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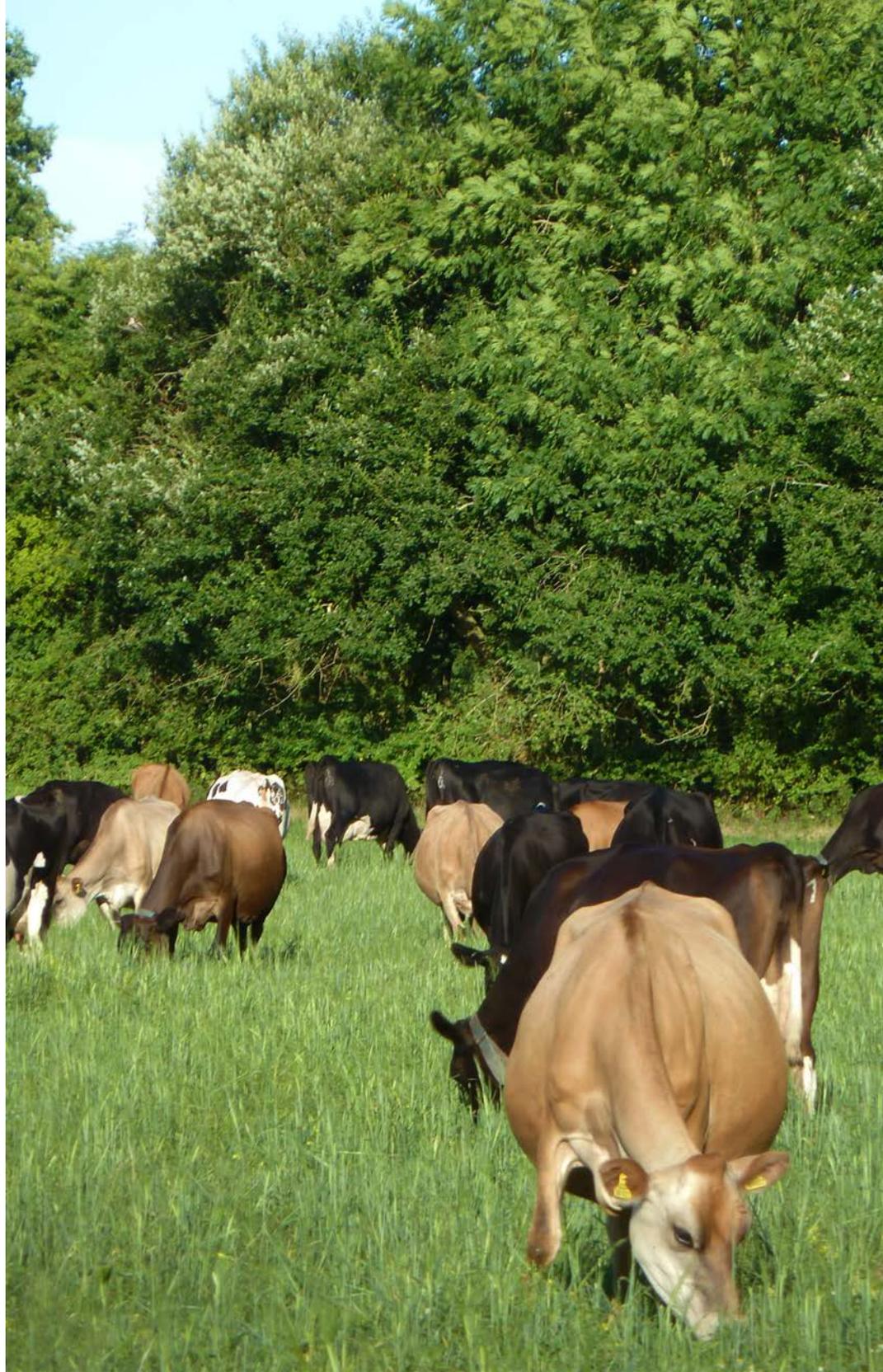
ELM FARM

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Cover photo

Ed Goff's beloved dairy cows at Hindford Grange, 2013. See p15.



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We have returned to a slimmer but more frequent Bulletin.

We aim to publish 3-4 issues per year for £25 in the UK (£30 overseas) from organicresearchcentre.com

Organic Research Centre

Bulletin

No. 126 – Autumn 2018

News in brief

The Oak Award

Susie Hewson, founder of Natracare – a pioneering organic company – is the winner of the first Oak Award to recognise an individual's outstanding organic contribution, presented on 25 October at the Yeo Valley canteen. Susie was chosen by judges from the Organic Trade Board (OTB) and the Organic Research Centre to be a topical and worthy recipient of the inaugural award. Representatives of her company were at the awards ceremony to receive the award, which was made from a 150-year-old oak tree, created by Parlour Furniture, to reflect the natural strength, longevity and resilience of organic principles. The Awards ceremony was held as part of a fundraising event for ORC, sponsored by Yeo Valley and attended by nearly 100 guests. At the ceremony, a presentation of two oak candlesticks was made posthumously to Peter Melchett, a campaigning practical organic farmer, most recently Policy Director of the Soil Association, who died on 5 September 2018. Joanna Lewis, of the Soil Association, received the award on behalf of his family. The Oak Award will be given annually by the Organic Trade Board, as a way for all of us to recognise the work of one outstanding individual each year, shining a light on excellence and innovation in the UK organic sector.



Tipping point in agricultural production

A major new global assessment published in the prestigious journal *Nature Sustainability* shows that more than 163 million farms world-wide (29% of all worldwide) have crossed a redesign threshold and are incorporating some forms of sustainable intensification on 453 million hectares of agricultural land. The paper *Global Assessment of Agricultural System Redesign for Sustainable Intensification*, involved leading authors from 17 universities and research institutions in the UK, including the Organic Research Centre, as well as researchers in the USA, Sweden, Ethiopia and New Zealand. Significantly, the study shows that developing countries such as West Africa, India and Bangladesh are more willing to redesign their systems and adopt sustainable agriculture practices to boost food production and biodiversity. A worldwide example of redesign is organic agriculture, which is showing a rapid increase globally, with the largest number of organic farmers in India, Ethiopia, Mexico and Uganda; while the largest organically farmed areas are in Australia and Argentina. Encouragingly, the UK too has seen a 6% growth in the organic market, with dairy products and meat taking the lead. Professor Nic Lampkin, Chief Executive of ORC and one of the authors of the report said, "We have reached a tipping point in agricultural production and it is evident that we need urgent change to protect our environment as well as providing healthy, nutritious food but Government needs to give farmers the right tools to implement change.

Publication of Agriculture Bill

The Government's Agriculture Bill was published on 12th September and sets out how farmers and land managers will in future be paid for 'public goods', such as better air and water quality, improved soil health, higher animal welfare standards, public access to the countryside and measures to reduce flooding. This will replace the current subsidy system of Direct Payments, which pays farmers based on the total amount of land farmed. In its place, a new Environmental Land Management system will start from next year. The Government intention is to work together with farmers to design, develop and trial the new approach. There has been a general welcome of the confirmation that public money will be aimed at providing public goods, and the focus on soils, water and air quality that this entails, but no mention of the links between farming, food and public health, despite calls for this to be a top priority from a broad coalition of food, farming and public health experts. The ORC along with the English Organic Forum and others in the organic sector will continue to work hard to develop proposals and offer our experience and expertise to Defra. The 2nd Reading of the Agricultural Bill took place in mid-October, followed by the Committee stage.

Population marketing experiment extended

The European Commission has extended the temporary experiment providing for certain derogations (to Council Directive 66/402/EEC) for the marketing of populations of the plant species wheat, barley, oats and maize.

The marketing experiment, which has enabled the marketing of the ORC Wakelyns Population was due to end in December 2018. The Commission stated that: 'The assessment has not yet been finalised as on a number of aspects of the experiment more information needs to be collected during a longer period of time. It is therefore necessary to extend the duration of the temporary experiment.' Six Member States, including the UK, have taken part in the temporary experiment. The Commission further stated: 'In view of the extension of the duration of that experiment, it is appropriate to allow new Member States to start participating, at the latest on 31 December 2019.' The experiment will be extended until 28 February 2021.

We have been analysing the data from the Liveseed farm network variety trial (See ORC Bulletin No.125 p9) and are delighted that, in terms of quality performance, the ORC Wakelyns Population wheat seems to perform as a group 1 (top quality) variety, whilst yielding more than the other 'conventional' group 1 varieties. Analysis is still in progress, but these are real-farm data from across England, and it is a good achievement for ORC and vindication of our and Martin Wolfe's work. The results will be shown at the congress and reported on in full in the next ORC Bulletin.

For more details on items on this page, including links to the publications, visit the News link at www.organicresearchcentre.com or, to receive more frequent updates, register for our E-bulletin service and follow us on Facebook, Twitter and Flickr.



About us

ISSN 1367-6970

Bulletin editor

Phil Sumption

The Organic Research Centre

is a leading, independent, research charity working for better farming, food and health, promoting environmental sustainability, quality food and health and wellbeing for all. We work in the UK and internationally to: research and develop practical, sustainable land management and food production systems based on organic and agro-ecological principles; foster knowledge exchange with and between current and future producers, food businesses and related professionals; and influence policy and public debates on the future of food and farming based on sound evidence.

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Printed by ORC on 100% recycled paper and powered by renewable energy.

Editorial: Better together

The 2018 UK Organic Congress, jointly organised by eight leading organic groups, represents a new milestone in collaboration within the movement. The Congress demonstrates that what we have in common can be stronger than what all too often divides us.

For a long time, the organic movement has made the case for diversity, for systems-based approaches and for multiple and synergistic objectives. We are now putting the principle “that the sum can be stronger than its parts” into action for the sector as well. We hope that the event will be an excellent opportunity to deepen that collaboration, not only between the organisations, but between individual members, regardless of their affiliation.

Working together is not always easy, we have to learn to listen, to adapt, and to allow sufficient time to get to know each other. All too often our various overcommitments, egos and competitiveness (ours included) get in the way. But our achievements collectively can make it worthwhile. The OTB’s Promotion Campaign, the Food For Life Initiative, the Daylesford Foundation’s Agricolgy information hub, and the English Organic Forum’s success in securing improved support payments for organic farmers as part of Countryside Stewardship demonstrate what is possible.

The first Oak Award, presented to Susie Hewson founder of Natracare at a joint event of the Organic Trade Board and ORC, hosted by Yeo Valley, is another example of working together for the common good (see page 2). The evening was a unique celebration of the outstanding contribution of many individuals, including the other shortlisted nominees Julie Brown of Growing Communities, Alex Smith of Alara Wholefoods, Anthony Snell of Windmill Hill Farm, and Andrew Wilkinson of Gilchesters, making organic ideas succeed in practice.

Resolving the fragmentation of the organic movement, experienced in many countries, may be a factor behind the success of organic food and farming in countries like Denmark, Austria and Switzerland. Paul Holmbeck, speaking in the Congress closing plenary, is Political Director for Organic Denmark, a body where the whole organic sector works together for a common purpose. The organic market share of 13.5% of total food sales and the continuous engagement of government since the mid 1980s in Denmark speak volumes for this approach.

The English Organic Forum, and similar groupings in Wales, Scotland and Northern Ireland, are engaging with their respective governments to present a common voice. An Organic Roundtable with Defra has been formed to develop an industry-led organic action plan in England, following the Scottish lead a couple of years ago. In recent months we have also seen collective engagement with the AHDB and the start of active discussions about specific initiatives that might lead to more support for organic producers from the levies they pay. The new AHDB-funded projects at ORC (see page 10) and the Soil Association, to support organic benchmarking groups, are a first sign of this.

Let’s hope that by working together we can be more effective in showing the potential of organic farming for future agriculture policy in the UK, so urgently needed in light of the great challenges that lie ahead.

Special mentions

We would like to acknowledge the special contribution made to UK organic farming and agricultural policy by **Peter Melchett**. Much has been written about him since his untimely death that it is hard to add to it here. I worked with him on the implementation of the first English Organic Action Plan, and in recent years as part of the English Organic Forum, and will miss his active engagement and perceptive contributions. He was rightly recognised as part of the Oak Awards event. See <https://celebratingpeter.wordpress.com> and <https://tinyurl.com/Guardian-Melchett>.

We are very pleased to welcome to Elm Farm our new share farmer, **James Edwards**. Originally from Wales, James specialises in sheep production with flocks on a number of estates in Berkshire and Hampshire. Elm Farm will become his base, and we very much look forward to developing an active working relationship with him, so that Elm Farm becomes once again a focus for researching, demonstrating and communicating the potential of organic farming to deliver technical, financial and environmental benefits. We will cover James’s progress in future Bulletins and on-line. For now, as we get it all set up, a big welcome to him.

Nic Lampkin and Susanne Padel

Sheep sustainability research findings beginning to emerge

We are now into the third year of the iSAGE (Innovation for Sustainable Sheep and Goat Production in Europe) project. ORC livestock researcher **Nicola Noble** (née Smith), who has worked on the project for ORC and also the National Sheep Association (NSA), updates us on progress so far.

ORC is experienced at working collaboratively on funded research, with previous livestock projects such as SOLID (Sustainable Low Input and Organic Dairying – see Bulletin 120) and ICOPP (Improved contribution of local feed to support 100% organic feed supply to pigs and poultry – see Bulletin 118) being notable examples. Within this project, ORC are a significant research partner, taking the lead on a number of different tasks, making iSAGE one of the larger livestock focused projects within the organisation. We have strengthened our relationship with the NSA by working closely with them (I work with both organisations) to identify suitable farmers for all aspects of the project. Many NSA members have participated directly in the holistic sustainability assessment

The Public Goods Tool

A sustainability assessment identifies which parts of a farm business are sustainable and which areas can be improved. Farmers are asked to provide information from their farms for 13 specific sustainability criteria (see below) to be assessed using the 'Public Goods Tool' developed by ORC. This tool includes many of the indicators recognised by the United Nations Food and Agriculture Organization sustainability assessment.

We used the tool to interview farmers and collect data for each criterion. The interview covers many aspects across the farm and, as some of our members learnt, takes up to three hours to complete. To date, 215 sheep and goat farms

What is iSAGE?

The Innovation for Sustainable Sheep and Goat Production in Europe (iSAGE) project aims to make the sheep and goat sectors more sustainable, resilient and efficient. It includes many aspects of production, the supply chain and a strong focus on knowledge exchange. The five main objectives are:



1. What makes farms sustainable and how innovation can be utilised.
2. What farmers believe are the priorities for the industry and how to make their life easier.
3. How sheep and goats can be bred to make farms more sustainable.
4. Identify potential ways retailers and processors can contribute to more consumption
5. Understand better how consumers perceive sheep and goat products.

The project includes 34 research bodies and industry partners from around Europe. From the UK, the Organic Research Centre (ORC) and Scottish Rural College (SRUC) are leading research, with NSA and AHDB as their industry partners respectively.



iSAGE has received funding from the European Union's Horizon 2020 research and innovation programme (grant agreement 679302). More at www.isage.eu.

Sustainability themes

Social

- **Landscape and heritage:** Contribution of a farm to preservation of the countryside and its heritage.
- **Social capital:** Community engagement and associated benefits to the local community (e.g. public access, training).
- **Animal health:** Management of livestock to ensure good health (e.g. staff resources, health plan, biosecurity).
- **Animal welfare:** Management of livestock to ensure welfare (ability to perform natural behaviours, housing, feeding).

Environment

- **Soil management:** Soil organic matter / nutrient levels and soil damage through chosen management practices.
- **Agri-environment management:** Stewardship involvement and encouragement of native wildlife.

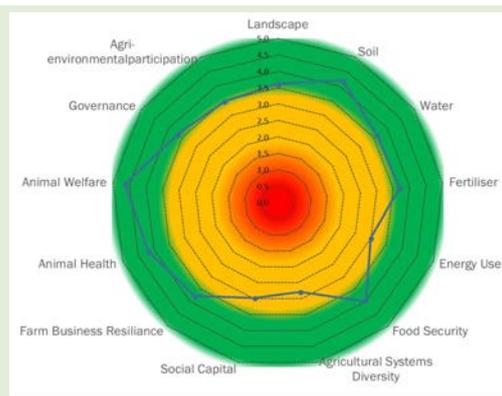


Figure 1: Average sustainability assessment scores for UK extensive sheep farms

- **Water management:** Efforts to reduce pollution, sources of water being used and (if used) efficiency of irrigation.
- **Fertiliser management and nutrients:** 'Farm gate' NPK balance and on-farm nutrient, manure, fertiliser and waste management.
- **Energy and carbon:** Fuel, electricity and energy use, and attitude of usage on farm.
- **Agricultural system diversity:** Range of crop varieties and animal species on-farm, plus marketing/processing availability.

Economic

- **Food security:** Contribution of farm towards food quality and availability of food in the local area.
- **Farm business resilience:** Financial resilience of the business and its long-term prospects.

Governance

- Effect of farming practices off the farm (e.g. ethical decisions, legal compliance, accountability and holistic management).



Comments from UK farmers on completion of the on-farm assessment

“An assessment can really help you focus on what you need to look at next or where there’s potential for doing something new.”

“It has been a really useful exercise and I would encourage others to take advantage of it.”

“Useful to see that we are doing things well.”

“The most interesting part was looking through the whole farm data. It’s good to go through it all, as it gets you thinking.”

in the UK, Spain, Italy, France, Finland, Greece and Turkey have been assessed, made up of 20 intensive sheep meat farms, 50 extensive sheep meat farms, 16 intensive dairy sheep farms, 29 extensive dairy sheep farms and 31 dual purpose farms. Extensive systems are defined as those where sheep are mainly pasture fed.

Once all the information has been entered, the results are immediate and the farmer can visualise what they are doing sustainably on the farm and what they may wish to improve. In addition, the performance of farms can be compared with other farms of the same type across Europe. We have also found that farmers value the actual process of completing the assessment, as well as the outcome.

My colleagues within NSA have also found the assessments of value, as they provide a visual way to communicate to non-farmers (such as Government officials and people further up the supply chain) the range of outputs from sheep farms other than meat. If we take the average scores for UK extensive sheep farms as an example (Fig 1) animal welfare and animal health perform very well. Environmental factors such as soil, landscape and water are also in the ‘green’, suggesting positive environmental benefits for extensive systems. Areas which could be improved upon are energy efficiency, diversity on farm and social capital. However, in some of these farms, farm ownership played a huge role in the ability to invest in expensive systems such as energy efficiency and farm diversity. For example, graziers or tenant farmers would be less likely to invest in some of the areas highlighted as potentially vulnerable.

From the UK sheep farmers interviewed, 65% said that their workload was hard, very hard or extremely hard work and 76% said their business was just about surviving. Despite this, it was encouraging to see they all intend to be in business next year, 76% intend to be in business in the next 10 years and 77% had a succession plan for the future. Surprisingly, 71% were generally happy with the amount of holiday they could take, despite the workload being so tough.

Another part of the project, separate to the sustainability assessments, is to see if farmers are successfully using innovation or management to improve the sustainability of their farms. Innovation in this context is defined as something that can be used by farmers to make their farm more sustainable by being more profitable, more environmentally friendly, or by making the farmer’s or animals’ life easier.

comment@organicresearchcentre.com

In addition to looking at individual examples of innovation (see Table 1), the project also aims to highlight any barriers towards uptake, including farmer opinion on the innovations investigated. At the end of the project, advice about which innovations are most suitable for specific farming systems and relevance to each country will be provided. Helpful tips to encourage adoption and overcome some of the hurdles experienced by farmers working together with the iSAGE project team will also be identified.

There is still a lot of work to be done to complete these projects. Within the sustainability assessments, further in-depth analysis is needed to identify areas in which to focus future work. Ideally, we aim to analyse trends within the data produced, as well as identify areas of specific interest to UK sheep farmers.

Case studies of novel practices are well under way, with more results expected at the end of this year and into early 2019. Officially, the project ends in February 2020, when a final report should be available. However, due to the size of the data set, it should continue to be useful for future NSA policy work, research projects and initiatives.

Learn more about the ORC Public Goods Tool at: <https://tinyurl.com/PG-Tool-ORC>

Table 1: Assessment of novel practices

Innovation	Description	Results
NSA Next Generation Ambassador Programme (UK)	A programme supporting and encouraging young people in the sheep sector.	Ongoing
Natural resistance to gastrointestinal parasites of sheep breeds in low input systems (UK)	Evaluating the health of UK native and newly introduced sheep breeds developed for good health status under extensive systems (e.g. New Zealand Romney, Easy Care and Lleyln).	Ongoing
Mobile flock management for intensive goat farms (Spain)	Timely management and breeding decisions based on individual, electronically-collected and automatically processed data.	Farmers that collect and use individual records have more production, less unproductive periods and consistent annual production.
New sheep and goat AI speculum (Spain and France)	Newly designed speculum better suited to specific breeds.	Easier AI with less help required and, in some cases, improved success rates.
Controlled weaning in organic goat rearing (Italy and Greece)	Allowing kids to spend night-times with their mothers rather than being 100% artificially reared.	1.5 months less labour required during milking.
Better utilisation of farm forage (France)	Comparing utilisation of farm forage.	Reduced reliance on imported concentrates and forages.
Sharing technical information via social media (Turkey)	New ways for reproduction researchers and consultants to reach farmer clients.	Successful use of YouTube (>270,000 views) and interactive messaging between farmers and consultants.

Adapted from an article originally printed in NSA’s Sheep Farmer magazine. To receive Sheep Farmer on a regular basis, become a member of NSA at www.nationalsheep.org.uk/membership.

Browsing on trees for internal parasite management and pain relief

In the second of a short series of articles, written as factsheets for the Agroforestry Innovation Networks (AFINET) project, ORC Livestock Researcher **Lindsay Whistance** looks at how offering access to trees can improve the welfare of domestic animals.

Why offer animals access to browse?

Silvopastoral systems offer domestic animals multiple benefits including access to shade in the summer and shelter in the winter. Where trees are managed at browse height, or where there is access to hedgerows, farm animals will readily browse. Levels of nutrition, including protein, in browse can be comparable to other feed crops and trees can be a particularly good source of minerals. As a defence against attack from insects, pathogens and browsing animals, plants produce a range of chemicals known as Plant Secondary Metabolites (PSMs). These PSMs include tannins. Tannins are bitter tasting and a high content can reduce feed intake. Although condensed tannin in feed can be beneficial at around 1-4% of dry matter, beyond 5% can cause digestibility problems so diversity in feed sources is important for animals to avoid eating excessive PSMs. However, browsing on condensed-tannin-rich leaves offers animals protection against gastro-intestinal parasites. A second PSM, salicylic acid, is a recognised pain suppressant with anti-inflammatory and mild antibiotic properties and is abundant in willow.



An Exlana lamb browsing on hedgerow hawthorn in a Hampshire field

Self medication

Access to browse can improve welfare by enabling animals to manage their own health to a greater degree. With sufficient access, animals learn about the relationship between food and subsequent effects on their health. What animals choose to eat is largely determined by palatability; however, this is not just the taste of food but rather the relationship between taste and the feedback from the body. When an animal is suffering ill health, the dynamic aspect of palatability aids the selection of health-promoting food as taste and nutritional value diminish in favour of other chemical components that offer relief.

Sheep and goats feeding on tannin-rich browse show up to a 50% reduction in faecal egg counts. Gastrointestinal parasites cannot develop resistance to tannins, protein or copper so these methods of parasite control will continue to offer effective resilience. Importantly, if farm animals with access to a variety of plants containing PSMs learn to self-medicate for parasite burden, it is no longer necessary to give fixed doses of chemical anthelmintics to groups of animals with differing parasite burdens, thus avoiding the associated increasing problems of resistance. Using copper to treat certain parasite burdens can be effective but excessive copper is toxic, causing brain and kidney damage in sheep, with some breeds of sheep such as Texel and Suffolk being particularly susceptible.

It is not always easy for humans to recognise pain in animals and even veterinarians consistently underestimate pain levels

Tannins and copper restrict parasite development

Condensed tannins and copper inhibit the development of gastrointestinal parasites, resulting in both fewer eggs being laid by adult worms and a reduction in the number of eggs hatching. All tree leaves contain tannins, and minerals, with species such as hazel and beech being good sources of copper.

Protein improves host resilience to parasites

Whilst condensed tannins reduce the digestibility of protein in the rumen, the enzymes which prevent digestion are themselves broken down and digested in the abomasum and small intestine. This increases the availability of higher quality, rumen-bypass protein in the diet, resulting in increased resilience to parasite infection.

Pain relief from browse

Animals suffering from ill health choose to eat food that offers pain relief when healthy herdmates don't. With injury, blood vessels become dilated and muscles contract, causing pain. Salicylic acid inhibits this process thus offering pain relief. Trees such as willow and poplar are particularly good sources.

associated with normal farm occurrences such as giving birth and treating lameness. Enabling animals to self-medicate alleviates pain and alerts stockpersons to potential health problems as well as their severity since animals increase their intake of medication as pain levels increase.



Young cattle browsing on goat willow at Elm Farm

Browse systems that include the management of animal health require sufficient access to trees for all animals and sufficient time for regrowth. Sustainable browsing, where browse is defoliated at 50% or less, requires a minimum of 8 weeks rest, depending on growing conditions. More than 50-60% defoliation can reduce a plant's ability to regrow. Once established, silvopastoral systems require disciplined and skilled management of both plants and animals.

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Alternative cereals—meeting the needs of millers and bakers

In September, around 20 people including farmers, millers, bakers and researchers, from Wales and beyond, came to Slade farm, near Bridgend, to discuss alternative cereal supply chains and enjoy a good farm walk. Hosted by farmer Polly Davies, Steven Jacobs of OF&G and Organic Arable's



Andrew Trump, the day was linked to two ORC research projects: CERERE (CEreal REnaissance in Rural Europe: embedding diversity in organic and low-input food systems) and DIVERSify (Designing innovative plant teams for ecosystem resilience and agricultural sustainability). One focus of the day was meeting the needs of the milling and baking sector in alternative cereal supply chains. ORC researchers **Anna Sellars** and **Charlotte Bickler** report.

Slade Farm

Polly grows spelt, spring wheat, spring oats, spring barley and spring beans, in rotation with sheep, pigs and cows, selling through their farm shop, mail order and local delivery, while her husband runs a vegetable box scheme. The cereals are sold to Organic Arable as a cash crop, and used as feed for their livestock. For the first time, this year, she experimented with growing a small amount of heritage cereals for Fenil Ganol in Ceredigion.

Polly shared that while she would love to do more with Welsh and heritage grains, for a mixed farmer to incorporate more heritage cereals into the farm rotation would mean sacrificing some cash crops, adding complexity to production, harvesting, storage and marketing, to an already complex operation. For example, harvesting several types of cereal adds extra time requirements in an already tight harvesting window, particularly in Wales; farmers in the east of England may be different! The minor and heritage cereal market remains relatively niche and without an established open market, particularly in organics; this highlights why growing these crops under contract is recommended.

Quality, baking and selling heritage grains

The group discussed the balance of Hagberg FN requirements and how best to maintain Hagberg in harvest and storage of the grain prior to milling. Hagberg refers to the starch content of the grain, which over time converts through enzymatic processes into sugar, accelerated by wetness (e.g. rain around harvest time). High Hagberg can be maintained through harvesting in optimum conditions and storing in a cool, dry store, and a Hagberg falling below 200 will reduce the price of the sold grain. Bakers in the group, on the other hand, reported that a lower Hagberg was not necessarily an issue; while the lower the Hagberg, the gummier the bread consistency, it also has a slightly sweeter flavour.

Bakers in the group have observed a growing interest from the public in heritage and provenance of grains. In Wales there have been hotspots in Pembrokeshire, and in the Abergavenny Food Festival, which showcases quality Welsh products. However, one participant noted that integrity of the label 'heritage' is important; national retailers use it in bread labelling, but it is unclear if 'heritage' refers to the ingredients, the methods or the recipes used in producing it. Should there be more control over labelling claims and connotations? Another common interest among the group was in the nutrition and quality of bread, linked to issues of digestibility and nutrition.

One baker talked about his wish to upscale his micro-bakery, but shared the concern of balancing the cost of baking the loaves with customers' 'willingness to pay'. Other



A discussion group among the haybales!

bakers discussed their experiences of 'willingness to pay' and how they place value on their products, ranging from flour costs from 5% to 30% of their final price. One said that having a range of products allows for some distribution of variable profit margins across products, to maintain a more uniform price and variety of products.

Shared experience showed that consumers are often unwilling to pay more than £4 for a 1kg loaf (compared to an average of around £1.80 for 1kg higher-end wholemeal bread in the supermarket), particularly if it may not last a week. However, the generally accepted price of approximately £3.50 for a 1kg artisan loaf arguably doesn't capture the price per portion or the nutritional density as compared to supermarket loaves.

Steven Jacobs raised that while there is a lack of high-quality milling wheat in the UK, sourdough methods offer opportunities for making the most out of cereals that might not be suitable for conventional baking methods. Heritage cereals offer more scope for baking in that they often have higher protein levels because of their lower yield. This also indicates that with a growing interest in and consumption of sourdough bread, that there is increasing scope to maximise use and expand production of non-conventional cereals, as well as emphasising the importance of working with processors to develop routes to market for these products.

As part of the farm walk we saw the benefits of 'plant teams' for improving productivity and sustainability of arable farming through Polly's personal experience.

For more information:

The Welsh Grain Forum is working to collect heritage varieties and expand a 'bank' of these with a view to testing building to a commercial scale, exploring challenges of storage, production and distribution of heritage cereals. <http://welshgrainforum.co.uk/>



Cerere received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement n° 727848



The Dean Organic Fund

The Dean Organic Fund was established following a major bequest from the late Jennie Bone to the Organic Research Centre (ORC), along with the transfer of funds from the former Dean Organic Trust which she established in 1993. Her idea was to support the conservation of wildlife in the farmed environment by providing interest free loans to organic producers. ORC is committed to continuing this process with the new Fund. The second round of applications closed in September. Here, some of the successful applicants from the first round tell their stories of how the fund has helped them.

Stephen and Lynn Briggs, Whitehall Farm, Cambs

Stephen and Lynn Briggs are tenants of a 250 acre organic farm in Cambridgeshire growing cereals, vegetables and 125 acres of Agroforestry. The farm has a Higher Level Stewardship (HLS) agreement, and Stephen and Lynn are passionate about adding value and engaging with customers and the public. After more than two years in development, in early 2018 they opened Harvest Barn Farm Shop, which retails local, organic and farm produced produce along with a café, and outdoor visitors and education area.



“We applied for the Dean Organic Fund (DOF) to help in developing the new farm shop business. The £25,000 loan has helped fund the purchase of retail and butchery equipment, and outdoor education and visitor infrastructure. The DOF loan has helped us manage cash flow for a rapidly developing new business venture and allowed us to expand and broaden the offering to customers quicker than we would have been able to without the DOF loan.”



Taw River Dairy, Devon

Sam and Katie Bullingham of Taw River Dairy, Okehampton, Devon, received a loan for the expansion of their livestock herd and development of dairy processing facilities. Sam Bullingham said: “We applied to the DOF as we saw it as a great way to aid our sustainable organic farming system, being first generation farmers without land to secure against, access to capital is often difficult and always expensive! We used the money to buy ourselves a reliable modern tractor that should future-proof our farming for the foreseeable future, with the remaining capital we invested in more cows for our rapidly growing dairy and processing business. The DOF loan has been immensely valuable to us, we are a young couple with our own tenancy and relatively new business, the fact that we could postpone starting repayments until year two was great, it removed pressure in a financially tight period of growth.”

Lauriston Farm, Essex

Lauriston Farm, Maldon, Essex, received a DOF loan for capital investments for a new horticultural enterprise.

Farm Director Spencer Christy said: “Lauriston Farm Limited heard about the Dean Organic Fund through the Biodynamic Association as we are a Demeter certified biodynamic holding that last year was put into community ownership. Part of the five-year business plan associated with this initiative involved initially cultivating two acres of grassland. We would establish a horticultural enterprise to supply thirty weekly seasonal vegetable boxes to our members/shareholders. We raised significant funds to cover revenue costs of the set up and were looking for a fund to help with the capital infrastructure required. We undertake extensive conservation work as ninety percent part of the farm’s 210 acres has SSSI status so the DOF seemed like the perfect match for us.

“The loan has paid for an 85 x 24ft wide polytunnel with side ventilation, a Tracmaster 740 two-wheel tractor with rotary plough and 80cm wide rotavator; an irrigation system for the tunnel and outdoor beds, two broad forks, various trays and boxes, fleeces and woven crop coverings.

“The rapid approval of our application and receipt of the loan enabled us to have the funds in place for the start





of the 2018 growing season. Now, in mid-August, we are supplying twenty weekly boxes within a twelve-mile radius of the farm, two local farm shops and attend two local artisan monthly markets. The interest free aspect as well as the twelve-month repayment holiday gave us the ability to develop the new enterprise this season and be ready for the start of the 2019 growing season with an existing customer base to generate the income to start repaying the loan.

“It has been a great pleasure and honour to be in receipt of such funding and we welcome visitors to the farm to see what we do and, in particular, how the DOF has helped us.”

Albury Vineyard

Photo: John Mobbs, Great British Wine



Nick Wenman of Albury vineyard in Surrey said: “The major challenge for vineyards in the UK is our variable weather conditions, which can lead to significant fluctuations in fruit yield and quality. This is particularly acute for organic vineyards with yields typically 20% less than conventional vineyards. Of the 500 commercial vineyards in the UK less than 20 are certified organic so there is no alternative supply of fruit in difficult years. It is important therefore that we do everything possible to ensure the maximum possible yield whilst maintaining quality. This is accomplished by various canopy management techniques, one of which is to trim the vines several times during the growing season. This encourages good fruit set, exposes the grapes to the maximum sunlight available and allows airflow around the grapes to prevent disease.

“Up until now this operation has been performed by hand using hedge cutters, but this is inefficient and time consuming, which means that it isn’t always done effectively. We therefore applied to the Dean Organic Fund to provide the funding to purchase a tractor-mounted vine-trimmer to automate the process. This has already been used to great effect at the vineyard to help prevent disease and expose the fruit to sunlight.”

Lynbreck Croft

Lynn Cassell and Sandra Baer of Lynbreck Croft, Grantown on Spey, received a loan for the establishment of meat processing facilities.

“We applied for the Dean Organic Fund as we saw it as an opportunity to grow our new croft business. We are a high agro-ecological performing croft with a vision



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to farm with nature using our animals as ‘land managers’ to deliver maximum benefits for wildlife and people. We are only a small set up with very little funding other than that we can get through grants or through our part time jobs. The Dean Organic Fund gave us a once in a lifetime opportunity to secure investment to grow our business in a way that promotes the values our croft is based on – healthy soils = healthy land = healthy animals = healthy food = healthy people.

“We are using the money to install a food processing facility and purchase the kit we need to store and butcher our own meat. We are investing in a fully kitted out sterile room in our recently renovated byre where we will be able to process raw meat and make artisan produce including high quality sausages and burgers. We are purchasing a food smoker and equipment needed to slice and vacuum package produce, including charcuterie we will be making. Our loan has also covered the cost of a walk in chill and two freezer units where we can store meat safely.

“In an industry where ‘added value’ is the latest buzz phrase, we plan to increase the financial value of our produce. For us as a small producer, this investment will enable us to generate enough income to reduce our part time working, allowing us to put more time into growing our business. We are so passionate about the way that we farm and the food that we produce and this investment has meant we can make our produce ‘go further’ allowing us to reach a wider market. It has also opened up the opportunity to buy in carcasses from other high agroecological/organic farming units where we can add value through processing and still provide the consumer with full product traceability.”

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Staff news at ORC

Mark Measures

Mark has decided to stand down as Director of IOTA after 14 years. Mark said: "I have recently had the opportunity to take some time away, to do a Winston Churchill Fellowship, which has given me the space to review my workload and priorities in a number of areas. I will continue to contribute to IOTA and ORC but at a lower level of activity than in the past. I am very pleased that ORC is able to provide a safe home for IOTA and I look forward to it flourishing as it explores new ways of supporting advisers, whether they are working full time with organic farming or on an occasional basis."

Marion Johnson

Marion joined ORC in September as Principal Livestock Researcher. She will be working with the livestock team on the iSAGE, Organic + and OK-Net Ecofeed projects. She will also be developing a research programme in conjunction with James Edwards the new Elm Farm share farmer. Marion has arrived from the Future Farming Centre in New Zealand, where she has been working on a variety of projects ranging from mixed leys for dairy goats and reintroducing native species with medicinal properties to pastures, through to agroecological farm plans for Moriori land on the Chatham Islands. A veterinary parasitologist by training (Liverpool School of Tropical Medicine and University of Otago) with a background in agriculture and environmental biology (Massey University NZ and University of Manchester) Marion is interested in promoting animal health through broad diets and good management, botanical veterinary medicine and encouraging biodiversity on farm.



Lisa Arguile

Lisa joined us at the start of September, after graduating from Plymouth University. She is currently working within the sustainability team on iSAGE, analysing data to answer questions relevant to the future sustainability of the sheep and goat industry across Europe. Lisa has grown up on a working farm, with both arable and livestock enterprises, accompanied by a degree in Marine Biology and Coastal Ecology. She is interested in the ecological impacts within a variety of systems and the future sustainability of the farming sector.



Domingo José Lopes Monteiro

Dom joined us in June. He will be working with the facilities team, assisting with the day to day running of the place (facilities wise). He will also be taking over all of the maintenance issues that the building may have as well as the grounds. On top of this Dom will be assisting other members of the team on tasks where they feel the need for assistance, and helping with events that happen at the hall at Elm Farm.



Lydia Moore

Lydia's background in events and marketing, combined with practical experience in the organic food industry, led her to the role of Project Manager for Agrigology. She developed an interest in sustainable food production from her upbringing on a farm in Ireland, which was reinforced by spending a year at Ballymaloe, understanding the principles of organic farming, and two years at Daylesford Organic in Gloucestershire. At University, she studied paleoclimates and vegetative changes from pollen core samples, as part of her undergraduate degree and then pursued a masters degree in sustainability that collaborated across environmental science, economics and business.



Project news at ORC

Organic-PLUS

Organic-PLUS is a 4-year EC Horizon 2020-funded project, led by the Centre for Agroecology, Water and Resilience (CAWR) at Coventry University, which aims to minimise the use of contentious inputs in certified organic agriculture in Europe. The consortium comprises 10 universities and 15 research organisations and NGOs from 9 EU and 3 associated countries, including scientists from a wide range of academic disciplines and involving advisers, farmers and other stakeholders in a participatory research design. Organic-PLUS has four objectives:

1. To identify and evaluate contentious inputs currently used in European agriculture
2. To provide specific technical solutions to minimise or phase out their use
3. To provide environmental, social and economic assessments of phase-out scenarios
4. To disseminate and broker knowledge, ideas and results to maximise impact.

ORC's role will be to map the use of contentious inputs in organic farming and to carry out on-farm trials of dairy heifer growth and health status, using plant-based products.

Farmbench

ORC has won a contract to recruit groups of organic farms to increase the amount of organic data available on AHDB Farmbench. We will help these farmers submit their data for analysis. ORC will then facilitate meetings for each organic group of farms to share the analysis of anonymised data re performance across the group and consider what approaches have been most effective. Individual farm data will remain confidential. Participating farms must have at least one cereal or oilseed crop in 2018 or 2019 harvests. All Farmbench datasets will be included, combinable crops, potato, beef and lamb and dairy.

If you would like to participate, please contact Penny Dixon: penny.d@organicresearchcentre.com



Agroforestry is the missing agroecological element

With the help of a farmer bursary from the Organic Research Centre and Farm Woodland Forum Cotswold farmer Jonty Brunyee recently attended the 4th European Agroforestry Federation (EURAF) conference in Nijmegen, Netherlands. Here are his reflections.

I am an organic, pasture fed and regenerative farmer in the Cotswolds at Conygree Farm on the National Trust's Sherborne Park Estate. I am passionate about farm conservation, diversity and ecology, and producing high quality food.

Species rich limestone grassland restoration and the creation of habitat for farmland birds are our two key aims.

In addition, I have planted a number of small shelter belts and new hedges on the farm. However, I hadn't considered agroforestry as an option. Until now!

This three day event focused on accelerating and inspiring transition towards agroforestry as a sustainable land use, including the role that agroforestry has to play in the fight against climate change.

On day one I met with academics, practitioners and policy leads from across the EU and further afield. Speakers summarised progress to date, the need for ecological intensification, agroforestry and CAP, and Dutch ambitions. Parallel sessions offered research findings on factors of success and failure, costs and revenue potential, future policy issues, and the real potential that agroforestry has to reduce and mitigate climate change. All impressive and inspiring stuff.

I was particularly looking forward to day two and the various field tours. We visited Willem and Henriëtte van Roessel of Riel, 85km west of Nijmegen. Here the family have moved away from conventional dairy farming to an organic, mob grazed pasture based, calf at foot system. All milk is now sold direct. Over 600 fruit and walnut trees have been planted in avenues in the herb rich pastures. Although it's early days these trees are providing shade and shelter to the cows (leading to higher animal welfare and feed efficiency), better water retention in dry conditions, a source of tree fodder (good for the gut biome) and will eventually generate additional income. Chickens free range under the trees too. While milk yields have dropped farm business profits are up and stress levels are down – what is not to like!

A delicious home grown lunch was served at Boshoeve Sprankenhof care of Mark Vonk and Josè Vermeer. Once a conventional dairy farm the holding has been transformed into an organic fruit garden with a variety of berries integrated with vegetables, a greenhouse and chickens. A fine example of high value produce stemming from diverse land use (enterprise stacking) and good soil management delivering a range of public goods and a thriving business.

Our final stop was at Den Food Bosch. This fascinating food forest project is a co-operation between students from HAS Hogeschool Den Bosch, researchers from Wageningen University and the local water authority. It aims to showcase

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Den Food Bosch Food Forest Project

alternative farming practices and food forest systems, and to share experiences of temperate climate agroforestry. Year one planting was near complete and the first fruit and vegetable harvest was starting. By harvesting solar energy, building soil carbon and working with ecological diversity, this one hectare plot should yield over £30,000 of fresh produce each year. Local water quality and biodiversity will also be enhanced. Good luck to all involved – inspiring work.

In the evening, all parties returned to Nijmegen for a conference BBQ and much needed cold

beer. Everyone seemed energised by the lessons they had learnt that day.

A prize for Best Conference Poster was awarded to Dr Ian Grange (from the Royal Agricultural University (RAU) in Cirencester, where I also do some lecturing in farm business management) for research he and colleagues have done into the value of hedgerows for carbon capture and storage. More attention is now being given to hedgerows, not only as a landscape and boundary feature, but also for a range of other ecosystem services they provide, including carbon sequestration. I hope Mr Gove has spotted this win-win.

Day three consisted of parallel sessions on farmer case studies, innovation, tree fodder (a really interesting concept to a farmer like me seeking a healthy and sustainable ways of producing beef and lamb), the value chain and biodiversity. Closing statements were made and a conference statement agreed.

I left Nijmegen with a fresh vision for Conygree Farm. I now realise that agroforestry is the missing element. I have focused on the horizontal and totally ignored the benefits of 3D farming. This lesson is relevant to all but particularly fellow regenerative farmers and Pasture for Life producers.

Since the conference I have started developing a plan to link the existing woodlands on the estate with a mix of block planting and grazed wood pasture. Also, to help us move to a high welfare mob grazing system I am looking to create grazing avenues with trees – this will, I hope, offer shelter and shade for our livestock, fodder for browsing, carbon sequestration benefits, increase the area of habitat on the farm and offer an additional agroforestry/timber resource.

The crazy weather this year has shown me two things. The cold drifting snow showed where all the wind tunnels are on the farm and hence where more shelter is needed, while the heatwave has highlighted that the best grass grows under and around trees – if only I had planted more ten years ago!

With my RAU hat on I am currently leading a team developing a new BSc in Agroecology and Sustainable Land Management at the university. Agroforestry content will now be built into this exciting degree. Finally, I encourage all farmers out there to engage with the next EURAF conference and the various AFINET/Farm Woodland Forum events. Seeing good examples and learning from each other is always so valuable.



Livestock on diverse leys: a return to the past for a promising future

*The use of herbal leys with grazing livestock is a dying practice, but one offering potentially huge benefits to livestock and arable farms alike. A group of six farms from across the country who have, make use of, or are establishing, more diverse leys with livestock are coming together as part of the DiverIMPACTS project to investigate some of the pros and cons of this practice. **Samantha Mullender** reports.*

Organic farms have long used leys of grass and herbs in their arable rotations to restore soil structure and fertility after cropping. Crops take up nutrients from the soil when growing, which are then exported when the crop is harvested and taken away. Meanwhile, the cultivation of the soil to sow, weed and harvest crops can disrupt its structure and damage its health.

The main drawback of a ley for an arable farmer is the perceived loss of productivity – the lack of an income from a crop for two, three, four years. For an organic farmer, the return in terms of soil fertility and capacity for weed control outweighs this, but for other farmers it is seen as cheaper and easier to return nutrients using organic or mineral fertilisers and to control weeds with herbicides.

A suggestion to make leys an attractive – and indeed beneficial – option for livestock and arable farmers alike is two-fold. First, to move to a more diverse mix of grasses and herbs, and second, to use the ley to keep livestock – effectively getting a ‘crop’ from the ley years too. It is this combination that this study group of farmers are experimenting with.

Benefits of diverse/herbal leys reported by study group

- Increased flood resistance and water holding capacity
- Improved workability of soil
- Better yield than standard ryegrass-clover mix
- Breaks weed cycles – combined with livestock, a solution to herbicide resistant blackgrass
- Increased drought tolerance
- Improved soil health (carbon, organic matter, nutrient cycling...)
- Simple solution – if you use enough species, you’re almost guaranteed to have some perfectly suited to your conditions
- Greater fertility benefits than standard grass mix, allowing reduced reliance on inputs
- Greater nutrient content and diversity for livestock
- Anthelmintic, anti-bloat and fertility benefits for livestock

By using a more diverse mix, farmers build an innate adaptability into their ley, with the species flourishing being those best suited to the field’s particular microclimate, soil and the weather experienced during the year. Deeper-rooting species are also able to resist dry conditions, highlighted by group member Adrian Steel’s experience with his leys this summer. He previously supplemented his ryegrass-clover leys with carefully selected additional species and has now found the deeper-rooting yellow trefoil to have coped with the hot, dry weather much better than the other species.

More generally, deeper roots both help the soil retain moisture for longer, as well as reducing risk of waterlogging in wetter areas – something particularly important in Welsh beef and sheep farmer Marc Jones’ decision to start diversifying his mainly ryegrass-clover leys. Other benefits identified by the group have included higher productivity than less diverse mixes, the availability of mid-tier subsidies for herbal leys and, from a livestock perspective, a more nutritious feed that also offers anthelmintic and anti-bloat properties.

Adding livestock to a ley adds an income. A ley, particularly a diverse one, in an arable situation is appealing for livestock owners. Not only is it clean grazing, it also represents an extra food source that can increase the number of animals that can be kept and/or reduce dependency on bought in feed. Alternatively, it offers a chance to rest other pastures that are perhaps suffering from overuse. Grazing livestock on diverse leys also has benefits beyond the health and performance of the livestock themselves. The productivity of the ley under grazing is usually higher than under cutting, whilst the conversion of vegetative material to manure deposited on field has a fertilising benefit that doesn’t require a mechanical spreader and purchased inputs.

If there are all these benefits, why don’t all farms feature diverse leys and why aren’t all of them grazed? As contract farmer Toby Baxter points out, a key barrier is that seed costs are more expensive and there simply aren’t numbers on the costs and benefits of investing available through the standard channels. He argues that the cost easily balances out once the higher productivity, the mid-tier support and the longer lifetime of the diverse ley are taken into account, but for someone newly investing, it can seem a big gamble. Several of the study group have responded to this by selecting just one or two species at a time to add to their mix.

From a livestock perspective, if a farm is not already mixed, concerns over having the appropriate labour skills and infrastructure – housing, on-field water availability, fencing etc. – often arise. This was the case for arable farmer Katie Bliss. She already worked with a local dairy farm, providing cut ryegrass-clover ley as silage for their cattle in return for them providing the machinery and labour for the cutting and sowing of the following crop. She wanted to bring in grazing livestock to help with blackgrass control but was worried about the logistics and having the appropriate skills. Having played host to about 200 sheep grazed on around 25ha last autumn, many of these fears were alleviated. For sheep, water and housing was less of an issue, whilst the sheep’s owner organised all the fencing, travel and logistics and was first port of call should any problems arise. As a further benefit, the dairy was also pleased with the arrangement, with the sheep keeping down the grass for cutting.

This solution won’t work in all cases, but it does demonstrate that adding a ley to your arable rotation



need not be years of lost income. With the right ley and right facilitators, it can offer its own returns both for the duration of the ley and into the following crops. Through partnerships with other farmers – something five of the group make use of – it doesn't need to represent large investment in machinery, infrastructure or labour.

Over the next three years, this group of farmers are going to continue to investigate the challenges these partnerships present, as well as explore the benefits and challenges diversifying their leys and bringing in livestock present on their own farms. The coming months will see two watching closely to see if their newly sown leys take hold, whilst another begins to restructure his farm management. Over the next few years, the challenges faced and overcome and the successes and failures on these farms will provide real

life insights into the benefits of livestock on diverse leys and how best to make it work.

If you have or are considering diverse leys combined with livestock, or have any more general questions for the group regarding this work, please don't hesitate to get in touch at samantha.m@organicresearchcentre.com

Thanks to the six group members: Tom Appleby, Toby Baxter, Katie Bliss, Richard Gantlett, Marc Jones and Adrian Steel, for their participation and input in this project.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 727482.

This communication only reflects the authors' view. The Research Executive Agency is not responsible for any use that may be made of the information provided.

Tom Appleby	Toby Baxter	Katie Bliss
<p>Bretforton House Farm, near Evesham</p>  <p>Farm: Dairy; all sown pasture. Organic</p> <p>Main soil type: Heavy but sandy. Around pH 7</p> <p>Leys: Just starting to diversify from ryegrass-white clover. Adding plantain, yarrow and cocksfoot for rooting. Fertilise with manure & slurry. Reseed when tired (10-20y)</p> <p>Livestock: switching Holstein cross to Norwegian red crossed wt. Kiwi/Jersey bull. Calves contract reared (wt Adrian Steel) from 12wks to 19mnths</p> <p>Motivations: (at home) drought resistance, cattle health - reduced antibiotics. (on contract) clean grazing, anthelmintic and anti-bloat properties, short leys so up-to-date seed mix, can increase dairy herd size (because followers offsite)</p>	<p>Farm contractor, Wiltshire</p>  <p>Farm: Mainly arable, some with sheep and cattle. All no-till</p> <p>Main soil type: Variable</p> <p>Leys: Standard Cotswolds mix. 4-5y ley-10y cropping</p> <p>Livestock: Fully outdoor breeding ewes – Romney-Lley crosses & some Aberfields. Just starting to take 60-70 cross bred male dairy calves from 10wks to sell at approx. 20mnths</p> <p>Motivations: weed (esp. herbicide-resistant blackgrass) control. Increase in crop productivity post ley, and cheap livestock grazing (because ley would need to be there anyway) is added bonus</p>	<p>Ferry Farm, near Wisbech</p>  <p>Farm: Arable</p> <p>Main soil type: Fens</p> <p>Leys: Cotswolds mixed variety grass/red clover. Limited by dairy's requirements (buys cut grass for silage)</p> <p>Livestock: Rented out grazing to sheep farmer overwinter. Romney, Suffolks and Kerry Hills. Ley also cut and sent to local dairy for silage.</p> <p>Motivations: blackgrass control, tackle compaction, decreased reliance on inputs (pesticides & fertilisers), improve soil biology</p>
Richard Gantlett	Marc Jones	Adrian Steel
<p>Yatesbury House Farm, Calne</p>  <p>Farm: Mixed arable and beef. Biodynamic & organic; all no-plough.</p> <p>Main soil type: Silt loam, chalk beneath</p> <p>Leys: Cotswolds mix of annuals & perennials with 33 varieties, 24 species. 3y (prev. 2y) ley-4y cropping. Graze April-Nov</p> <p>Livestock: pedigree Aberdeen Angus.</p> <p>Motivations: needed more grass for cattle, better forage (health perspective and protein), improve soil carbon dynamics. Also seen improved water filtration as added bonus</p>	<p>Trefnant Hall, Welshpool</p>  <p>Farm: Grass leys in rotation wt. fodder crops</p> <p>Main soil type: Thin medium loam on shale</p> <p>Leys: Ryegrass-red clover. Switching to 'dry' mix from Germinal wt added plantain. Fertilise wt N, P and potash. 5-6y ley-2y fodder crop. Graze Feb-Nov.</p> <p>Livestock: 850 Lley & Romney sheep, fully forage fed. 300 dairy cross Angus/Hereford bought in Feb for finishing, plus 100 contracted for intensive finishing (indoors)</p> <p>Motivations: summer growth & drought tolerance; reduce inputs (fertilisers, feed, anthelmintics and antibiotics...), better finishing & conditioning. Would be interested grazing partnership wt local arable</p>	<p>Chapel Farm, Pershore</p>  <p>Farm: Arable wt. sheep. Organic, but leys before organic.</p> <p>Main soil type: Heavy clay (nearly heaviest), some loam, some marl</p> <p>Leys: 4 varieties of rye grass, 3 clovers, timothy and trefoil; agreed with dairy (see below). Fertilise wt compost. 3y ley-3y cropping.</p> <p>Livestock: own sheep (under review), contracted dairy followers (from Tom Appleby)</p> <p>Motivations: herbicide-resistant blackgrass control, calf GR higher on ley, easy outlet for excess straw</p>

Grazed herbal leys for healthy soil

As part of the DiverIMPACTS (Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability) project, ORC intern **Jesse Opdam** conducted a case study to analyse the potential benefits of grazed herbal leys for the soil health and its consequences on a farming system. It took place on an organic arable farm in the West Midlands, with a predominantly clay loam soil.

The farm's crop rotation consists of three years of cereals (spelt, oat and rye/wheat) alternated with three years of herbal leys, including white clover, red clover, timothy grass, rye grass, birdsfoot trefoil and yellow trefoil. The herbal leys are grazed with sheep and with cattle in cooperation with a local dairy farmer.

Methods

Six plots with different crops, each being in a different stage of the rotation, were sampled and compared. From each plot 60 to 80 soil cores were taken using a soil auger with a diameter of 1 centimetre to a depth of 15 centimetres (Figure 1). The sample points were distributed over a 'W' pattern across each plot, then mixed, packed in boxes and individually labelled for sending to the lab.

The soil health indicators that were measured by the NRM lab included soil pH, available phosphorus, available potassium, available magnesium, total soil organic matter and CO₂ respiration rate. The same soil samples were also analysed by the SoilBioLab for active bacteria, total bacteria, active fungi, total fungi and mycorrhizal colonization. The soil structure was assessed based on the Visual Evaluation of Soil Structure and root biomass sampling was included based on recommendations made by the farmer.



Figure 1: Sampling for lab analyses (left) and structure assessment (right)

Results

The results of these analyses showed differences between the plots. Herbal leys led to improvements in soil structure over time, with the oldest ley having the most intact structure. This is not reflected in the results of the root biomass weighing, probably due to high sample weight variability and a difficult separation process. Potential nitrogen mineralization in the plots with herbal leys is 105 to 123 kg/ha/year, whilst only 75 to 105 kg/ha/year in the cereal plots. Soil pH levels decrease slightly in the third year and they reach a favourable level of 6.5 in the tenth year ley, which positively impacts the availability of phosphorus.

There is a clear increase of microbial activity and overall soil health when the plots are in the ley period (Figure 2).

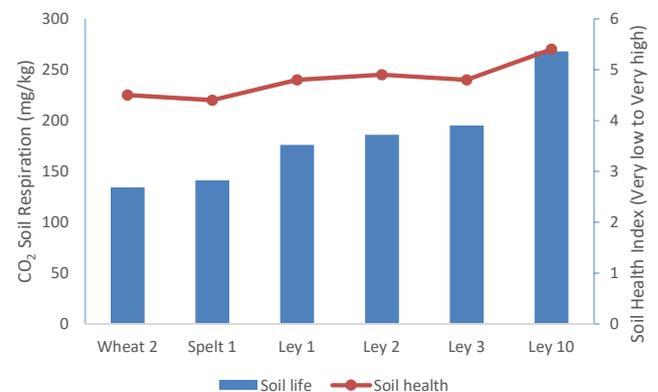


Figure 2: NRM Microbial activity and overall Soil Health test results

This is supported by a similar increase in amount of total fungi. The microbial increase over time is equivalent to a linear increase of 10.26 mg CO₂ respiration per kilogram soil per year when the plot is in a ley stage.

The nutrient budget of the farm shows a balanced nitrogen cycle due to symbiotic nitrogen fixation by leguminous plants in the herbal ley and the return of manure to the soil. However, for a balanced carbon, phosphorus and potassium cycle some import of compost or manure is still needed.

Conclusions

Based on the results of this case study, it can be concluded that grazed herbal leys have a benefit for the health of the soil. For optimal soil health, a ley-arable crop rotation with grazing is favoured over continuous arable production and over an arable-ley rotation without leguminous plants.

This more diverse farming system reduces the dependency on nitrogen input and grain based animal fodder, and provides an alternative source of income for the farmer.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727482.



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Obituary: Ed Goff

It is with great sadness that we have to report that Ed Goff died on 20th October 2018. Ed was outstanding in so many ways: a stalwart of the organic world, a supporter of the Organic Research Centre and a real dairy farmer producing real food. Mark Measures reflects on his life.

A university graduate (with a degree in Geography and Biology) and one-time volunteer in Zambia, Ed was fortunate in taking over the 150-acre family farm in Shropshire in 1975, to which he devoted his life, supported for most of that time by his first wife Sheila. Not only was he a real working farmer earning his living from this small patch of land, but also he was at the forefront of the organic farming revolution in the UK. He set about converting his farm in 1983, long before most farmers had even heard of organic farming, and he worked tirelessly milking his cows and developing a system that worked. The farm is still going strong today; genuine sustainable farming.

Throughout, he was a great supporter of the work of the Organic Research Centre, hosting research, using their Organic Advisory Service and at one time working with them as an adviser. He was the first farmer to get involved in the development of organic conversion planning in the UK and he even permitted the scrutiny of his farm conversion by a young academic by the name of Nic Lampkin, who evidently benefited from the experience! In Ed's own words ("...they were learning as much about it as I was I think"). He went on to show what grass-clover leys could really do, grew fodder beet, bred cows for the job and set up a milk marketing business. His 'compostorium' is still years ahead of the manure management facilities on most organic dairy farms.

His input to developing organic standards, conferences, farm walks and research was unique, but I best remember him for his writing – those hours in the parlour were put to good use and he produced the most entertaining and perceptive articles that have ever appeared in the organic press. Retrieve his series of articles *Plain Tales from a Slurry Tower* in *New Farmer and Grower* of 1994, '95 and '96, if you want to have a good laugh with Ed. Look at what he wrote in the ORC Bulletin to benefit from his challenging mind.

The sharpest commentary was of course aimed at the conventional farmer. Ed did not suffer fools at all, and he was withering in his criticism of conventional farming, hypocrisy and cant, which he sometimes also found in organic circles. He showed that farming could be done in a better way and still be profitable, so why couldn't others take proper responsibility for caring for their land and animals? Nothing missed his sharp attention: the green wash of neo-conventional farming labels, bandwagons and those who were doing no more than reinventing the wheel, Roundup, the illusion of cheap food, the National Illness Service (aka the NHS) and the pitiful attempts made by conventional farming to reduce antibiotic use. All came in for censure or ridicule. One upstart group, the Gay Hussars, was dismissed as "enviro babble... tests showed it to be only a froth of hot air and self publicity and had no organic content." Even his adviser did not escape comment "I see him as my organic parson, carrying out the traditional pastoral role of comforting the afflicted and afflicting the comfortable".



Ed (right) with Nic Lampkin at Elm Farm in 2011



Ed (left) with Mike Turnbull, ORC Organic Producers' Conference 2013

In 1995 he was particularly critical of the merger of the Soil Association, British Organic Farmers and the Organic Growers Association because of the loss of an independent producer organisation; arguably he was proved right.

Ed was a lovely man, practical yet emotional, caring yet demanding. He recently told me how fortunate he was to have been able to devote his working life to what he loved best, working with his herd of cows. We are indeed all fortunate to have known and worked with Ed.

He is survived by his second wife, Margaret.

2017 Organic Farm Management Handbook



Price is £10 plus postage. Single copies can be ordered online at: <http://tinyurl.com/OFMH17>

For trade and bulk (5 copies or more) contact:

elmfarm@organicresearchcentre.com

Next edition out late 2019



Events and announcements - details at www.organicresearchcentre.com

Join ORC's Farmer and Business Supporters' Group

ORC is at the forefront of UK research on organic and other agroecological approaches to sustainable and healthy food production, including knowledge exchange and policy advocacy on behalf of organic farmers and businesses.

While much of this work is supported through project funds from the EU, governments and foundations, we rely heavily on donations from individual supporters to provide vital underpinning for our activities.

Regular monthly or annual donations help us to plan ahead with greater confidence about our ability to undertake new initiatives on behalf of organic farmers and food businesses.

Will you join the growing band of farmers and businesses willing to support us like this?

We're not just asking for your support – we're offering something in return to say thank you!

FAB supporters have:

- The opportunity to attend FABS annual events to hear about our current activities, with space to discuss your priorities for research, information and policy initiatives
- Opportunities to participate in bids and funded projects
- Networking opportunities and events
- Pre-publication access to research reports, technical guides, bulletin articles, conference papers and other publications, with an invitation to feedback comments where appropriate
- Access to the research team and a quarterly update on progress and staff news, with links to on-line resources, for each of the main areas of ORC activity
- Links to and (optional) membership of relevant on-line discussion forums
- Discounted access to ORC conferences and events, including our annual conference
- Free subscriptions to ORC's printed bulletin, monthly e-bulletins and the Organic Farm Management Handbook every two years or so.

Please give us your support and sign up today!

To join the ORC FABS group, please pledge a regular annual donation (or monthly equivalent) of at least:

£100 (Supporter)

£250 (Bronze)

£500 (Silver)

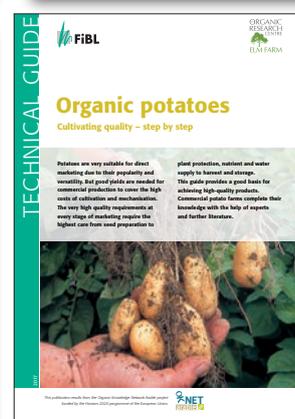
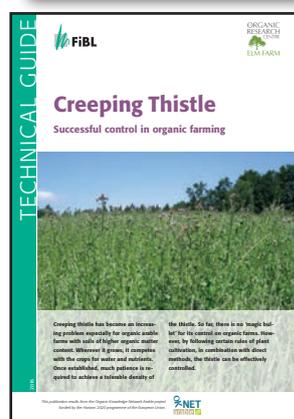
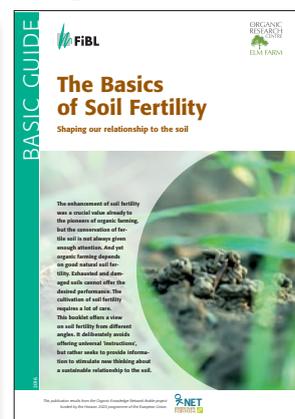
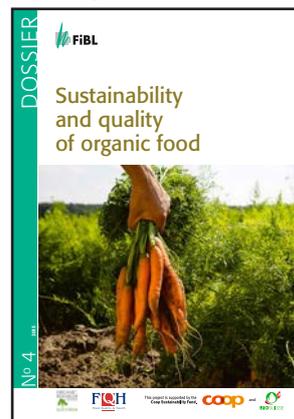
£1000 (Gold)

£5000 (Platinum/Organic Ambassador)

We are keen to recognise the different levels of support, but all supporters will receive the same benefits.

To register, please contact Gillian Woodward at ORC: 01488 658298 ext. 554
gillian.w@organicresearchcentre.com

ORC/FiBL technical guides



Download or order hard copies: <https://tinyurl.com/ORC-pubs>

Events

3-4 January 2019: Oxford Real Farming Conference

9 January 2019: Eastbrook agroforestry event with Steve Gabriel

7 February 2019: Agroforestry Implementation, Dartington Estate. UK Agroforestry Network Group meeting.