run a herd of 370 purebred Holsteins that are fed a total mixed ration (TMR) diet and operate a housed all-year autumn calving system. On average, each cow produces 45 litres of milk per day.

"PSPB testing benefits our business, as it's stress-free for both us and the cattle. Cattle now do not have to wait and it's more convenient, and as accurate as scanning," says Hywel Watkins.

Such a protocol provides an additional pregnancy diagnosis tool that is inexpensive and pro-active, resulting in better pregnancy rates, but also allows the herdsperson to work closely with the farm's veterinary surgeon. The ultimate result is one of 'win-win' for all parties involved – the veterinary surgeon, the farmer and the cow. The animal's behaviour and productivity is inhibited minimally, the farm enterprise can save money, and the veterinary surgeon can continue their involvement and oversight of the herd.

Comparing on-site preservation techniques for fresh Welsh birch sap for use in artisan products by local businesses

The Forestry Statistics for 2019 indicate that birch is the third most common broadleaf tree species in Wales, covering an estimated 11,000ha of private woodland, much of which is on farms. Since these trees are not intended for timber, they are generally under-managed, but with some inputs, are potentially available as a source of birch sap and other (non-timber) products while growing, and as firewood at maturity.

The group behind the EIP 'Dewis Bedw' project were unsure about the best way of conserving sap for the production of syrup (a high-value, gourmet food product) after it has been tapped.

"This project aims to trial and evaluate methods for conserving and adding sufficient shelf-life to the sap for it to be transported off-site for further processing and adding value," explained Maria Wilding of Llais y Goedwig, the project lead.

"Removing this barrier to market during harvesting would allow foresters and farmers to consider market opportunities for products based on tree sap, and in particular birch tree syrup."

The project's first birch sap harvest began in February 2021, overseen by Dr Jenny Wong and Bryan Dickinson of Wild Resources Ltd, tapping over 30 birch trees at three sites – two in south Wales and one in the north.

Birch sap suitable for collection is only produced by the trees for a short period each year. This year, tapping peaked in the first week of March; sap was then collected each morning for 17 days.

Fresh birch sap has a low sugar concentration and high water content, and needs to be concentrated to convert it to syrup. Almost 400 litres of fresh sap was collected at each site (just below 1,200l in total), allowing three different preservation processes to be trialled, to learn which would be the most practical for reducing sap volume before it leaves the woodland.

Outdoor wood stove: The project investigated boiling 80 litres of sap in large evaporating trays heated over a wood fire. First indications were that this could work well and be an efficient way of concentrating sap, which could also be run as a communal event. Sugar concentrations were increased to over 16% with minimal supervision. The group plans to further investigate this next year.

Sap being reduced on a wood-fired hearth

Reverse osmosis: Micro-filtration of the sap using two different types of equipment was tested, and this appears to have high potential for initial preservation of the sap. Sugar concentration was easily doubled after a single pass through the filters (in 45 minutes), but by continually recycling the sap, much higher concentrations could be reached.

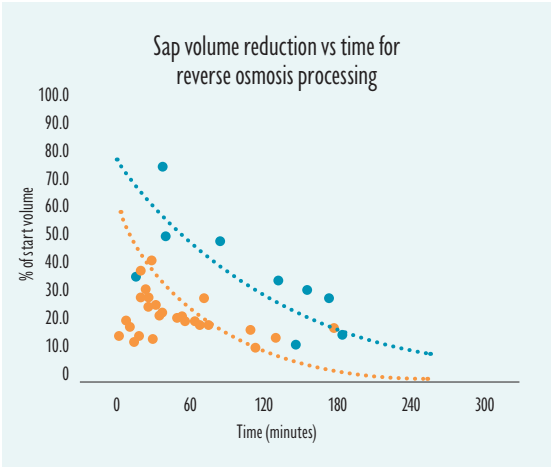


Figure 2: Sap processing times for two reverse osmosis systems

Catering urn: All three sites tested the use of large (40l) thermostatically controlled urns to boil down the sap and increase the sugar concentration. Initial trials suggest that these may be more useful for processing at the later stages of sap concentration, and possibly less so for fresh sap. Although the urns required little supervision, and sugar concentration of almost 30% could be achieved, processing times were much greater, and consequently energy costs were higher.

Further tests of the processing systems are planned for 2022.

"Alongside trials of the sap processing, the project will provide recommendations on appropriate tapping procedures to ensure that harvesting of birch sap is sustainable," noted Maria Wilding. "We have been examining the healing rates of the tap-holes and found some trees can show rapid healing within a few months of tapping, whilst others are slower. We plan to make further assessments of all the tapped trees in 2022."

Birch tree being tapped

Organic ancient cereal supply chain

Modern agriculture has notoriously low crop diversity, leading to low agrobiodiversity and low food diversity, but with a renewed interest in ancient and heritage grains as an alternative, growing and baking trials have taken place in Pembrokeshire.

With several genotypes of ancient wheat varieties available, it is important to test them to determine suitability for a given environment, says Henny Lowth, a field crops researcher at the Organic Research Centre, who was involved in the project.

"As well as evaluation in the field, it is important to test grain for its end-use suitability and quality to ensure small local supply chain success, linking farmers, processors, and consumers," she said.

The project set out to investigate the agronomy of ancient and heritage wheat. By embedding the research in commercial farming operations, a 'real-world' perspective could be gained. Trials were set up in spring 2019 across four farms, and certain management factors were included, such as varying seed rates and under-sowing.

After this preliminary study, trials were set up in autumn 2020 across three farms, looking at ancient and heritage winter wheats. In spring 2021, trials across three farms looked at ancient, heritage and modern wheat, as well as intercropping with field beans.

Overall, the project revealed heritage wheats can yield equivalent to modern varieties under organic conditions, as evidenced by the spring heritage wheat (April Bearded), compared to the modern variety (Mulika), over two growing seasons.

In 2019, Mulika yielded more than the ancient wheat (Einkorn), but yielded equivalent to April Bearded (Figure 3), and in 2021, there was no significant difference in the yields of the modern variety compared to April Bearded and another heritage wheat (Atle), and the ancient wheat (Emmer) (Figure 4).

Figure 3: 2019 Spring Wheat Yield

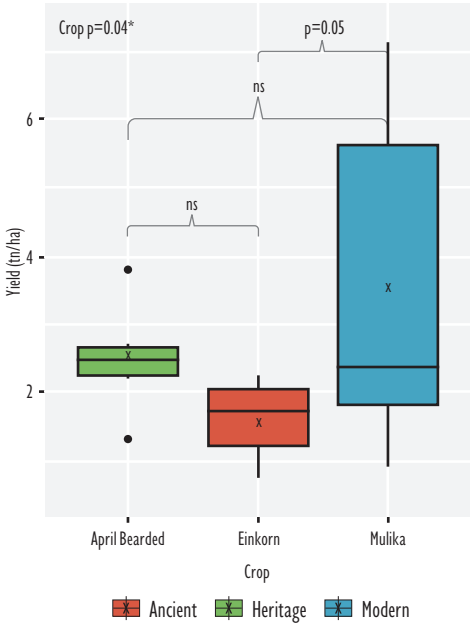
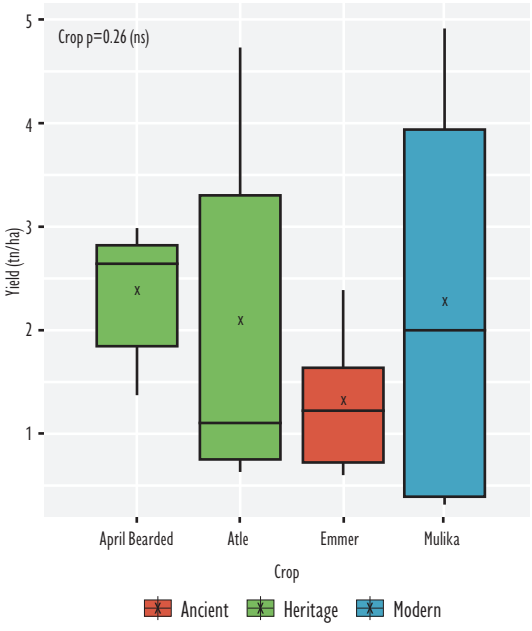


Figure 4: 2021 Spring Wheat Yield



The box and whisker plots in Figures 3 and 4 show the spread of the yield values; the X marks the average yield for each crop. The effect of crop on grain yield is considered significant if the p-value ≤0.05; if crop is not statistically significant (ns), then p>0.05. In 2019, the yield value for Mulika had a high variability due to the inclusion of a non-organic site in the experiment, where the Mulika could reach its yield potential.

Yields of the winter crops were generally poor, due to low seed quality and suboptimal drilling. However, results showed that Emmer, the Welsh landrace (Hen Gymro), the old variety (Maris Widgeon), and the heritage wheat (Rivet) can offer promising alternatives to the current modern landrace (Torth y Tir) being grown in the area.

Foliar disease assessment revealed that Mulika had the best resistance; the heritage wheats showed high levels of yellow rust – particularly April Bearded and, to a lesser extent, Emmer. Einkorn, however, showed good resistance generally.

"Differences in disease resistance highlight the importance of local adaptation and the requirement for testing different genotypes to find the best adapted crops for a particular environment," said Ms Lowth.

Investigation of under-sowing and seed rates showed that lower seed rates of the heritage and ancient crops can maintain yield by compensation through yield components, but increase the risk of weed cover from lower plant populations. Meanwhile, there were no detrimental effects on yield or quality from under-sowing crops with clover; indeed, it resulted in a significant reduction in weed cover.

In 2019, April Bearded was more weed-suppressive than Mulika.

Protein content was higher for the heritage and ancient wheats compared to Mulika; this

From left: Owain Rowlands, EIP Wales Officer; Gerald Miles, Caerhys (one of the farmers involved in the project); Tony Little, EIP Wales Innovation Broker; Henny Lowth, Organic Research Centre

cannot be completely explained by a yield-protein trade-off, since the modern wheat did not always yield significantly higher.

The taller heritage and ancient wheats were at a higher risk of lodging – a risk increased by cultivation under non-organic conditions; this is remedied by lower plant populations.

Grain from the 2020/21 trials was used in baking trials to assess the end-use value of the crops tested; the results are currently being analysed.

Some barriers were identified during the project, such as the need for local infrastructure to support diversification practices and, in the case of ancient wheats, the need for a small-scale de-huller.

Seed supply could also be a key issue, as these genotypes are not commercially available.

"Seed is hard to find, and may be of low quality if being sourced from farmers who are saving seed", said Ms Lowth.

"Many crop genotypes are available and accessible in gene banks, although initial seed supply is low, requiring multiplication over several years."

Where have ewe moo-ved to? Trialling the use of tracking technology in extensive grazing systems

Livestock tracking technology could help Welsh farmers graze habitat land.

Welsh farmers using GPS tracking collars to help manage their sheep and cattle grazing on mountains and conservation land say the data gathered could help boost diversity in these areas.

As part of the project, six farmers, including Black Mountains grazier Ian Rickman, have trialled the collars during the 2020 and 2021 grazing seasons. Mr Rickman said there was evidence that their use could go further than simply managing livestock to improve welfare in extensive grazing systems.

"Perhaps the information on where the sheep have been grazing, on what habitats, can be used going forward to increase biodiversity on the hill," he said.

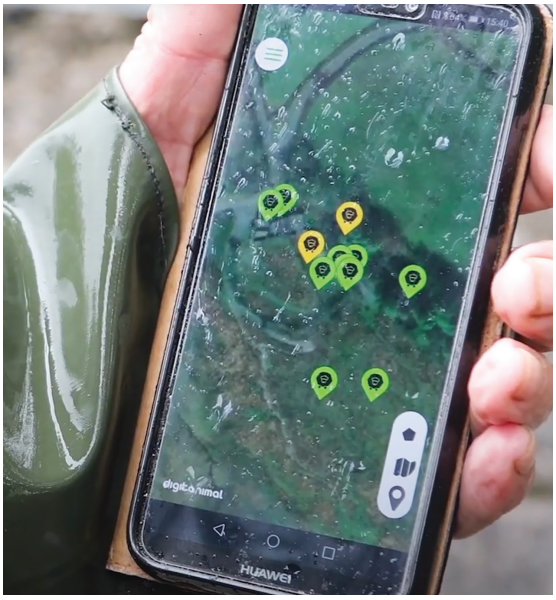
Mr Rickman's own flock of 400 ewes graze 80 hectares of upland at Gurnos, near Llandeilo, and he has grazing rights for sheep on the Black Mountain.

"When the ewes are on the mountains, they can be difficult to manage, especially so in recent years, as fewer flocks graze there; this encourages sheep to spread out more, making gathering difficult."

Theft had also been an issue. "We turn sheep out and unfortunately, some don't come back," said Mr Rickman.

Setting up the technology was an initial challenge, because the Black Mountain covers a vast area, and its undulating topography and many gullies can act as a barrier between the collar on the ewe and the information-gathering antennae.

However, the provider has been able to advise on the best place for siting the antennae, according to information on maps and farmer knowledge of the topography.



The collar information is picked up by the antennae and relayed to the farmer's mobile phone via an app.

"It shows us where the sheep are, how far the sheep moved in the last 24 hours, and the pattern of that movement – even the ambient temperature," said Mr Rickman.

The technology could give farmers the confidence to graze stock on more remote areas, including habitat ground, matching grazing with conservation objectives.

One farmer who is already doing that is Hilary Kehoe, who farms at the foot of the Carneddau Mountains and also runs a herd of 25 suckler cows at Gors Goch, an 80 hectare piece of land managed by the North Wales Wildlife Trust.

Managing the cattle on this land has its challenges. "It has taken four people two days to find a lost cow and calf; now I can just look at the app on my phone, see where they are and go to the right place to find them," said Mrs Kehoe, who advises on conservation grazing across Wales through Pori, Natur a Threftadaeth (PONT), the grazing organisation for Wales.

She has trialled the collars on the cattle to see how the technology can help farmers grazing this type of land.

The land is grazed in compartments and a function on the app allows her to set boundaries for these and alert her via a message if they are crossed. This has happened twice, and the alert function allowed Mrs Kehoe to reach the cattle before they wandered into the nearby village.

She described the technology as a "valuable tool".

"It gives people the confidence to put stock out," she said. "I get an alert if a cow is inactive for more than four or five hours, and I know that I have to come and check it, because my phone pings and tells me so!"

For further information on this EIP project, please visit the Farming Connect website:
gov.wales/farmingconnect

Afon Dyfi

Control of Agricultural Pollution Regulations

Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021: new requirements on the storage of organic manures

The requirements of the regulations relating to the storage of organic manures (other than slurry) such as farm yard manures apply from 1 January 2023; this will allow time for changes to be made if required. The storage of slurry is covered separately within the regulations and must be contained appropriately.

Storage of manures (excluding slurry)

Organic manure, or any bedding contaminated with any organic manure, must be stored in a location that meets at least one of the following criteria:

a) In a vessel

b) In a covered building

c) On an impermeable surface, or

d) In the case of solid manure that can be stacked in a freestanding heap and that does not drain liquid from the material, on a temporary field site; these have additional requirements outlined below.

Any liquid arising from organic manure (e.g. liquid fraction from weeping wall store or liquid arising from any solid manure stored on an impermeable surface) is classed as slurry, and must be contained appropriately.

You can significantly reduce effluent from manure stores by covering or roofing them and diverting clean rainwater away from the store through guttering and drains.

Temporary field sites

The regulations also introduce new requirements for the management of temporary field sites (also known as field heaps) to reduce the risk of pollution. A field site is considered as temporary if it has not been located in any single position for more than 12 months and the location does not meet the above requirements for a manure store.

Temporary field site location

The regulations also introduce requirements on the location of any temporary field sites. They must not be located:

1. where a field is liable to flooding or becoming waterlogged.
2. in the same place as one constructed within the last two years. Locations of previous temporary field sites are included on the risk map.
3. within 50 metres of a borehole, spring or well, or within 10 metres of surface water or a land drain (other than a sealed impermeable pipe).
4. within 30 metres of a watercourse, on land identified on the risk map as having an incline of greater than 12°.

The surface area of a temporary field site must be as small as reasonably practicable, to minimise the leaching effect of rainfall, and topsoil must not be removed from the ground upon which a temporary field site is to be constructed.

If the manure being stored is solid poultry manure that does not have bedding mixed into it, it must be covered with an impermeable membrane.

Detailed guidance can be found at: gov.wales/land-management

When **Beccie Williams** wanted a career change, Farming Connect helped every step of the way!

Beccie Williams

Beccie Williams is a wife, mum to three young children, and now a full-time poultry farmer, too. Beccie and her husband Matthew took over his parents' tenanted beef and sheep farm in Llanbister, near Llandrindod Wells, in 2010. They later bought the farm and are now business partners at the 280-acre holding, where they keep 700 Welsh mules, a herd of 30 cattle and a free-range poultry enterprise set up in 2019.

Beccie's working background was in agricultural insurance, but with the arrival of her third child, she wanted a career that would enable her to work from home.

"It's been a steep learning curve to manage and provide top-quality care for a flock of 16,000 laying hens, but thanks to Farming Connect's lifelong learning and development programme, I'm loving my new role and improved work/life balance."

Beccie undertook training through Jimmy Hughes Services Ltd, an approved Farming Connect training provider based in Llandrindod Wells. She undertook a combination of subsidised face-to-face learning, online sessions – 'the only option during the pandemic restrictions' – and fully-funded e-learning modules, which she does in her own time. With every training course subsidised by up to 80%, she says it would have been impossible to undertake so many courses without this financial incentive.

"Learning everything I can about managing the health and welfare of poultry has given me the confidence, skills and knowledge to run our new venture, and I'm putting my knowledge into practice each day."

"E-learning has also been brilliant – you can choose a time that suits you, refresh what you've learned as often as you like, and the short quiz at the end of each module is very reassuring.

"Having a personal development plan and using Storfa Sgiliau – Farming Connect's online data storage tool for continuing professional development (CPD), which has recorded all of my training and learning experience, as well as event attendance – has enabled me to identify my strengths and weaknesses, and given me pointers as to what training to apply for next."

The next Farming Connect skills application window will be open from 09:00 Monday, 3 January until 17:00 Friday, 28 January 2022.

Over 80 training courses are available, subsidised by up to 80% for registered individuals.

*If you intend to apply for training funding during the January window, and are not already personally registered as an individual, please call the Service Centre on 08456 000813 before 5pm on Monday 24 January 2022.

Beccie's route to managing a new poultry enterprise...

Short courses (subsidised by up to 80%):

Preparing for the IPPC (Poultry) Regulations

- covering critical environmental issues such as dealing with waste from the hens, run-off, saving water, noise pollution and biosecurity

Rodent control on the farm

- undertaking the necessary procedures safely and effectively

Safe use of vet and meds

- handling farm medicines safely

Working safely in agriculture/ horticulture

- learning how to reduce the risks when working at heights, handling livestock, handling machinery and farm vehicles etc.

Emergency first aid at work

- what to do in an emergency, how to administer first aid and when to call the emergency services

Fully-funded e-learning courses (poultry):

- Respiratory disease in poultry
- Poultry parasites
- Poultry vaccinations
- Managing poultry manure

If you need further advice on Farming Connect skills and training, visit: **gov.wales/farmingconnect skillsandtraining.** Alternatively, contact your local development officer, or call the Farming Connect Service Centre on **08456 000 813**.

To read Beccie's full story, visit **gov.wales/farmingconnect**

E-LEARNING

January MODULES OF THE MONTH

Our e-learning interactives cover a wide variety of topics which will help you develop new and existing skills, acquire more knowledge and improve working practices within your business.

Our SHEEP focus for this month is on the largest single factor affecting the profitability of the sheep flock – lambing!

Are you prepared for a successful lambing season? Brush up with some handy hints and tips by completing one of the short, bite-sized interactive modules below from the comfort of your own home:

SHEEP
- Anthelmintic resistance on sheep farms
- Lambing – docking, fostering and castration
- Lambing problems
- Lambing survival
- Lambing – the basics

To see the full list of modules and the comprehensive user guide on completing e-learning modules, please visit gov.wales/farmingconnectskillsandtraining

"I found it such an easy way to acquire more knowledge, always pitched at just the right level and letting me learn at my own pace."

Wyn Williams, Llanfair Caereinion

Animal health clinics

Sampling, testing and one-to-one advice from local vets is available for Welsh farm businesses registered with Farming Connect.

For further details, contact:
Helen Lewis – 01970 631 425
helen.lewis@menterabusnes.co.uk

Suggested list of testing and advice available:

Blood testing (trace elements, metabolic profiling, Johnes)
FEC
Ram or bull fertility
Leptospirosis IBR
GENETIC DISORDERS / SCREENING
Ecto parasites (Scab)
Bacteriology – culture and sensitivity, lameness, postmortem
Any animal health related issues

Digital surgeries

Free one-to-one advice with a consultant on their specialised topic. The surgery will enable you to gain advice and guidance specific to your business.

For more information or to book a surgery please contact your local development officer or the Farming Connect Service Centre on 08456 000 813.

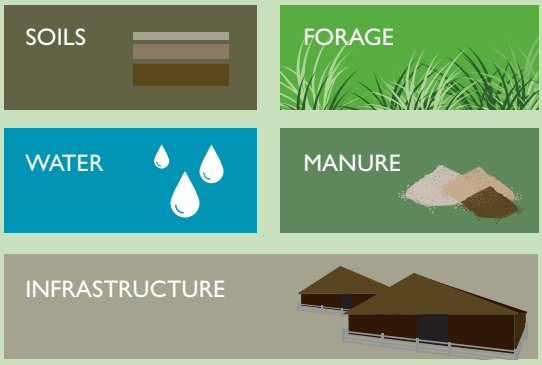
Business and Business Performance / **STAFF MANAGEMENT** / MARKETING AND DIVERSIFICATION / **Agriculture and Succession Law** / Financial Planning and Accountancy / **Planning and Development** / **Carbon Footprinting** / Milking Parlour Design and Efficiency / Infrastructure / MILK QUALITY / Energy Efficiency / Renewable Energy

WOODLAND / Grassland Management and Forage Crops / Feed and Fertiliser / **SOIL ANALYSIS** / **Biodiversity** / **Habitat** / **Regenerative Agriculture** / Precision Farming (GPS technology etc)

Handling Systems / NUTRITION / Calf Management / Animal Health / **Poultry Ventilation**

On-farm clinics

- ✔ **One-to-one guidance from an approved specialist consultant**
- ✔ **Sampling, testing and advice on a wide range of topics which influence on-farm efficiency and profitability**



For more information, or to book a clinic, please contact your local development officer or visit the Farming Connect website and complete the 'expression of interest' form.

Key messages:

PARTNERIAETH DIOGELWCH AR FFERMYDD CYMRU
WALES FARM SAFETY PARTNERSHIP

Working with machinery

Always make sure you:

- Follow the **"safe stop"** procedure before doing any maintenance work;
- Have been trained;
- Take additional precautions to ensure that machinery remains stationary (e.g. chock wheels);
- Ensure that any part of the machine that is raised is properly supported so that it cannot fall;
- Keep all people clear when the machine is operating;
- Put in place suitable arrangements when working alone.