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Woodchip field lab

Iain Tolhurst with woodchip compost used in growing media. See field lab report (pp4-5) and 'What has research ever done for me?' (p6)

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Organic Research Centre Bulletin

No. 118 – Winter/Spring 2015



News in brief

ORC one of '101 Global Food Organizations to Watch in 2015'

ORC is proud to be named by Food Tank (US-based NGO which focuses on building a global community for safe, healthy, nourished eaters) as one of their '101 incredible organizations who are playing a vital part in creating a better food system', highlighted by them to celebrate 2015

Organic crop yields can be closer to conventional than thought

A new study by the University of California, Berkeley has provided valuable insights into the yield gap between organic and conventional systems. It is a larger meta-analysis than previous studies and has used different statistical methods. The authors highlight the fact that yield differences are greater in crops where high N fertiliser inputs are used in conventional systems (e.g. cereals) and that previous analysis of yield differences have been based on a disproportionate focus on these crops. The study found "relatively small and potentially overestimated" differences in yield (15.5 and 22.9%), despite historically low rates of investment in organic cropping systems. These differences dropped to $9 \pm 4\%$ and $8 \pm 5\%$ when diversification techniques (multi-cropping and crop rotations, respectively) were used. The authors suggest that further investment in agroecological research has the potential to improve productivity of organic and other "sustainable agricultural methods" to equal or better conventional yields in various cropping systems.

Reducing GHG emissions from livestock

The Livestock Research Group of the Global Research Alliance on Agricultural Greenhouse Gases and the Sustainable Agriculture Initiative Platform have joined forces to compile information about the greenhouse gas (GHG) mitigation options currently available, and produced an options roadmap based on current research, to help reduce the food industry's contribution to global climate change. The document includes current best practices at the farm level and emerging options to reduce the emissions intensity of livestock production across a range of farm systems.

OrganicDataNetwork

The 3 year long OrganicDataNetwork project has published its final 'synthesis report' aiming to increase the transparency and efficiency of the European organic food market through better availability of market intelligence. ORC led two of the project's work-packages: a) identifying who collects organic data in Europe and what is collected; b) undertaking case studies in the UK, Germany, France, Italy, the Czech Republic and the Mediterranean with the improving national organic market reports. The project report is available on <http://orgprints.org/28035/>. Other project publications, incl. a code of practice and manual for organic data collectors, are available on <http://www.organicdatanetwork.net/home.html>

European organic market continues to grow

In 2013, the European organic market grew by approximately six percent to more than 24 billion euros according to data provided by the OrganicDataNetwork, the Research Institute of Organic Agriculture (FiBL), and the Agricultural Market Information Company (AMI). Switzerland, Sweden, and Norway, showed double-digit growth rates. The countries with the highest per capita consumption were Switzerland; with more than 200 euros, followed by Denmark, Luxembourg, Liechtenstein, Austria, Sweden, and Germany. Overall, EU inhabitants spent an average of 44 euros on organic food. Globally organic sales as a proportion of the total food market were highest in the US and Europe; where Denmark (8%), Switzerland (6.9%) and Austria (6.5%) lead the way.

Big Farmland Bird Count

ORC staff and volunteers have been taking part in the GCWT 2015 Big Farmland Bird Count. Jo, Sally, Meg, Bob the Birder (Can he spot it?) and Ali counted 21 species of birds at Elm Farm, which is a similar number to last year. More unusual species included a greylag goose, and the most abundant, a flock of 15 redwings.

Agroecology made into law in France

The development of agroecology in teaching and research, and the creation of economic and environmental interest groupings (EEIG) is a key part of a new "Law for the future of agriculture, food and the forest" and marks a new phase in land policy by encouraging the establishment of young farmers and the protection of agricultural land. It is an important step in meeting society's expectations reducing the use of pesticides and the development of alternatives for plant protection (biological control, natural preparations, etc.). Elements include:

- Restricting the use of antibiotics in livestock farming, in the fight against antibiotic resistance
- Reducing pesticide use: target 50% by 2025
- Major projects and works which take up agricultural land will now have to compensate the losses of agricultural production by financing projects that help strengthen the agricultural economy of the territory.
- Protection of vulnerable individuals from pesticide exposure e.g. schools, hospitals etc.
- Encouraging organic farming through the Ambition Bio 2017 project.

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The Organic Research Centre

is the UK's leading, independent research organisation committed to developing sustainable land management and food production systems based on IFOAM organic/ agroecological principles; disseminating knowledge to current and future farmers/ land managers and other related businesses; compiling evidence on systems performance and informing public debate through communication with policy makers and opinion leaders, and through them the wider public, in order to ensure the health and well-being of soil, plant, animal, people and the environment.

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Editorial:

Is there any prospect of a Danish dawn in the UK?

The Danish Ministry of Food, Agriculture and Fisheries has announced a new £40m strategy to double organic farming and serve more organic food in public institutions. Denmark has a goal of doubling its 2007 level of organic land by 2020 and to do so will strengthen the development of the organic sector, encourage conversion and work with alternative ownership and operation models. Organic farming is seen as a key part of Denmark's agricultural and food policy and a valuable source of export income.

Other EU countries have the same view and the new EU Commissioner, Phil Hogan, when opening the Biofach trade fair, described the organic sector as "in the vanguard" of the new EC's agriculture policy for creating growth and jobs.

This perspective is not shared by the UK. Whilst the organic sector has grown and prospered in all parts of the EU and the rest of the world, we have experienced stagnation and even decline during the coalition years. On the cusp of an election and a new government, is there any prospect of a Danish dawn for organic food and farming in the UK – or even anything different?

It looks unlikely. Farming Today's recent interviews with the spokespersons of the leading political parties did not throw up a single hint that organic farming is on anyone's mind let alone agenda. There was a depressing sameness and same oldness from the three main parties about UK food and farming in general. Phrases like "world leader", "sustainable and competitive on the world market" and "consumer confidence that we have the best food in the world", were trotted out as they have been for most of the last 15 years. These clichés have never been turned into policies and reality and it's hard to see what is going to change now.

No-one mentioned the need to reverse the cuts in Defra and to reinvigorate its innovation and give it a role at the centre of government. That speaks volumes about how little regarded is food, farming, biodiversity, environment and the sustainable management of finite natural resources by those at the heart of our government and political life. Until that changes, organic food and farming in the UK will remain largely marginalised.

It is not for us to advise on how anyone should cast their vote in an election. We can say that, whatever the outcome in May, the organic sector will be best served if it can forge better working alliances between its different parts. Within the pages of this Bulletin there is plenty of good news – positive news from the market, excellent research outputs, exciting insights on trade – and even in difficult areas, such as the battle over EU support and regulation, there are things from which we can take heart; such as the efforts of the EU organic sector and the positive work of Defra officials.

ORC's report for Scottish Natural Heritage on Agroecology and Sustainable Intensification, which will be published after the election, will also highlight what can be achieved.

We have said before that organic farmers and growers need to represent themselves better in policy areas, with a united front. We still hold to this but a reinvigorated alliance of all in the UK organic sector will be crucial in the next period. Working together to win wider citizen and consumer support is the key.

In her comments to Farming Today, the Food and Farming Minister Liz Truss inadvertently set out some key points of conflict between industry and consumers, government and citizens: The drive to push back pesticide regulation; to introduce GMOs; to reduce and further threaten food safety and environmental protection in the interests of trade. These policies will be a lightning rod for consumer and citizen action and will heighten interest in organic food and farming. If we can work together to get across and deliver the message and reality that organic is truly food and farming 'you can trust', we may yet see a Danish dawn.

Lawrence Woodward



Leeks, cabbage and chips

For almost 30 years, plant substrates and growing media have been produced and mixed on site at Tolhurst Organic Partnership C.I.C. at Hardwick, Pangbourne. After adapting and experimenting with various ingredients over the years, Iain Tolhurst (Tolly) has found a mixture, largely based on woodchip compost produced on site, which is reliably producing healthy and strong transplants. ORC crops researcher Anja Vieweger reports on a grower-led field trial which compared it to a commercial, peat based compost.

In early spring 2014, funded by the Duchy Originals Future Farming Programme, Tolly set up a small trial comparing:

1. Woodchip compost produced on-site. The woodchip is composted for about 12-18 months, then sieved to remove any remaining larger wood pieces and enriched with vermiculite and lime.
2. Klasmann growing medium, a standard growing substrate for certified organic production ('KKS - Kompost Kultur Substrat') which contains peat, coir, green waste compost and organic fertiliser.
3. And 4. Both the above media enriched 10% v/v with Biochar Soil Improver which contains biochar, mycorrhizae, wormcasts and seaweed.

Cabbage and leek transplants were raised in each mixture in a replicated and randomised trial design; first in the greenhouse and later in the field (planted out in April). The performance of the plants was monitored throughout the entire growing period and plants were assessed for growth, health, yield and quality of the end produce.

Associated field lab events

Three field lab meetings took place throughout the trial period, enabling interested growers to follow its development, hear about other growers' experiences and give feedback and input to the experiment.

The **first field lab** was held in late February 2014 and introduced the trial, its methods and aims. Tolly gave an overview of the production of compost generally and the production of woodchip compost on his holding. Some of the growers present were motivated to test other materials for their own substrate mixtures and set-up their own small trials during the growing-season.

At the **second meeting** in the first week of April, the transplants were fully developed in the growing trays, with the cabbage plants almost ready for planting out in the field. The first findings were discussed and Tolly gave some feedback on the trial design and on setting up experiments in general.

The **third field lab** was held in the last week of September when outcomes of the trial were presented and discussed. Very useful feedback was received from participants and alternative options for producing and mixing home produced growing media were discussed; for example Pauline Pears' small experiment which achieved positive results when comparing leaf-mould compost with 'organic' (non-certified) growing substrate (New Horizon) for brassica transplants. The meeting reflected on the best methods for such small trials; especially how to maximise the reliability of results and the efficiency of the labour and money input.



April field lab looking at the trial transplants in the greenhouse

During the growing season

Whilst the cabbage plants did not show any major differences in growth during the first weeks after sowing, there was some effect in the leek plants. Those grown in Klasmann substrate (with and without added Biochar) seemed to have grown quicker and on average a longer (2-4cm) shoot length was measured. This levelled out later in the field, as six weeks after planting shoot length of the other plants had caught up. Tolly monitored pests and diseases during the entire growing period. Apart from the odd slug there was no notable infestation in either crop. For this reason, pathogens were only systematically evaluated at harvest. None of the described diseases had a negative effect on the saleability of the product.

Cabbage crop yield and quality

The average cabbage weight and quality was assessed during harvest. For this, three harvest windows were marked out in each row (12 windows in total) where the weight of the harvested cabbages before and after trimming was assessed. There was no significant difference between the treatments (see Fig. 1).

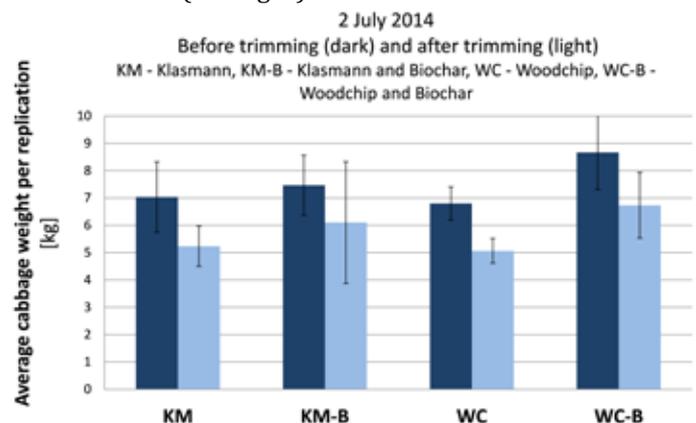


Figure 1: Average cabbage weight in the four different rows at harvest



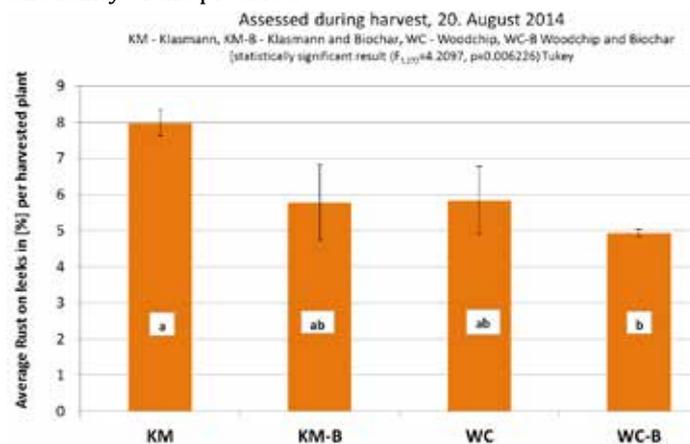
Cabbage trial set-up in the field. Plants raised in the four different growing substrates were planted in four rows, with two guard rows on either side to buffer any occurring edge-effects.

However, there was a tendency (not statistically significant), for the cabbages raised in substrates with added Biochar, – particularly the woodchip based, to be slightly heavier/larger.

There was no apparent difference in the quality or the yield between the treatments; the average quality ranked by Tolly ranged between 7 and 8 out of 10. No significant differences were found for slug damage; however, a slight trend towards a higher number of the pest occurrence in plants raised in substrates with added Biochar was seen; and the range of ranking numbers within these replications was larger.

Leek crop yield and quality

As with the cabbage harvest, leek harvest windows were marked out in 3m lengths. Plants were loosened with a fork, pulled out with the roots and freed of any attached soil. The stalks of each replication were then weighed and assessed for fungal diseases and quality. After all assessments were completed, the stalks were trimmed and weighed again for the total saleable yield. All harvested leek plants were evaluated (24-29 per pseudo-replication and three replications per substrate). The disease spread was estimated as a cover percentage of all the leaves on the plant. In all replications of each substrate a number of stalks showed the beginnings of the Onion Whiterot (*Sclerotium cepivorum*) fungal disease. Most of the damage was removed during trimming and there was little or no influence on the saleability of the produce.



*Figure 2: Infestation of leeks with Rust (*Puccinia allii*) at harvest. (Variants with different letters are significantly different from each other.)*

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Rust (*Puccinia allii*) infection was just starting to show in all substrates and replications but it had no effect on the trimmed/saleable end-produce. Plants raised in Klasmann substrate showed a statistically significant ($F_{3,272}=4.2097$, $p=0.0062$) higher infestation than those raised in the other three substrates (around 8% compared to 5-6%). Post hoc testing using Tukey's HSD test revealed a significant difference between the control (Klasmann substrate) and woodchip compost with added Biochar (p adjusted=0.00423), (see Fig. 2).

Conclusions with a caution

The trial was set-up on a small scale, aiming to represent 'average' and comparable conditions of growers' own trials and experiments. Many trials comparing different growing media do not consider later effects in the field (e.g. ongoing robustness, resilience etc.) and so it was interesting to follow the crop all the way through to the end of the growing period.

It demonstrated that the tested woodchip compost can be successfully used to replace a commercial growing substrate containing peat. The trial showed that growth, health and even yield of the assessed crops were comparable, with only small differences in weight or quality. In one instance plants raised in woodchip compost and Biochar performed better than the commercial control.

However the results have to be evaluated cautiously.

After a long growing phase in the soil it is unwise to draw definitive conclusions on the reasons for the differences found. Attributing these solely to the growing media of the transplants cannot be done with certainty. Nonetheless, the trial revealed some interesting results that can be followed up in more in-depth experiments, and whilst being site-specific it provides sound information for growers' decision making.

Engagement with enthusiasm

This trial/field lab engaged over 50 growers, advisors and other interested stakeholders, in some cases, inspiring them to try producing their own compost or growing medium, or to compare alternative substrates for their own business. The possibilities and approaches of trialling new products or methods on a small scale, specifically tailored for the circumstances of a holding or business were demonstrated and discussed. As a result, a small network of enthusiastic and engaged growers and advisors has formed. They plan to exchange knowledge and experiences on this subject in the future.

As for farmers' own trials in general, it is very important to find a balance between scientific research approaches/ rigour and site-specific, practical and feasible experimental methods. Within limited budgets it is not always possible to cover all potential influences and aspects of the research question being studied. But it is possible to address site-specific aspects and needs and to provide a sound basis for future decision making which – with suitable caveats – can also be valuable to other growers and sites.

For the full report go to:

<http://www.soilassociation.org/innovativefarming/duchyoriginalsfuturefarmingprogramme/fieldlabs>

What has research ever done for me?

“Well, I’ve learnt a great deal about growing through the various trials and research I’ve been involved in over the years and feel very lucky to have had the opportunity” says leading organic grower Iain Tolhurst.

There’s a general feeling amongst farmers and growers that research bears little reality to life on the farm. Researchers, scientists and academics seem to be from another planet with little connection to the problems that matter to the farmer. And - with masses of information gathering dust in filing cabinets instead of filtering down to practitioners – there is some truth behind this view.

In this respect, organic research has performed considerably better than conventional research. Despite relatively little of it being done, due to sparse funds and resources, far more of relevance has reached the farmers and growers. This is probably because the organic world is a small one and networking between producers is very strong compared with conventional farming.

I’ve been involved in a large number of research projects and trials spanning more than 3 decades and for the most part I’ve always felt some benefit to myself in terms of knowledge and experience but also to my business, which for most farmers is what really matters. I’ve always kept the question “what will this piece of research do for me?” firmly in mind.

Weighing things up

This question always needs to be asked by producers before they embark on a research activity. They are investing time and they have to show some sort of return. Individual producers need to decide how long they can wait to see a return on that investment; for some it may only be a season or two, others maybe can wait for many years and look perhaps far more into the future. Much will depend on the financial viability of the holding. In general, the smaller the turnover, the less likely much time can be spent on research projects unless they are funded at least in some part.

Of course many growers conduct their own on-farm trials of various types; this may be as simple as comparing a new or alternative variety of a vegetable against their standard cultivar. This will often yield useful results in only a season or two but there is a risk that one seasons good performance may not be repeated in following years when conditions may be quite different.

And here lies the main problem of carrying out any research: there are potentially so many variables that can cloud the resulting picture. The other main issue concerns sharing and dissemination of any useful material that may come out of on-farm trials. Unless knowledge is shared it has little value to anybody except perhaps the practitioner and even that may be questionable.



Iain Tolhurst (Tolly) with ORC researcher Anja Vieweger

“DOFFing”

This is where the recent initiative – the Duchy Originals Future Farming Programme (DOFF) – comes in. This approach to on-farm research has brought a new interest from producers in carrying out trials and research as there are real advantages to conducting farmer/grower-based research under the safety and security of a body to keep things on the right track.

- DOFF is run by the Soil Association, in conjunction with ORC.
- DOFF research and field labs are producer focused. There is no assumption that scientists have all the good ideas
- Each lab is hosted by a producer who has pinpointed a problem and is trialling how to tackle that problem
- A small group of farmers meet 2-4 times during the trial to track progress and compare notes
- DOFF provides a facilitator to help organise the field lab and a researcher, both to help out with measuring progress and to learn about the producers’ needs and research priorities.
- DOFF pays for materials and in some cases an element of labour input.

The future of on-farm R&D

Many of the research ideas are coming from the farmer/ growers themselves. They understand the practical daily challenges of their farm businesses and are in the perfect position to nominate projects. A bottom-up approach commands more interest from the people on the ground.

Conducting trials under the umbrella of two well-known and respected organisations gives real credibility to the results. Having ORC heading the research brings a wealth of experience spanning almost four decades.

The field lab model works well for producers who feel that they want to do trials and, importantly, wish to share the experience with other producers. The approach brings the advantage of structure in carrying out on-farm trials; giving the producer a clear set of guidelines and protocols to follow. Having a skilled and experienced researcher involved gives the producer the information and confidence to manage the day to day running of the trial; it also brings a discipline to maintaining the project and ensuring that the outputs are met.

I hope that on-farm field lab style research will be the future path of R&D on farms and feel it will bring great benefit to organic producers. It should encourage more farmers to come forward with research projects and share the results with all who have an interest but especially other producers.



Forwards, backwards and sideways: where is the EU organic reg going?

*The potential implications of a new organic regulation are massive for producers throughout the EU and not least for those in the UK. There was widespread dissatisfaction with the proposals of the outgoing Commission but will a compromise text be better received? **Susanne Padel** gives an update and highlights the points Defra are fighting for.*

Following the furore caused by the Commission's first proposals the Italian Presidency came up with a compromise text last October. However no agreement was reached and it now the Latvia's turn as EU President to try and reach secure agreement by the EU Council. Italy's handover included some 'political guidelines' for outstanding issues. A committee of the EU Parliament (EP) is currently also discussing the draft with the aim of bringing a resolution to a vote in the plenary session in May before trilogue negotiations can start in May. All parties are seeking to put a positive spin on things but the timetable is very ambitious and it's not at all clear that progress towards a broadly acceptable text will be achieved by June 2015.

A 'fresh look' and 'new approach'

EU policymakers and organic stakeholders came together at February's BIOFACH – the world's leading organic fair – held in Germany. The message from the organic movement was clear: Organic is the only sustainable food and farming concept regulated at EU level and despite ongoing financial crisis still shows continuous growth in Europe. The organic regulation must therefore support the dynamic development of the sector and not threaten its growth. For his part, the new European Agriculture Commissioner, Phil Hogan promised a fresh look and a new, solutions-oriented approach in his keynote address to the opening ceremony. Representing the Latvian Presidency, Armands Krauze, Parliamentary Secretary of the Ministry of Agriculture, highlighted the importance of a growing organic sector in Europe that contributes to the delivery of the goals of the Latvian Council Presidency – sustainability, competitiveness and growth. However, the European Parliament rapporteur, Green MEP Martin Häusling, stated the ambition in the Parliament: "We don't want a complete revision of the EU organic regulation, but a reform that will work in practice."

Getting it right is more important than speed

This is close to the organic sector position but the IFOAM (International Federation of Organic Agriculture Movements) EU Vice President Sabine Eigenschink, warned, "It's not only about deciding on the political questions. We also must ensure that in the end there is a technically sound regulation that also simplifies the daily life for operators. At the moment, it seems that EU institutions underestimate the time needed to ensure this." Per Kølster, Chairman of Organic Denmark agreed "the quality of the final proposal is of critical importance and this must not be compromised in the interests of speed."

Christopher Stopes, IFOAM EU President reiterated, "There are IFOAM EU solutions on the table. We are eager to continue the work with EU institutions on a practical way forward."

But as ever, different member states have differing, and not always overlapping, interests. As far as the UK is concerned, Defra has been consulting stakeholders and working hard to ensure their interests are well represented in Brussels.

Protecting UK organic

There is, for the most part, unanimity within the UK organic sector and Defra is doing its best to represent those views. The following issues have emerged at the various stakeholder meetings.

- **Trade regime proposals:** It is thought desirable to maintain some reference to the concept of equivalency rather than full compliance. Defra has submitted an alternative proposal on trade maintaining equivalence under some circumstances to the Latvian Presidency.
- **De-certification thresholds for non-authorised substances:** There is widespread concern that the EU proposals are unworkable and would change the emphasis of the organic regulation from process-based to being end product-based. The proposal also undermines the polluter pays principle. Stakeholders feel that a unified EU approach using trigger points for investigations would be more acceptable.
- **Retailer controls:** Views are mixed as to whether retailers of pre-packed products should be included in the EU control regime. Some argue that the current exemption should be maintained; others consider registration with risk-based controls, a potential way forward, giving low risk enterprises a virtual exemption.
- **Group certification:** There is no consensus in the UK and Defra would welcome further views on who might qualify for group certification (e.g. potential thresholds based on average turnover).
- **Environmental management system:** The proposal to remove the obligation for non-farming operators was widely welcomed.

Other issues still under discussion include the proposal to restrict operators to one control body, the requirement for 95% organic to also apply to organic feeds, several definitions and matters relating to 'exceptional rules', and a suggestion that Defra should lobby for the removal of the additional origin of raw material labelling requirement.

There is still much ground to cover to produce a regulation which is broadly satisfactory. At a recent meeting, the diversity of opinions among EU ministers was demonstrated. While acknowledging the progress made under the Latvian Presidency, most ministers also cited areas (including thresholds and the frequency of controls) that would require deeper analysis and additional work. At the moment it's not clear if things are moving forwards, backwards or sideways. It remains to be seen whether a compromise can be reached by June 2015.



Grow oats, eat oats: Make the world a better place

Would the world be a better place if we grew and ate more oats? Nick Fradgley outlines the highlights and key achievements of the QUOATS project – Harnessing new technologies for sustainable oat production and utilisation – as it comes to an end.

Oats have long been valued as health promoting and an easy crop to grow; generally requiring fewer inputs and adaptable to a wide range of soils. However, oats are still considered a 'minor cereal' and the main aim of the QUOATS project – leading on from Oat Link in 2009 – has been to promote oats as a commercially competitive crop for growers and end-users. Led by the Institute of Biological Environmental and Rural Science (IBERS) in Aberystwyth, the project included a wide range of partners from both academic research and industry to ensure that the latest scientific research was relevant for farmers and consumers.

Oat breeding

The vast majority of modern oat varieties grown by UK farmers were bred at IBERS. Around 200 winter and 100 spring oat crosses are made each year. By intercrossing modern parent varieties as well as oats with novel genetic backgrounds from around the world the breeders create genetically diverse populations which can be used as breeding material.

Considerable progress had been made over the course of the project in mapping the oat genome. Wild relatives such as *Avena atlantica* and *Avena strigosa* are also being analysed which will hopefully give breeders a better understanding of how the three genomes (A, C and D) contribute to the modern cultivated oat. These wild relatives, often originating in the 'fertile crescent' around Turkey, may well provide invaluable genetic resources for novel qualities such as disease resistance, drought tolerance or grain nutritional qualities.

Using modern plant breeding technologies, such as Genotyping By Sequencing (GBS) and Marker Assisted Selection (MAS), breeders are able to identify the location of particular genes and how they are expressed as traits or characteristics in the growing plant. Markers can then be created to select material containing relevant genes from thousands of breeding lines. In this way breeders have developed oat varieties that have desired qualities such as mildew and crown rust resistance, low-lignin husks, kernel content, enhanced β -glucan and oil content as well as yield components such as grain size and number of grains per panicle. In the last five years, ten varieties have been entered in National List trials and five have made the HGCA Recommended List.

Quality oats

Oats are an excellent crop to grow within an organic rotation but, whilst returns can be good, the market has at times proved to be unstable. A great deal of agronomic work has been done to improve crop yield, but millers and other end-users have quality requirements which growers must meet to achieve a milling premium in the market place. The effect of the growing environment and management on grain quality seems to be variety dependent, with the



Nick Fradgley in ORC organic oat trials at Wakelyns Agroforestry

older variety, Mascani, being the most consistent in terms of quality – which is why it remains the millers' favourite. Development of new varieties with a higher yield and nitrogen use efficiency whilst maintaining qualities required by millers continues to be the main breeding priority.

By examining genetic and environmental factors affecting the relationship between yield and quality, the project has sought to enable breeders to create varieties most suitable for the specific end use and hopefully secure a more reliable market for farmers.

There has always been contention among producers and millers as to how useful specific weight is as an indicator of milling quality compared to other measures such as kernel content or hullability which is related to grain length and roundness. However, in practical terms specific weight is the easiest measure of oat quality upon which millers can offer premiums without doing more detailed analyses. Although grains per m² was found to be the greatest determinant of yield, thousand grain weight is a better indicator of milling qualities such as kernel content.

Healthy oats

People are becoming increasingly aware of the health promoting benefits of oats and there has been a steady rise in consumer demand. Most publicised is the role of β -glucan in regulating cholesterol levels and preventing heart disease. To target this component, breeders have developed markers for genes associated with higher β -glucan levels which they now routinely use in breeding programmes. Greater 'available' nitrogen levels were also found to increase β -glucan as well as protein content.

The sensory perception (e.g. taste, texture) and shelf life of oats were found to be affected by varietal differences in specific volatile fatty acids which are mainly products of lipid oxidation.



The importance of avenanthramides, a group of antioxidant phenols with powerful anti-inflammatory effects, has also been highlighted. Their anti-inflammatory properties have been recognised as an effective addition to the diet, as well as to oat-based extracts in skin creams.

The production of avenanthramides is thought to be driven by infection of foliar diseases, including crown rust, in susceptible varieties such as Balado. Interestingly, samples from ORC organic trials stood out as having higher levels of avenanthramides compared to three conventional sites in a year with significant disease pressure.

Oats for sustainable crop production

Agronomic trials across the UK over five years have looked at variety performance in a wide range of environments. Trials conducted by ORC highlighted the value of oats as a low input crop in organic systems. As non-chemical weed control is an important factor on organic farms, the weed competitiveness of oats was a particular focus and differences were found among the varieties' weed suppressive ability as well as weed tolerance. Crop traits such as tillering ability and leaf area (as measured by Leaf Area Index) were found to be useful for weed suppression; however, below-ground competitive effects including efficient nutrient uptake, allelopathy and rapid early growth rates are also thought to be important.

As well as examining the nitrogen use efficiency, a lodging model was developed by ADAS in conjunction with structural engineers at Birmingham University to dissect the components of lodging resistance in oats. Straw height, stiffness and root structure all play an important role and oats are thought to behave more like oil seed rape than wheat in the way that the panicles form a binding canopy. This also occurs, to some degree, in awned varieties of wheat.

Due to increasingly tighter FSA restrictions on mycotoxin levels, work has been done to compare the genetic and environmental factors affecting mycotoxins as a result of Fusarium infection. There are clear varietal differences relating to Fusarium resistance, with spring varieties generally having lower levels than winter varieties even when both are sown in the winter. The winter variety Balado seemed to be most susceptible.

Samples from the ORC organic site had consistently lower mycotoxin levels probably due to the greater interval between cereal crops in a longer organic rotation. Straw height is also an important characteristic for reducing grain infection. This is not simply because the greater distance makes it harder for the Fusarium pathogen to progress from the leaves to the panicle, but because some genes relating to straw height and Fusarium resistance are intrinsically linked.

Oats for sustainable livestock production

As well as being a healthy and sustainable food for people, oats are also valued as a more sustainable feed for livestock, particularly if they can be home-grown. Trials conducted by Bernard Matthews show that newly developed oat varieties with enhanced oil content have better energy value and that naked oats can replace less sustainable oil and fat sources, such as imported soy, in poultry rations. Husked varieties

with a lower lignin content may also be particularly valuable as feed for ruminants which produce less methane greenhouse gas as well as favourable milk output and quality.

“And in the end...”

The QUOATS project was led by Aberystwyth University (IBERS); jointly sponsored by BBSRC, by Defra through the Sustainable Arable LINK Programme, by European Regional Development Funding through the Welsh Government's Academic Expertise for Business (A4B) Programme, and through the Scottish Government Contract Research Fund with funding from AHDB and industry partners.



The project partners were ADAS UK Ltd, Bernard Matthews Ltd, British Oat and Barley Millers' Association, Du Pont (U.K.) Limited, Felin Ganol Watermill, G B Seeds, Harper Adams University, James Hutton Institute, Mole Valley Feed Solutions, Nairns Oatcakes Ltd, Oat Services, Organic Research Centre - Elm Farm, Phytatec (UK) Ltd, Poultry Xperience, Senova Ltd and the DairyCo, EBLEX and HGCA divisions of the Agriculture and Horticulture Development Board (AHDB).

The project website at www.quoats.org has further information but to answer the question posed at the beginning: Yes, farmers should grow more oats and people should eat more oats, because it is clear that the world would indeed be a better place if we were all getting more oats.

Black grass field lab



This field lab examines the approaches and experience that John Pawsey has had at Shimpling Park Farms bringing sheep back onto an arable farm and the range of strategies available for dealing with a black grass problem. Participants, at the meeting in March, saw the effect of recent grazing on winter wheat sown at two different timings as part of the Duchy Originals Future Farming Programme (DOFF) funded field trials. Other approaches such as using competitive crops, cover crops and spring cropping were also compared in the field and across the farm rotation. Subsequent field lab meetings later in the year will involve recording the black grass population numbers resulting from the different approaches. Other methods, including using a weed surfer at the optimal time when weed seed are not yet viable, will also be investigated.

Towards 100% organic feed for pigs and poultry in the EU

*From December 2017 all organically produced monogastric animals in the EU will have to be fed a 100% organic diet. The European Commission (EC) is also considering the extent to which feed should be locally sourced from the farm or region. ORC has been working in a consortium of 11 organisations from 10 countries to examine how this might be achieved. The results of the ICOPP project (Improved Contribution of local feed to support 100% Organic feed supply to Pigs and Poultry) have recently been published. In the following pages, **Jo Smith** and **Catherine Gerrard** highlight the findings of this critical research.*

ICOPP included a range of feeding experiments with pigs (sows, piglets and finishers) and poultry (layers and broilers) focusing on concentrate feedstuffs, roughage, and foraging from the range. In addition three complementary activities provided an overall strategic perspective:

- an analysis of the availability of relevant feeds across Europe;
- a drawing together of comparable information on feeding values of new feed stuffs for practical planning; and
- an economic and environmental assessment of new strategies.

Organic feed availability and demand in the ICOPP countries and in Europe

In order to evaluate the availability of feeds across Europe existing literature and relevant statistical data on organic feed were compiled; information sources for protein contents of key crops as well as existing data on protein requirements of pigs and poultry for the feeding calculations were investigated.

The countries involved in ICOPP – Denmark, Lithuania, Netherlands, UK, Sweden, Austria, Germany, Switzerland, France and Finland – are 69% self-sufficient in organic concentrate feed. Over 50% is fed to bovine animals, 16% to pigs and 31% to poultry. Their total self-sufficiency rate for crude protein is 56%. In all countries, except for Lithuania, organic crude protein demand clearly exceeds availability. The overall gap for these 10 countries is approximately 135,000 tonnes of crude protein. The supply gap of essential amino acids was even higher being just above 50% for lysine and about 40% for methionine. It is clear that these 10 countries – and by extension the rest of the EU – will not be able to produce enough organic protein for their livestock feed in the foreseeable future. To do so in any reasonable time frame will require major shifts in production.

The EC proposal that a higher proportion of organic livestock feed should be produced on-farm/in the region will present further difficulties and the ICOPP calculations show that this might be very difficult to achieve in some countries.

Pathways for 100% organic feed supply

ICOPP considered and evaluated what steps could be taken towards a 100% organic feed supply by looking at: how nutritional needs can be covered with organic feedstuffs at all production stages; what organic feedstuffs are available; and how more local feedstuffs might be made available.

Two critical points emerge: firstly, the difficulties of meeting the amino acid requirement of pigs and poultry particularly for young animals and secondly the lack of organic concentrate feedstuffs in Europe relative to demand. Some



Pigs foraging on lucerne, Denmark (credit: Anne Grete Kongsted, Aarhus University)

ingredients of organic origin needed to meet the protein profile requirements of young animals may be considerably more expensive than conventional alternatives. However, these would constitute only a very small part of total feed, e.g. approximately 1% of the feed in an organic pig production system, so the economic consequences are limited. The second point – and main problem – is the lack of organic concentrate feedstuffs in Europe relative to demand in terms of energy and protein and, in particular, methionine. These are essential in current feeding practices for monogastric animals. Therefore, more emphasis has to be put on the production of crops that are; a) suitable to organic farming; and b) have a high yield per ha of feed energy, protein and the relevant amino acids.

The potential of forage legumes

Legume forages, like lucerne, offer good potential. If harvested at an early stage of development, lucerne can make a significant contribution to covering the protein requirements of monogastrics, thereby supporting animal health and welfare. Also, in most cases, the introduction of a forage legume into a farm's cropping system is likely to improve its overall environmental impact. However, in order to achieve the full potential of basing feed more on forage legume crops there is a need to investigate the possibility of separating the easily digestible and protein rich part of the forage so that it can be targeted for use in the animal's life and production cycle where it is most needed and most physiologically appropriate, e.g. where the digestive system is less developed.

Innovative approaches like this will be essential to dealing with the problem but it is also critically important to note that the vast bulk of organic concentrate feed in the EU is fed to ruminant animals (around 1,000,000 tonnes). Strategically, if part of this was used for feeding monogastric animals – who arguably need it more – then a major pathway would be opened up.



100% organic rations feed for pigs and poultry – evaluating feed

Detailed knowledge of the nutritional value of organic feeds is important to support practical feed planning and to evaluate the prospects of new feeds. A particular issue has been to 'translate' findings from different feeding value systems in order to take advantage of EU wide results.

Feed evaluation of organically produced feedstuffs

Digestibility trials were performed on potential novel protein feedstuffs for organic pig and poultry production. These included: grass peas, sainfoin seeds (whole and dehulled), okara, microalgae, mussel meal and *Hermetia illucens* pupae and meals. In addition, the chemical composition, including estimated amino acid availability, of a range of more common organically produced protein feedstuffs have been established by the MTT Agrifood Research Centre in Finland.

Based on this work a comprehensive feed table with data on chemical composition and nutritive value of organic feed stuffs was produced by MTT.

A key aim was to gain insight into the digestibility of fibrous feeds with a focus on amino acids. For this *in vivo* trials with pigs were carried out based on direct sampling in the intestines. Generally a high digestibility of protein and amino acids was found in grass silage. An additional discovery was a clear demonstration that feeding fibrous feedstuffs such as grass silage or okara to pigs can prevent the development of gastric ulcers.

Roughage and organic pigs and poultry

Use of roughage is mandatory in organic livestock production, but the potential of roughage to contribute to the nutritional needs of monogastrics is unclear or is not taken into account in ration planning. A number of feeding experiments were performed to investigate this. The main findings are:

Growing pigs

- For growing pigs, inclusion of grass silage cut at an early stage of development in a mixed diet with concentrates does contribute to the energy and protein supply (and prevention of ulcer damage), but the overall production results (daily gain and feed conversion rate) becomes poorer when silage is included at a rate of more than 10%. At the same time activity/competition at the feed trough may increase, resulting in more skin lesions.
- In a diet with lucerne silage for growers no differences were found in growth rates when soybean protein was substituted with pea protein, highlighting the fact that forage does contribute to amino acid supply.

Poultry

- The methionine content in the protein of early harvested lucerne is higher than that of soya bean cake and almost twice as high as that of peas. It may provide an important source of amino acids for poultry. Early cut silage may be included in the diet of layers at a proportion of 20%



of dry matter without impairing egg production. In diets for slow growing broilers early cut lucerne silage can amount to 10-20% in the rearing period (week 1 to 4) and up to 30% in the fattening period (week 5 to 8) without impairing growth.

Foraging in the range

Access to a foraging area provides the possibility for monogastrics to partly cover their nutritional needs from biomass available in the range area, but very little is known on this issue, in particular how soil invertebrates may contribute. The abundance of soil invertebrates was researched and experiments with pigs and poultry performed:

- Of all the invertebrates studied, earthworms offer the most potential in contributing to the nutritional needs of poultry in particular, while having only a minor contribution to pig nutritional needs. 1m² of most habitats studied would contribute considerably to the daily requirements of laying hens for methionine, and in most cases, completely meet lysine requirements.
- Low-protein diets stimulate broilers to forage on the range area and direct foraging can make an important contribution to protein supply in broilers of slow-growing genotypes without detrimental effects on growth performance.
- For growing pigs direct foraging on well-established lucerne can make an important contribution to energy and protein supply in fattening pigs if the pigs are fed restrictively with a low-protein feed mixture and if they get regular access to new land (strip-grazing). However, the restriction in supplemental feed reduces growth rate significantly. While the feed conversion rate of the supplied concentrate improves, the overall feed conversion rate becomes poorer. This was also seen when feeding grass silage to growing pigs. Thus, it seems that for growing pigs foraging is useful in supplying amino acids.
- For lactating sows fed considerable amounts of concentrate the intake of grass DM in the diet intake varied between 0.2 and 1.6 kg DM sow⁻¹ day⁻¹ as determined by the profile of n-alkanes. These results indicate that lactating sows fed with relatively large amounts of concentrate are able to utilise nutrients in the sward if it is maintained in a good condition.



Feeding organic concentrates

Eight feeding experiments – aimed at ensuring an appropriate nutrient supply for pigs and poultry – were carried out with various organic concentrates. The main findings are:

Pigs

- Sainfoin seeds are of high nutritional value, particularly if dehulled (similar to soybean cake), and can partially (up to 15% in the diet) substitute commonly used protein sources. They can also be used in feeding of weaners.
- Nutrient content of grass pea seeds is slightly higher than that of faba beans, but care must be taken due to anti-nutritional substances. Grass pea seeds can partially (up to 30%) substitute commonly used protein if subjected to appropriate heat treatment. They can also be used for weaners.
- Mussel meal can replace common protein sources in feed for growing/finishing pigs with maintained production results in terms of growth, feed efficiency and carcass quality. Inclusion rate should not exceed 5%.
- For lactating sows peas and faba beans are appropriate protein sources.

Poultry

- Preliminary trials suggested that protein from organically produced *Spirulina* algae can replace protein from traditional organic sources in broiler diets.
- Refining of ingredients of plant origin enriching the relative content of methionine seems to be a useful way to supply relevant protein sources for poultry, e.g. for sunflower seed expeller.
- Insect meal (*Hermetia illucens*) up to 12% in the diet of layers can replace soybean cake without any difference in egg production, feed conversion, health and taste of eggs.

Reaching 100%

It is clear from ICOPP that is possible to rely on organic feedstuffs of European origin to cover the needs of monogastrics in all stages of their production cycle. However, there is no single silver bullet solution. New feed sources can be introduced and existing ones used in new ways. A more strategic and structural approach will also be needed and it is unrealistic to expect 100% organic feeding of monogastrics to be achieved without major changes taking place.

Further information

A full list of publications from the project can be found at <http://www.organicresearchcentre.com/icopp/>

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Future directions:

Within the EU project AGFORWARD (www.agforward.eu), ORC has been working with producers within the Sainsbury's Woodland Chicken Development Group to improve the range for the poultry. One of the main issues identified by producers is the lack of vegetation under the trees due to a closed canopy reducing light levels, and where trees have been pollarded to open up the canopy, weeds have established rather than grasses. Over the next two years we will be working to develop shade-tolerant sward mixtures that establish and survive under the trees plus offer potential nutritional and medicinal benefits for the chickens.



Practical research and innovation – diversity in practice

The 9th ORC Organic Producers' Conference was held in Solihull, 26-27 November 2014. For the first time two popular organic events were brought together to allow more people to participate. The Soil Association's National Soil Symposium, which preceded the Producers' Conference, looked at resilience. The ORC conference had producer-focused technical and business workshops on the first day, and an emphasis on current research and innovation activities on the second.

Diversity in practice

Plenary: Organic farming and sustainable intensification?

Emeritus Prof Allan Buckwell (Institute for European Environmental Policy), Patrick Holden (Sustainable Food Trust).

Both speakers gave their views on what sustainable intensification is and discussed the problems of defining it and its individual components. For Buckwell, it should mean producing more food while not damaging the environment but it is a path/process. The EU's very intensive farming systems need to focus on sustainability; improving productivity without further intensification. Achieving this will be site and system specific and organic farming has a role to play. Holden explained why he entered farming and said that his system and organic standards are sustainable intensification in practice. However, he argued that organic standards can be inhibiting and do not encourage continual improvement. There is a clear need for farm level metrics (which are not composite metrics) which will measure how well a farm is doing and show how further improvements can be made.

Making money out of growing fruit and vegetables

Roger Hitchings (OGA), Ben Raskin (Soil Association) and Tony Little (OCW)

The session discussed the notion of profitability and split into several sales avenues to establish the highlights and concerns for profitability. CSAs, box schemes, wholesale and farmers' markets were discussed in detail by four small groups.



Prof. Allan Buckwell

Growers need a good understanding of production systems in order to identify opportunities for cutting costs; to justify investments (e.g. putting up another polytunnel); to secure loans; and to monitor and modify their business. Decisions, such as which crops to grow, and importantly, which ones not to grow, which ones to buy in or leave out altogether, are crucial. The discussion brought out the following points:

- Labour costs are highest and most difficult to record, per job or per crop.
- A smartphone app is used by some growers.
- Profitability per crop versus per job is relevant for some sales avenues, for example in box schemes.
- Social profits and benefits need to be factored in, when assessing profitability of various sales channels.

The GM threat: time to take action

Bruce Pearce (ORC), Lawrence Woodward (GM Education) and Claire Robinson (Earth Open Source)

An update on EU policy on GMOs was provided, highlighting recent moves to allow individual member states to permit or ban GM cultivation. This will pave the way for commercial GM cropping in the UK. An update of the health risks from GMOs showed results from recent laboratory and animal feed studies highlighting a range of toxic and allergenic effects from GM feed. An overview of the impacts of GM technology on farmers was given, with examples of increased herbicide use and resistance in weeds within GM crops. The lack of availability of non-GM seeds for certain crops (e.g. soybean) and control of supply chains by corporations such as Monsanto was highlighted as a major logistical challenge. As was the threat to the organic sector due to cross-contamination.

Breeding for organics – new populations and varieties

Andrew Whitley (Bread Matters), Andy Mitchell (Defra) and Edwin Nuijten (The Louis Bolk Institute)

This session addressed organic plant breeding from a range of perspectives, including the development of locally relevant, diverse bread wheat varieties, the recent changes in EU legislation for seed which allows the temporary marketing of composite cross populations, and examples of ground-up initiatives where farmers and growers are central to the breeding programme. Andrew Whitley spoke about his project 'Scotland The Bread' which aims to refocus the entire Scottish bread supply on a local basis.





Andy Mitchell outlined the background and aims of the pilot regulation allowing populations (as opposed to distinct, uniform and stable varieties) to be sold. Edwin Nuijten gave examples of cooperative breeding initiatives in the Netherlands. The general conclusion was that progress is being made in organic breeding, but its future relies on input of all actors involved in the food and supply chain, from farmers through to end-users and researchers.

Securing the future: making succession work

Michael Mack (Smiths Gore), Polly Davies (Slade Farm), Tony Evans (The Andersons Centre) and Gareth Taylor (Red Deer Farm)

With presentations from both consultants and next-generation farmers, the workshop gave insight into the process of succession from both sides of the table. Polly Davies's top tip for prospective farmers was "if you do want to farm, do it now – there are worse bosses than your parents". Tony Evans and Gareth Taylor presented the case for alternative models of succession, such as joint ventures, showing that succession doesn't have to be through family. Michael Mack shared his experience in successful succession planning – you only get one go at succession so it's important to get it right!

EU Organic Regulation

Christopher Stopes (IFOAM EU) and Nick Turner (Defra)

Christopher Stopes stated that the proposed changes to the EU Organic Regulation are potentially threatening the organic sector but the implications have not been well evaluated or communicated. The proposed text calls for substantial changes but is legally weak. Nick Turner described the UK reaction to the proposals. The discussion identified opinions on a number of issues: difficulties in abolishing all derogations were pointed out; specifically welfare issues and varying requirements in different countries. Progress has been made in removing seed derogations and now the market should be driven forward towards systems which ensure that as many organic seeds are produced as possible. Group certification in the UK should stay on a voluntary basis, and be informed by nations who have had positive experience with its implementation in the past.

Keeping growing: ensuring success

Alice Holden (Growing Communities), Jon Goodman (Ragmans Lane Market Garden) and Simon Crichton (Triodos Bank)

Alice Holden and Jon Goodman described their experiences during the first years after their apprenticeship. Simon Crichton of Triodos Bank, gave advice on financing such start-up businesses. He pointed out that renting land is usually much cheaper than buying even in the long- term; and the approach of Jon and his partners, having external part-time jobs to support their business during the first years of establishment, is a common model of financing. To the question how long it took them to establish a stable and successful business," answers from the more experienced growers in the room included "42 years and counting" and "living in a caravan for the first 8-10 years, before really getting to know the land and the system."

Designing agroforestry systems

Jo Smith (ORC), Stuart Holm, Emma Mayo and Hamish Thomson (Woodland Trust)

The session was hands-on with everyone getting involved in designing an agroforestry system. Jo Smith described a range of systems, some of which, although familiar, may not initially be recognised as agroforestry practices e.g. hedgerows. Jo presented the key design considerations for agroforestry systems, emphasising the importance of managing interactions between system components and of designing in a way that enhances positive interactions while minimising the negative. Split into three groups, each given a case study farm, participants then designed a system using Jo's guidance. The case studies included arable, livestock and horticultural systems. Finally, Hamish Thompson covered the availability of Woodland Trust grants for tree planting and the opportunities presented by Countryside Stewardship with its focus on national flood management.

Emerging opportunities in organic supply chains

Emma Rose (Soil Association), Ben Pugh (Farm Drop) and Gareth Davies (CSA Network UK)

This included an overview of new marketing opportunities for organic growers, an update on progress within the Food for Life Catering Mark and the online platform 'Farm Drop' (<https://www.farmdrop.co.uk/>). The session also provided an outline of some of the risks and opportunities associated with developing a Community Supported Agriculture (CSA) scheme, with reference to some successful projects in the UK. The active discussion highlighted the level of interest in new marketing opportunities and the innovative ways in which the organisations represented are working with producers to overcome difficulties (e.g. situations of under- or over- supply). There was a consensus that public procurement and alternative routes to market are an important part of sustainable business strategies and with the growing interest of consumers and Government in such schemes, the future looks bright.

Micro-dairies

Josh Healy (North Aston Dairy), Tom Tolputt (South West Farm Consultants) and John Newman (Abbey Home Farm)

The number of dairy farms has declined by 92% over the last 60 years while the average herd size has increased by 635%. Productivity has increased by a factor of at least 2.5. Producers have been squeezed by retailers and processors and in a bid to maintain/increase profitability they have sought to minimise the cost of production by increasing the number of cows in the herd. The session explored alternative responses to avoid this production treadmill while maximising efficiency. These approaches include on-farm processing and retailing, or selling products of known provenance to meet customer demand. Farmers, Josh Healy and John Newman, shared knowledge and experience of running micro-dairies and by-passing processors and retailers. Tom Tolputt spoke about opportunities to maximise the efficiency of small-scale organic dairy farming through robotic milking.



Josh Healy



Policy/CAP implementation

Naomi Oakley (Natural England) and Nic Lampkin (ORC)

This session provided up to date news on what support will be available to organic producers in the up-coming Rural Development Programme (RDP), subject to EU approval in December 2014. Naomi Oakley gave an overview of CAP and RDP implementation plans in England. She also presented details of the Countryside Stewardship (CS) payments and options. There is a shift in balance of organic payments: relatively more for maintenance and less for conversion. Thanks to the engagement by ORC, OCV and others in the organic sector, the payments are better than first proposed. Nic Lampkin gave an overview of RDP and organic support in Wales. The situation in Scotland and Northern Ireland was briefly touched on.

Plenary: Agroecological solutions for future farming

Prof. Pablo Tittone (Wageningen University)

Pablo Tittone is professor in the Farming Systems Ecology Group at Wageningen University in the Netherlands. He gave a stimulating and energetic presentation setting out a global perspective of the agroecological approach for future farming. Agroecology can be described as farming with nature; incorporating diversity, resource efficiency, recycling, natural regeneration, and synergies between crops, livestock and trees. His key messages are that an agroecological approach is knowledge-intensive; it can also be high tech with scientists and farmers working together to design agroecological landscapes and food systems based on latest research and technologies. In some countries, agroecology is already accepted as the future of farming, e.g. Brazil has a national programme of agroecology.



Prof Pablo Tittone

Practical research and innovation

Postgraduate research in organic farming

Laurence Smith (ORC), Federico Filippi (Coventry University) and Stephen Meredith (IFOAM EU)

Two postgraduate students researching organic farming systems presented information on their research and the challenges they face in working in the organic sector. A key criticism is the lack of systems approach thinking within current PhD research. A brainstorming workshop followed to identify current challenges for postgraduate researchers in organic agriculture and possible ways to solve these as part of a UK-wide organic postgraduate research network. The workshop identified a general feeling of isolation amongst postgraduate researchers; a lack of access to information on unpublished and ongoing research; and the difficulty in establishing collaborative links between young researchers and practitioners. Potential solutions included: regular meetings between postgraduate researchers; and a web portal to act as a repository for information about current and past research and researchers.

Conversion planning and organic farm management

Edward Goff (farmer), Stephen Briggs (Adviser, Abacus), Sarah Hathaway (Soil Association), Nic Lampkin (Glastir Organic, Organic Centre Wales), Iain Tolhurst (Grower and adviser)

A series of perspectives and experiences were presented on the main components of the conversion process – the reasons, the plan, risk assessment, and advisory expertise available.

The discussion that followed the presentations brought out the following points:

- For advisers the real challenge is to get the farmer involved in the plan.
- From growers' perspectives, advisers are sources of information to which they don't otherwise have access.
- The grower needs to be educated in the value of the plans and use the plan on an on-going basis.
- Risk assessment needs to be stressed in both conversion and management plans
- Need to address the issue of expertise (or lack of) in the organic sector of conversion advisers.

Dairy research and innovation: breeding choice

Conrad Ferris (AFBI), Gillian Butler (NEFG) and Gordon Tweddle (Acorn Dairy)

The session covered various topics associated with breeding. Conrad Ferris spoke about research carried out in Northern Ireland on breed substitution (comparing Norwegian Red cows with Holsteins); cross-breeding (comparing Holsteins with first cross Jersey crossbred cattle and Holsteins); and three-way crossbred dairy cattle (Swedish Red x Jersey x Holstein). Gillian Butler talked about work under the low input breeds project on genomic breeding for low input farming. Gordon Tweddle spoke about his own experience with cross-breeding to produce cows that would appeal to his direct sales customers. The discussion period centred on whether genomic breeding would mean that cross-breeding was no longer required, and the suggestion that genomic breeding values could be used within cross-breeding.

Make legumes do the leg work

Hannah Jones (Reading University), John Newman (Abbey Home Farm) and Christine Watson (SRUC)

Researchers' and farmers' perspectives on growing and making best use of legumes on farms were presented. Dr Hannah Jones highlighted key results from the Leglink project, including the benefits of diverse legume mixtures in a fertility building ley for N fixation and providing food for pollinators throughout the year.

John Newman, who farms near Cirencester, gave his perspective of growing diverse ley mixtures on a mixed farm. Participating in trials within the OSCAR and Leglink project, John has looked at the value of the ley for N fixing and as livestock grazing, and has examined the cost effectiveness of the different mixtures.

Prof Christine Watson outlined some of the results from the Legume Futures project which assessed the value of legume crops in different farming systems across Europe. She highlighted the importance of legumes in permanent grassland and the need to replace imported soya as livestock feed.

**Mary Langman memorial workshop: Organic food quality and health***Peter Melchett (Soil Association) and Anja Vieweger (ORC)*

Following the 2009 Food Standards Agency (FSA) study organic produce has been portrayed by the media as no healthier than non-organic, adversely impacting on the organic sector. Peter Melchett presented the results of the 2014 Newcastle University led research which has shown organic produce contains significantly higher levels of anti-oxidants and significantly lower levels of cadmium than non-organic produce. However to continue changing public perceptions more research will be needed. Anja Vieweger presented research on health concepts, revealing how the definition of health varies between scientific areas. For future development of standards and policy a universally accepted and understood definition of health is needed: communication of what health means through demonstration may be an effective way forward.

Organic business management – tools and approaches*William Waterfield (Waterfield & White), Bill Grayson (farmer), Laurence Smith (ORC) and Richard Harding (Promar)*

The session opened with two thought provoking presentations: William Waterfield on making use of ORCs Public Goods tools in working with farmers on questions of sustainability; and Bill Grayson on what it was like to have this work done on his farm. This was followed by two facilitated discussions on tools for nutrient and carbon management. The carbon tools have differing approaches, but most seek to identify hotspots, such as livestock, energy use, forage production and changes in soil organic matter. Nutrient management tools are based either on analytics (anything from the soil to milk and blood) or on calculations; they aim to monitor the present situation and trends over time, and help assess mineral supplementation need and better systems design.

Diverse legumes and grass mixtures for forage/grazing*Rob Richmond (Manor Farm, Glos), Konstantinos Zaralis (ORC) and Angus Gaudie (Stamfrey Farm)*

Increasing sward diversity and fine tuning its composition allows dairy farmers to increase productivity, stability and nutritional content of the sward, resulting in increased farm profitability. Rotational grazing systems allow sward height to be maintained, facilitating faster regeneration. Mixtures of different clovers, vetches, trefoils and species such as chicory, plantain, meadow fescue, timothy, cocksfoot and particularly ryegrasses provide a nutritious and resilient form of forage for cows. Grassland management software e.g. Agrinet, allows the farmer to keep a record of which fields are under- or over-performing so that appropriate changes can be made to the system to sustainably increase their productivity.

On-farm trials: Learning from the horticultural field labs*Ben Raskin (Soil Association), Iain Tolhurst (Tolhurst Organic Produce) and Anja Vieweger (ORC)*

Today, it is widely accepted that organic growers innovate and do 'informal research' on their farms. They find DIY solutions to everyday problems and sometimes design novel production systems. However, alternative options need to be assessed and good tips must be shared with a broader range of growers. Organising a Field Lab is a way for growers and farmers to reclaim the research agenda and to bring about more relevant, useful and robust results for peers.

This kind of on-farm trial raises both methodology and feasibility issues. During this session, Ben (facilitator), Tolly (grower) and Anja (researcher) shared their perspectives on the Woodchip Compost Field Lab and explained the practical choices they made in terms of experiment design, replication, data record, results interpretation and dissemination. Participants discussed these trade-offs and the lessons to take home from this first attempt.

Improving the nutrition, health and welfare of organic pigs and poultry*Jason Gittins (ADAS), Catherine Gerrard (ORC) and Gillian Butler (NEFG)*

This was an overview of the main conclusions coming out of a number of UK- and EU-based research projects finishing this year. The implications of meeting nutritional needs with 100% organic feed using existing European protein sources appear to be a greater challenge for poultry than for pigs. There is potential for developing new protein sources such as sainfoin, grass pea and algae; including more roughage in diets; and encouraging better use of resources in the range. Matching the appropriate breed to the system was highlighted as important for improving welfare with some traditional breeds such as saddlebacks able to maintain performance as well as lower mortality rates. The presentations stimulated a good discussion ranging from whether the UK should lead the way on pushing forward the 100% organic feed regulation, through the requirement for changes in legislation to allow for more novel protein resources to be included in diets, to how better resources in the range can be accounted for.

Plenary: Farmer groups leading innovation and research*Victor Leforestier (BASE, France), Marc Duponcel (DG Agri) and Helen Browning (Soil Association/Eastbrook Farm)**Marc Duponcel, Victor Leforestier & Helen Browning*

The three speakers focused on different perspectives of the process of innovation and research, from the point of view of the farmer as well as a potential funder. Farmer group led research and innovation is a fundamental shift from how agricultural research used to be supported in Europe. We learned about some existing experience from the farmer network BASE in France and from DOFF in the UK. The discussion highlighted the clear potential for farmers and growers to take the driving seat in innovation; with knowledge exchange, networking and experimentation on farms all important. Field labs and research funds in DOFF as well as the new European Innovation Platform EIP AGRI should be able to support such groups. Researchers have a vital role in this process through their experience of setting up robust trials and experiments and analysing the data.

Session summaries, presentations and videos are available on-line at www.organicresearchcentre.com



Rotational grazing: Holistic and rational

Claims made about Allan Savory's 'Holistic Grazing Management' system have stirred up some controversy in recent months. In response, Natural England's Ian Alexander, who has observed and worked with organic farmers and the organic sector for many years, writing here in a personal capacity, recalls the ground breaking research of Andre Voisin which influenced the highly successful grazing management of many organic and conventional farmers.

I've seen three commentaries of Allan Savory's 'Holistic Grazing Management' in recent months ranging from the directly hostile (George Monbiot) through the sceptical (Mark Measures) to the broadly supportive (Patrick Holden). Savory certainly sparks controversy which is not always enlightening.

One key point that is generally overlooked is that the central observation on which Savory developed his approach came from the French scientist Andre Voisin (1903-64). This is that grass growth is sigmoidal; that maximum productivity is achieved by harvesting close to the upper asymptote AND then leaving the sward promptly to go through another production cycle; and that the scale of the x axis in a production cycle can vary from a couple of weeks to many months depending on season and moisture availability. Whilst Savory acknowledges Voisin's work it seems that many of his UK followers know little or nothing about it. I am surprised that so much attention in the UK focuses strongly on Savory's 'Holistic Grazing Management' with its special adaptations to fragile environments that are scarcely found in humid temperate regions while apparently disregarding Voisin's Rational Grazing which was developed for our biogeographic region.

Grass productivity in organic and conventional farming

Voisin's book *Grass Productivity* influenced both organic farmers – notably pioneer F. Newman Turner and his followers – and conventional farmers – e.g. the highly productive, clover based rotational dairy grazing system in New Zealand. *Grass Productivity* set out guiding principles¹ including:

- Plants, in order to survive, need REST and animals should be rotated through paddocks. He called this 'ration grazing.'
- There are growth stages that are proper to graze and stages where grazing is harmful to the plant.
- The total occupation period in a paddock should be short so that grass grazed on the first day is not grazed again during that period.

Holistic and rational

The Savory techniques were developed in what is now Zimbabwe to rehabilitate what he calls 'fragile' environments – rangeland with limited and highly seasonal rainfall. He observed that some of the features preventing this ecosystem from functioning efficiently were soil capping (making germination difficult) and standing biomass which decayed slowly. His solution was controlled mob stocking (to imitate the trampling of large herds of herbivores under direct threat from predation) which broke

comment@organicresearchcentre.com

up the soil cap and put any surplus biomass into close contact with the soil where it was more easily decomposed.

Savory's approach has things in common with Voisin's, but that doesn't, for me, make them interchangeable. Specifically; the positive benefits that Savory observes and aims for from trampling are more likely to translate into poaching and compaction in many UK situations. The evidence that I have seen strongly suggests that the technique of short bursts of intensive grazing (or forage harvesting) followed by an ungrazed recovery period can work to boost per hectare grass productivity and may help to restore and recover degraded pasture when thoughtfully used by a skilled practitioner. However the evidence for Holistic Management (Savory), as a specific technique, seems to most powerfully lie in 'fragile' environments while Rational Grazing (Voisin) seems best adapted to moist temperate regions.

Reference

1. https://oceanconnect.org/packets/connect/2012/presentations/grazing/Grazing_Management_Systems.pdf

Savory rebuttal

A recently published synthesis article in the International Journal of Biodiversity has also claimed misinformation on the science of grazed ecosystems presented by 'Holistic Grazing Management.' Five researchers synthesised over 100 separate research studies in order to refute unsupported claims and misinformation accompanying Alan Savory's 2013 TED talk on 'Holistic Grazing Management.' Savory argues that we need more livestock grazing, even in arid lands, rather than less. Savory also argues that soils need to be trampled to break up biological soil crusts (which are actually critical to soil fertility), that grazing rangelands will store vast amounts of carbon, and other questionable assertions. The literature review could find no peer-reviewed studies that show that this management approach is superior to conventional grazing systems in outcomes. Any claims of success due to it are likely due to the management aspects of goal setting, monitoring, and adapting to meet goals, not the ecological principles embodied in 'Holistic Grazing Management.' Ecologically, the application of its principles of trampling and intensive foraging are as detrimental to plants, soils, water storage, and plant productivity as are conventional grazing systems. Contrary to claims made that 'Holistic Grazing Management' will reverse climate change, the scientific evidence is that global greenhouse gas emissions are vastly larger than the capacity of worldwide grasslands and deserts to store the carbon emitted each year.

<http://www.hindawi.com/journals/ijbd/2014/163431/>

“Prosper and grow with organic”

The Organic Trade Board’s briefing in March had this bullish title and the Soil Association’s 2015 Market Report (covering 2014 sales) gives grounds for optimism as well as concern. Some recent consumer trends look promising and Danish and Dutch experiences show that these can be built on successfully. **Susanne Padel and Catherine Gerrard** take a look.

The Soil Association’s (SA) report shows that in 2014 the UK organic market grew by 4% to reach an estimated value of £1.86 billion.

Sales through multiple retailers make up 70% of the market and saw an increase of 2.2% to just under £1.3 billion with Sainsbury’s, Tesco and Waitrose being the biggest organic outlets. Significantly, 14% of supermarket organic sales were made online with Ocado also increasing its sales by 14%. Dairy products remain the largest organic product category in multiple retail sales by value (accounting for 27.9% of all spend on organic products) with sales increasing by 6.5%, including a strong 13.8% growth for yoghurt. Increased sales are also reported for eggs (+15.8%), poultry (+8.2%) and fresh fruit (+6.4%).

On the other hand and a possible cause for concern, supermarket sales by value of organic vegetables and salads fell by 2% and 1.6% respectively, although non-organic sales fell at a higher rate. It is not possible to determine whether these falls were offset by increases in other retail outlets and how much was accounted for by movements in volumes sold as opposed to movements in prices. Sales by value also fell for red meat and sausages (-6.1% in total with some variation between categories).

The SA estimates that 30% of the organic market is made up of outlets other than multiple retailers and includes box schemes; online shopping (non-multiple retailers); farm, health/ wholefood shops, delicatessens, catering outlets and farmers’ markets. Sales through these outlets are difficult to track but using company survey data the report estimates an increase in 2014 of 8.7% to £558.6 million. The SA uses a survey of the independent retailers to get insights into some trends. Of those surveyed, 64% of respondents reported growth, 24% no change and only 12% reported a decline in sales. The two biggest box schemes, Abel & Cole and Riverford, reported sales increases of 16% and 7% respectively. Mixed fortunes were reported for sales through farm shops and organic sales through farmers’ markets are not growing, with markets in general seeing a drop in stall numbers and shoppers.

Positive consumer attitudes underpin growth

Research presented at the OTB briefing indicates that this growth is soundly based. Researcher Wendy Dunn reported that 35% of UK organic consumers – roughly 9.3 million people – consciously buy organic food on a monthly basis and that 65% began buying organic products after the financial crisis in 2008. Households regularly buying organic are more likely to be younger than the average (25-44 years of age) and living in larger households with children. The research is based on an internet survey of 2000 households which had bought at least one of 8 specific organic foods once a month. Regular buyers of organic food are described as ‘foodies’

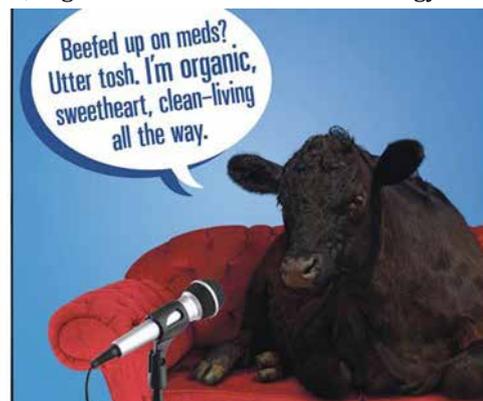


who care about their health, whilst 50% of respondents consistently cited the ‘naturalness’ of organic food as their choice driver. Most respondents say they would consider buying more organic food and drink if it were available; confirming that limited availability remains a barrier for organic purchases in the UK.

Positive marketing in Denmark and the Netherlands

The example of Denmark is instructive here. Thor Jørgensen, from the Danish discount retailer Netto, told the OTB briefing that multiple retailers have been important for the development of the market. As in the UK, sales through multiple retailers are a major factor in the Danish organic food market, but unlike here, the state owned organic food logo is pre-eminent and after 25 years is one of the organic world’s best known.

In 2005, Netto took an initiative using the slogan “everybody should be able to afford organic” and Thor Jørgensen highlighted that its strategy to develop organic sales has made very good business sense allowing the company to grow as well as rejuvenating the Danish organic market after a period of stagnation. To underpin this strategy Netto has developed relationships with organic producers to ensure a reliable supply base that meets their specifications. It was a surprise to learn that Netto - a ‘soft’ discounter - is Denmark’s largest organic food retailer. It would be interesting to speak to producers and hear their side of this story. Netto has now opened stores in the Manchester area and we wait to see how, or whether, organic features in their UK strategy.



One of the ads that will feature outside supermarkets in the OTB’s fifth annual ‘Organic Naturally Different’ campaign



Klaus Arnzt from Wessanen, a Dutch group which owns leading organic brands including Clipper, Allos and Kello, reviewed consumer attitudes in a number of countries including the UK. He argues they are remarkably similar and centre around health, taste, impact on the environment and ethics. Wessanen refocused its business strategy about 15 years ago with organic becoming a major part. Klaus Arnzt expects demand for healthy and sustainable food to double in the next 10 years and says that organic is an important foundation for any brand seeking to tap into this growth potential. However, "being organic is wonderful but it is not enough and it should not be an excuse for lazy marketing". It cannot be the only sales argument and promotion strategy and consumer's trust needs to be developed and supported.

Can UK production match market growth?

Both the SA report and the OTB briefing highlight that the UK organic market is making progress against a background of stagnation or decline in the general food market. But UK growth still lags behind the USA (11.5% in 2013),

Germany (7%), France (9%) and Italy (6%). There also remains the problem that UK certified land is reducing – by about 5% between 2012 and 2013 according to the Defra organic statistics analysed for the SA report. The reasons are complex. ORC analysis continues to show that organic farms perform similarly to comparable conventional farms – even to the extent that Farm Business Survey data shows that the financial performance of organic farms was mostly statistically similar to that of comparable conventional farms for many farm types during the recession years to 2013 – but farmer willingness to convert to and, in some cases, stay in organic production remains fragile. Hopefully, these reports will instill some confidence.

References

The 2015 Soil Association Organic Market Report can be downloaded for £100 (free for SA licences) from <http://www.soilassociation.org/marketreport>.

The 2015 OTB report 'A fresh look at the Organic Consumer' is available for members from the Organic Trade Board (www.organictradeboard.co.uk)

The GM 'Trojan Horse' is on its way to foul the fields and food of Britain

A new EU Regulation governing the authorisation for growing GM crops in the EU is about to come into effect. Lawrence Woodward considers what this means.

This so called 'opt-out' regulation has been called a GM 'Trojan Horse' because although it will allow individual countries to ban GM cropping under a limited and restrictive criteria, it will free up others - such as the UK - to "opt-in" and allow GM crops to be grown on their fields and thereby open up the EU to GM cropping. However, the measure has been widely criticised by both NGOs and the GM industry and could face legal challenges.

It is unlikely that there will be commercial planting of GMO crops in the UK for a few years yet. But, in a letter to the Beyond GM campaign, Defra minister Lord de Mauley said that "the government will ensure that pragmatic rules are in place to segregate GM and non-GM production".

Pragmatic rules means few and weak

But what is meant by 'pragmatic'? Our fears are that it will be as weak as possible with no rules on liability and nothing to ensure that 'the polluter pays' in the event of organic and non-GM crops and habitats being contaminated. The new regulation does not contain mandatory measures on these issues. They are left to EU Member States and given the UK government's preoccupation with GM technology it is questionable whether they are willing to implement a robust and legally binding arrangement to protect non-GM farmers and gardeners and the countryside. It is also not at all clear that the non-GM cropping policies of the Scottish and Welsh governments will survive scrutiny under the new regulation. The 'opt out' provisions are very restrictively drawn and might prove difficult to meet.

Need to act now to win on co-existence

Although GM cropping in the UK isn't imminent the threat to organic and non-GM conventional crops will be very real within the next few years. Herbicide-tolerant maize and oil seed rape (OSR) could be available within three years and cereals, possibly within five. The contamination potential of OSR is very high and the threat from the increased use of glyphosate herbicides is real. At present the structures and mechanisms for even objecting – let alone protecting or establishing liability – are not in place and this battle needs to be fought and won in the next year. Already the pro-GM lobby is publishing highly prejudicial recommendations through, for example the HGCA and EU programmes, which will offer little or no protection.

The last time the UK government engaged in a serious consideration of co-existence of GM, organic and non-GM crops it let Scimac, a pro-GM industry body, write the rules and adopted them wholesale. That was in 2006 and there is every reason to suppose that the government intends to brush the dust off their GM industry focused, voluntary code of practice once the EU has finalised its new regulation. GM technology has comprehensively failed to deliver on its promises whilst alternative plant breeding methods go from strength to strength. The risks of widespread GMO contamination of the fields and gardens of the UK and the health risks – evidence of which continues to emerge – are simply too great.

Organic farmers and growers need to make a common front with gardeners, consumers and all concerned citizens to restrict and limit the risks of this technology.



Innovative plant breeding and management for organic and low input systems

*The research activities of the SOLIBAM (Strategies for Organic and Low-input Integrated Breeding and Management) project, which started in 2010, have just been completed. SOLIBAM brought together 22 partners from 12 countries in order to develop specific and novel breeding approaches integrated with management practices to improve performance, quality, sustainability and stability of crops adapted to organic and low-input systems primarily in Europe but also for small-scale farms in Africa. The project background and highlights of some of the key outcomes are described here by ORC's **Sally Howlett** and **Nick Fradgley**.*

During the project more than 50 field trials were carried out to test innovative breeding and management approaches over at least 3 seasons for seven model crop species: wheat, barley, maize, faba beans, common beans, tomato and broccoli. Collectively, they evaluated farming systems and crop performance according to ten concepts: 1. Resilience; 2. Robustness; 3. Functional biodiversity; 4. Yield stability; 5. Adaptability; 6. Intercropping; 7. Sustainability; 8. Evolutionary processes; 9. Organoleptic quality and 10. Participatory research¹.

The SOLIBAM consortium was trans-disciplinary and included genetics, plant breeding, agronomy, ecology, food science, sociology and economics. ORC's major involvement was investigating the exploitation of genetic diversity in breeding and assessment of the overall supply chain from breeder to farmer and consumer. Our crops and socio-economic teams addressed the legal ramifications of diversity-based plant breeding and contributed to the formulation of policy recommendations.

A number of technical booklets have been produced bringing together complementary knowledge from across the project to form a set of diversity-based innovations² relating to the 10 key concepts described above. These can be thought of as 'SOLIBAM strategies' and include:

- performance stability through genetic diversity knowledge on populations
- crop-pollinator interplay approaches to develop varieties for low-input farming
- development of novel organic winter bread wheat breeding lines
- intercropping and associated crops
- tools for participatory plant breeding and management
- social innovation and collective action for decentralised and participatory research
- integrative breeding methodologies to improve sensory qualities
- new products with improved quality properties
- modelling tools to assess and improve environmental and socio economic sustainability of farms
- seed system adaptation

All these SOLIBAM strategies address the lack of varieties specifically adapted for organic and low-input systems, which are characterised by wide variation not only in the systems themselves, but also the environments, the farmers and the markets. This results in a complexity of interactions requiring diverse tools and methodologies for improved understanding and management.

ORC trials using diversity to bring stability

Performance (yield) stability is defined as the ability to perform consistently in different environments in space and time, and was a key focus of ORCs work in the project. Currently available crop varieties have been bred almost exclusively for high input agriculture, ensuring a high yield under optimal conditions. The genetically identical plants which comprise a pureline variety have no capacity, however, to adapt when the growing environment is more heterogeneous and unpredictable, as is inherently the case in organic and low-input systems – but also increasingly so in conventional systems as a result of climate destabilisation and resultant weather extremes.

SOLIBAM tested a range of alternatives to pureline monocultures including landraces, variety mixtures, composite cross populations (CCPs), intercropping and combinations of these options.

At ORC we trialled cereals (winter wheat and barley) and vegetables (sprouting broccoli and common bean) representing different levels of genetic diversity. The major premise being that higher levels of diversity in the breeding base will support the expression of a greater range of traits and hence provide adaptation potential, allowing for complementation and a much enhanced buffering capacity. The approach has been developed over a number of years by our arable research programme in cereals. SOLIBAM enabled us to expand this and also to look at vegetables where it has not yet been as extensively tested.

A highlight of our cereal work was a set of trials integrating the best of the population approach (i.e. long-term stability) with the best of pedigree line breeding (i.e. high performance). The idea was to create a physical mixture of a population with a pureline and grow them together in the same plot (Fig. 1). Our hypothesis was that this could be a way to 'boost' the performance of both components – the population would provide stability and greater buffering against disease, whereas the pureline could increase the overall yield or quality compared with sole-plots of each.

We used Alchemy and Solstice (feed and quality wheats respectively) and combined them in 1:2 and 2:1 ratios with a population (YQ CCP) developed by ORC in 2000. The full dataset is still being analysed, but early indications are that the crops with increased within crop diversity such as variety mixtures and, to a greater degree, populations, have enhanced yield stability which is a measure of yield variation across environments³ (Fig 2).



Figure 1: Winter wheat trials at Wakelyns Agroforestry integrating the best of the population approach with the best of pedigree line breeding.

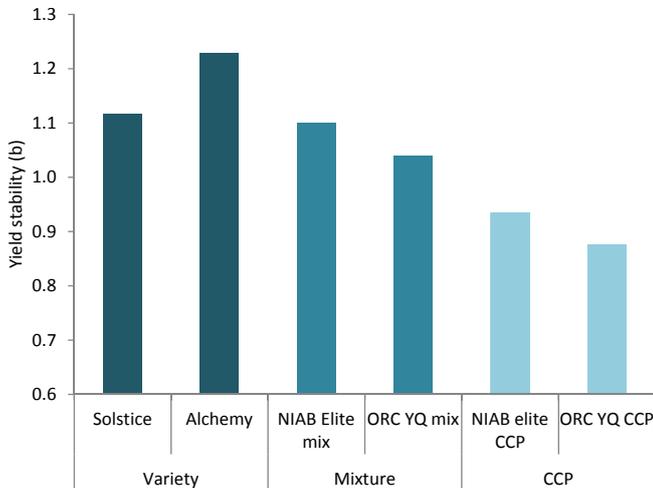
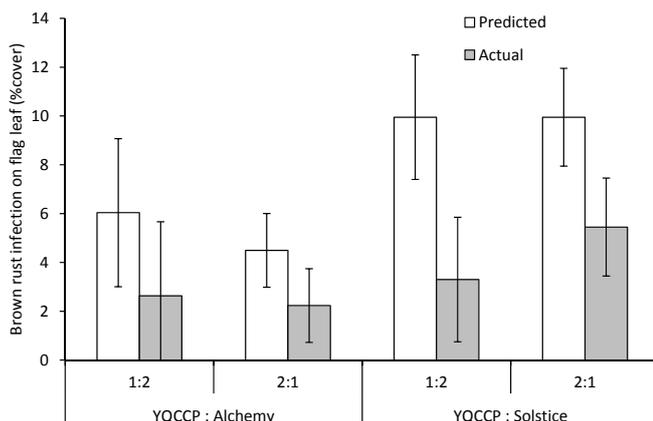


Figure 2: Values of yield stability for two varieties, two variety mixtures and two Composite Cross Populations trialled over four seasons at Wakelyns organic site. Lower values of stability (b) indicate less yield variation across environments.

Regarding disease, our results indicated that the observed levels of brown rust (*Puccinia triticana*) were significantly lower in the mixtures with Solstice than predicted based on sole-plot data at the organic site in 2012. This suggests that there may be an element of buffering against disease for some pureline/CCP mixtures through the increased diversity conferred by the population; however, although a similar trend was observed for the Alchemy/CCP mixtures, this did not reach statistical significance (Fig. 3).



Analogous trials were carried out in Hungary with different pureline varieties and the results from these will be incorporated with the UK data in further analyses, which may offer some insights as to why there seems to be a variety effect. For example, it may be that the 'protective effect' of the population only comes into play when disease infection rates are particularly high, as was the case with brown rust and Solstice in 2012.

Other approaches and other trials

Other partner institutes within SOLIBAM focused on aspects of cropping such as;

- breeding open pollinated varieties of faba bean with floral traits to encourage crop-pollinator interactions and support better seed production;
- using intercropping of wheat and barley (hanfets) to mitigate against erratic rainfall in dry areas where there is a high risk for crop failure and food insecurity;
- investigating different sowing schemes and seeding density for intercropping wheat and legumes for greater weed control.

Synopses of the results from many of these trials can be found in the book of abstracts from the SOLIBAM final congress⁴.

Translating results into EU policy

In addition to developing techniques and assessing quantitative and qualitative data, SOLIBAM has also engaged with the EC at a policy level. The work carried out by the consortium helped to identify three concepts that are recommended as cornerstones of future research policy:

1. Diversity: In addition to systems and breeding diversity, SOLIBAM demonstrated that decentralised research involving both public and private organisations is a valuable way to build new and diverse models of innovation.
2. Participatory innovation: Participatory plant breeding (PPB) is one such strategy. The combination of farmers' participation in this approach and decentralised selection has clear benefits in improving the efficiency of a breeding programme through increased adoption, and therefore an increased benefit/cost ratio.
3. Locality/terroir: The importance of locality in shaping future agricultural activities was emphasised by keynote speakers at the SOLIBAM congress in July 2014. The locality/terroir represents a unique combination of biotic, abiotic and human factors (cultural, social, economic) interacting at a specific place or area, all of which influence the success and uptake of new innovations. These cornerstone concepts have been used to develop a series of policy recommendations grouped into three main areas: seed, knowledge and food systems. They are expanded upon in a comprehensive, publicly available booklet published as one of the project outputs⁵.

Figure 3: Mean values of actual and predicted percentage brown rust (*Puccinia triticana*) infection on the flag leaf at Wakelyns organic site in 2012. Error bars indicate Least Significant Differences (LSD) at 95% confidence intervals. n=3 plots per entry.



The seed system recommendations are of particular importance in view of recent proposed changes to the seed marketing regulations. The existing regulatory framework has been tailored for high input agriculture and, for market approval, varieties have to comply with two standards which effectively exclude heterogeneous plant material: 1) Distinctness, Uniformity and Stability (DUS) and 2) Value for Cultivation and Use (VCU).

By their nature, landraces and populations do not meet with the uniformity requirement of DUS; and VCU acceptance is based on high yield thresholds along with best 'average' performance across locations, which ignores the advantages of low-input or organic breeding and discounts local adaptation.

SOLIBAM success

There is a growing recognition that current marketing regulations do not accommodate genetically variable material such as populations. SOLIBAM partners have been involved in negotiations with the European Commission to resolve this and have contributed to proposed new regulations which incorporate some of the projects recommendations. Although the first draft was rejected by the European Parliament, further discussions are on-going and in March 2014, the Commission agreed to a 'temporary marketing experiment' for wheat, oats, barley and maize which permits the marketing of populations of these species within the EU from 2014-2018 (EC 2014). The UK is coordinating this experiment on behalf of the EU and ORC has already started to bulk up our cereal population, YQ CCP, to ensure the availability of sufficient certified seed to sell to farmers in autumn 2015⁶.

Overall SOLIBAM has been a remarkable exercise in how diverse partners from diverse disciplines can come together in a complementary way to progress the individual and mutual benefits of diversity.

SOLIBAM was funded by the European Commission through the Seventh Framework Programme and brought together 22 partners spread across 12 countries.

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Comings and goings at ORC

Dr Robbie Girling moves on.

In February we were sorry to say goodbye to our Head of Crops & Agroforestry Dr. Robbie Girling as he left to take up a new post as Lecturer in Agro-ecology and Sustainable Agriculture in the School of Agriculture, Policy and Development at Reading University. Robbie joined ORC in June 2013 and immediately set to work getting to know his new team and getting on top of the wide range of projects within his programme. His ability to look at existing projects with a fresh eye has been very much appreciated and with him came new insights and skills which have resulted in new projects which will stay with ORC and we are already talking to him about potential new collaborations with Reading University so there is a silver lining. We are very sorry to lose Robbie but wish him all the best in his new position and on the recent birth of his second daughter Cora.



Dr Henry Creissen

Henry, crops researcher at Wakelyns, will be leaving ORC in April to take up a Post-doctoral Researcher position at Teagasc in Ireland. He has been appointed to the EPIC project (Establishing a Platform for Integrated Pest Management in Irish Crops). We foresee many opportunities for collaboration within this project and hope to build a productive working relationship between ORC and Teagasc. We will miss his humour and enthusiasm and wish him well.



Dr Beth Cullen joins the team

Beth Cullen joined ORC in March as an Information Officer working on the Ecofarming info hub and the OK-NET Arable project. Beth is a social anthropologist specialising in the use of participatory research methods and communication tools. Her PhD research used participatory video as a collaborative research tool to explore social and environmental changes with pastoralists in the Rift Valley of Ethiopia. Beth's subsequent work has focused on participatory approaches to natural resource management and sustainable agricultural development. Beth has lived and worked in Ethiopia periodically from 2005 to 2014. She spent the last three years working as a social scientist for the International Livestock Research Institute (ILRI) in Addis Ababa. As part of her postdoctoral work she conducted research in East Africa, West Africa and Asia in a range of farming systems. Her time at ILRI led to an interest in agricultural innovation systems and techniques for enabling farmer-to-farmer knowledge sharing, partly due to her experiences facilitating multi-stakeholder innovation platforms in the Ethiopian highlands. Beth has a long held interest in organic farming, having worked and volunteered on organic and biodynamic farms in the UK and Europe.





New projects at ORC

Developing best practice networks of health in organic agricultural systems

ORC is leading an Ekhaga Foundation funded project to create an international network of producers and scientists initiating new and interdisciplinary approaches to health measurement and research in ecological agriculture as a step to improving health impacts of the entire food system. The project will identify which health management principles, strategies and methods organic farmers have adopted on their farms and highlight best practice. Together with the findings of ORC's previous review of health concepts (also funded by the Ekhaga Foundation, this will enable us to produce a set of transferable strategies to translate organic principles into practice and improve the communication and demonstration of health concepts among all stakeholders. The creation of a best practice network of health in organic agriculture, involving farmers and researchers, will be a great boost for achieving the health benefits organic agricultural food systems aspire to.

DIVERSIFOOD - Embedding crop diversity and networking for local high quality food systems

ORC is a partner in DIVERSIFOOD a new four-year European project, funded through HORIZON 2020. Led by INRA the French National Institute for Agricultural Research, the project will bring together farmers, scientists,



processors, traders and consumers to promote the greater use of diverse plants and produce with a local and cultural identity. It will work with wheat (einkorn, rivet, emmer, durum and bread wheat), oats, barley, maize, chickpea, beans, lupins, false flax, buckwheat, broccoli, tomato, carrots, onions and chestnuts.

ORC's crops and socio-economic teams will be involved, as will our advice and education outreach programmes. The crops team will work with 18 international partners to develop an inventory of under utilised genetic resources for marginal/specific conditions and potential new uses and test some with farmers in participatory field trials. We will also evaluate different crop management approaches involving combinations of under utilised legumes and cereals for robustness and resilience. The socio-economic team will analyse the value chain of diverse local food and newly bred lines originating from participatory research within the project. They will also contribute to developing recommendations in collaboration with policy makers which will be presented at a stakeholder forum. We will engage in training activities to facilitate the introduction of innovations and novel activities arising from DIVERSIFOOD into the businesses of stakeholders. All of which will help demonstrate how society can encourage a diversified sustainable agriculture and promote it through production and marketing.

comment@organicresearchcentre.com

The Ecofarminginfo.org knowledge hub

ORC has reached agreement with The Daylesford Foundation to fund and support further development of the ecofarminginfo.org information hub with the particular aim of supporting the national pollinator strategy. The hub will champion sustainable farming systems and practices based on agroecological principles, including organic and integrated farming, agroforestry and permaculture and create the 'go to' platform where farming and food industry practitioners and related professionals, educators and students share research, demonstrate success, engage in knowledge sharing, and develop skills leading to a more sustainable future of farming.



This builds on ORC's Defra funded work to establish the www.ecofarminginfo.org information hub. The new Phase 2 will consolidate content and develop visual presentation of the hub, whilst aiming to broaden its appeal to agricultural students and to non-organic farmers wishing to manage land with greater sensitivity to the environment. ORC will have overall responsibility for development of the content and has recruited a Content Manager for this role. The Game and Wildlife Conservation Trust will be a core partner with expertise in integrated and conservation farming and will champion the outreach to a wider non-organic audience. The Daylesford Foundation will have responsibility for communications, with a focus on producing a creative, engaging hub that will effectively connect to the target audience. A full launch is planned for the summer.

Organic Knowledge Network Arable

Organic Knowledge Network Arable (OK-NET Arable) – a 3-year EU project, funded under Horizon 2020 – aims to improve the exchange of innovative and traditional knowledge among farmers, farm advisers and scientists to increase productivity and quality in European organic arable cropping to satisfy future market demand.

There are three specific objectives:

1. To create a European network of farmer innovation groups representing the best examples of co-innovation by farmers and researchers. The network will exchange experiences and test educational material developed in the project.
2. To digest and synthesise scientific and practical knowledge in organic arable farming and to put it across to end-users.
3. To create a unique organic farming platform for knowledge exchange across Europe offering innovative education and end-user material as well as within and cross occupational learning opportunities.

The project is co-ordinated by IFOAM-EU and involves leading organic research and farmer organisations. ORC is responsible for specific UK activities and the overall facilitation of knowledge testing with farmer innovation networks.



Making hedgerows count

Many UK hedgerows are in decline and on the brink of being lost but there could be practical and cost-effective methods of bringing them back into the farm business whilst improving them for wildlife and securing their future in the landscape. Managing hedgerows for sustainable woodfuel production might be one of them. ORC's agroforestry and woodfuel researcher Meg Chambers reports.

Regenerative management – such as increasing hedge bottom density by laying or coppicing, planting up gaps and increasing the number of hedgerow trees – will improve the quality of wildlife habitat that hedges provide and can mean that hedgerows persist in the landscape as wildlife corridors and landscape features of historical and social importance, but can it also provide a direct economic return? Management of hedgerows for woodfuel has the potential to provide an economic incentive to bring unmanaged and degraded hedgerows back into active management whilst securing conservation and landscape benefits.

Rejuvenating our hedges with multiple benefits

In order to identify practical and cost-effective methods of managing hedgerows for sustainable woodfuel production, a series of machinery trials is taking place as part of the TWECOM project. These build on work carried out by hedge organisations in Devon and Dorset and the Cordiale Project in France.

Machinery trials to investigate different coppicing and chipping methods are being organised. The trials will test different machinery options and harvesting methods, assessing the costs, time and fuel involved, and their practicality. These are the first ever trials in the UK to assess the feasibility of extracting timber from hedgerows for the woodfuel market using large-scale machinery.

Some coppicing basics

Winter is the preferable time for harvesting hedges by coppicing both horticulturally and in terms of woodfuel production. There are no leaves or green material present in the woodchip; the coppice stool responds well to coppicing with good regrowth; and there is no risk of disturbing breeding birds or animals. However, there are many logistical problems associated with coppicing in the winter. Firstly, most hedgerow and woodland contractors are very busy, the availability of specialist machinery can be limited, and there are often considerable transport costs of bringing in specialist machinery. Secondly, ground conditions can deteriorate rapidly after mid-October, depending on the location and soil type of the farm, with the potential for rutting, compaction and damage to grazing land.

Where coppicing can be done from the road or trackside, it does remove the need to track across fields but there is often not enough space for both the feller/machine and the hedge material, and road closure applications may need to be made to the local authority.

Felling licences from the Forestry Commission also need to be considered, as all timber in the landscape comes under the same felling regulations as woodlands.



Coppicing using Dymax tree shears

Harvesting by coppicing – hedgerow harvesting machinery trials at Elm Farm, December 2014

After much deliberation and reviewing of hedges and ground conditions, a mature hazel coppice hedge was chosen because it had a reasonable biomass and good access directly off the road, which would minimise the tracking of vehicles across grazing land. Three different scales of mechanisation were trialled: small, medium and large.

- **Small scale machinery option: Manual fell** i.e. man-operated chainsaw coppicing two 20m sections
- **Medium scale machinery option: Assisted fell** i.e. man-operated chainsaw assisted by excavator coppicing one 50m section.
- **Large scale machinery option: 25cm Dymax tree shears** mounted on an 8t excavator coppicing two 50m sections. Three different finishes were applied to the sections coppiced by the tree shears:
 - As cut by the tree shears,
 - Chainsaw finish long (where only the top 5-10cm of the sheared stems were cut back)
 - Chainsaw finish short (where all of the sheared stems were cut back to 5cm).



Chipping process

All of the hedge material (from half of the sections) was chipped using Wessex Biofuels' Heizohack biomass chipper the day after it was coppiced. It was chipped in the field directly into a grain trailer where the volume was estimated and the mass measured using calibrated weigh load scales. The woodchip was unloaded into a clean concrete-floored Dutch barn with open ends and good ventilation.

What was measured during the trials?

Time taken, man hours involved and fuel used were recorded, as well as the availability and cost of the machinery, and observations on the ease and efficiency of the coppicing operation, the cutting finish and any damage to the coppice stools.

The biomass harvested from each section will be calculated and calibrated against estimates derived from two hedge biomass estimation tools which have been developed by the Silvanus Trust and Rob Wolton as part of the Cordiale Project. The woodchip from each of the four hedges will be sent off for quality analysis, taking into account the species mix and chipping technique.

What will be monitored?

The stool survival, coppice regrowth rates and any observations of disease ingress in the coppiced stools will be monitored for each of the machinery options and cutting finishes. The impacts of coppice management on microclimate, leaf litter, soil carbon, and functional biodiversity (ground flora and invertebrates) will be assessed into the future depending on available funding.

Preliminary results

- The assisted fell technique was found to take the least amount of time per 10m of hedge (16 minutes) followed by the tree shears (28 minutes), tree shears and chainsaw finish (33 minutes), and manual fell (113 minutes).
- Manual felling was found to use the least amount of fuel per 10m of hedge (0.63 litres), while the assisted fell and tree shear treatments consumed a similar quantity (3.20 to 3.30 litres). Results suggest an average of 3.4m³ of woodchip per 10m of hedge was produced, with the hazel coppice estimated at being 24 years old from tree ring analysis.
- Further analysis will calculate the mass of woodchip harvested per 10m and factor in man hours and the availability and cost of the machinery providing a cost of harvesting per 10m cut against the value of woodchip harvested per 10m.
- Observations showed that the manual fell was a cleaner coppicing method with little debris left behind. This may however have affected woodchip quality due to the increased amount of bramble and green material entering the chipper.



Coppicing using assisted fell technique

- The trees shears were noted to result in splits running down into the stool and to push the base of the stools causing the roots to move. Future monitoring of the regrowth will determine if this disturbance has affected the coppice stools.

Acknowledgements

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Further information

TWECOM Project <http://www.twecom.eu/>

Cordiale Project <http://www.cordialeproject.eu/>

Hedgelink <http://www.hedgelink.org.uk/>

Devon Hedge Group and the biomass estimation tool developed by Rob Wolton Hedge woodfuel assessment tool

Photos and videos from the trials can be viewed from:
<https://www.flickr.com/photos/organicresearchcentre/>
<https://www.youtube.com/user/OrgResCent>





Scotland The Bread: Building a home-grown grain economy

Andrew Whitley, founder of the Village Bakery and The Real Bread Campaign, runs Bread Matters from his organic agroforestry holding just south of Edinburgh. He suggests that Scottish independence is a nutritional, as well as a national, issue.



Each side in the independence referendum debate claimed Scotland's food and drink sector as a success story – something to be cherished within the union, or a building block of greater economic prosperity post-independence. Such claims seem hollow on two counts at least.

First, there is something disjointed in trumpeting the economic importance of food and drink in a country beset by ill-health due (in part) to alcohol abuse and poor diet. Second, food sovereignty is surely a more lasting component of true national self-determination than export success in niche food and drink markets. When it comes to the staples, Scotland is notably dependent on others. Take bread, for example. Behind such undignified anomalies as the fact that many of the industrial loaves consumed in the Highlands are trucked all the way from England lies a more fundamental vulnerability: very little Scottish bread is made with Scottish wheat.

The country grows 650,000 tonnes of wheat, most of which goes to animal feed and alcohol production. Just a quarter of the current capacity would be enough to make all the bread consumed in Scotland. The reasons for this complete failure of self-sufficiency are familiar. Farmers are locked into a commoditised system over which they have little control and need ever higher yields in order to survive. Plant breeders and agrochemical input suppliers dance to this tune, ignoring grain quality (from the perspective of the human consumer) as much as the biological limits to growth.

Climate change (and the need to de-carbonise the food system), the volatility of global markets in the face of population growth and financial speculation, and the public health cost of highly processed food based on a narrow selection of commoditised ingredients all suggest the urgent need for change – from the ground up. Hence Scotland The Bread.

Bread and a food revolution

Our aim in this project is to re-establish a Scottish flour and bread supply that is healthy, equitable, locally-controlled and sustainable. Combining participatory research and action, it links plant breeders, farmers, millers, bakers, public health nutritionists and citizens. It will develop better grain in Scotland, grow and process it for lowest environmental impact and maximum nutritional benefit, support local economies with more jobs per loaf and help combat diet-related ill-health by making sure that this revitalised staple can be enjoyed by everyone.

We want to develop a grain supply chain designed for resilience, responsive to the imperatives of food justice and sovereignty and capable of feeding healthy citizens. To achieve these societal gains requires research to produce new plant varieties attuned to agroecological land management and the dietary needs of people, especially those with limited appetite and no say in what they eat.

There are three main strands to the project:

- plant breeding for traits that prioritise human needs
- establishing new (or adapting existing) mills and bakeries for primarily local distribution and conservation of nutritional quality, and
- community-level access to ensure that the new flour and baked products make a genuine contribution to improved diet and health.

At each stage, the involvement of public health nutritionists will be important in setting standards for the nutritional density and digestibility of Scottish breadmaking wheat, including the transmission of these characteristics through the milling and baking stages.

New skills, new deals, new supply chain

The project started on the ground in March 2013, by planting small samples of 19th century Scottish wheats on four organic farms. Initial tests (conducted by the James Hutton Institute) suggest significantly higher levels of iron, magnesium, phosphorus and zinc in most of the 13 wheats, compared to the control and more calcium and selenium in a few. These results are consistent with evidence from Sweden (Hussain et al, 2010) that “*wheat grain with high mineral nutritional value can be produced by using specific genotypes under organic cultivation*”

Further analysis and baking tests are being conducted with the 2014 crop. We hope to evaluate other varieties that fed the Scottish population in times past as well as introducing other promising (e.g. Nordic) varieties.

An appropriate processing infrastructure is likely to require small to medium scale, local reach and community-ownership and ‘fair trade’ arrangements between farmers, millers and bakers to ensure equitable rewards and honest prices that also allow for the variability of the weather and grain quality. Product development and dissemination of new skills based on the science of long fermentation will be important to the success of an emerging Scottish-supplied bread sector.

To complete the chain, innovative new trading structures and distribution mechanisms will be supported. There is a big need – and opportunity – in the ‘catered’ sector : schools, hospitals, prisons, care homes etc. where decisions on bread quality affect people and public health on a big scale.

For further information

see www.breadmatters.com

Hussain A, Larsson H, Kuktaite R, Johansson E. Mineral Composition of Organically Grown Wheat Genotypes: Contribution to Daily Minerals Intake. *International Journal of Environmental Research and Public Health*. 2010;7(9):3442-3456. doi:10.3390/ijerph7093442.



Organic support payments from 2015-2020 to increase in England, Wales, Scotland and the Republic of Ireland, but N Ireland is left out

New improved Countryside Stewardship (CS) support payments for organic farming in England were announced in November 2014, following an ORC-led campaign by the organic sector to get Defra to review its original proposals. The new English rates come closer to those previously announced in Wales, Scotland and the Republic of Ireland, but Northern Ireland loses out with no support at all. Nic Lampkin reports.

Defra's change of heart in England

The new rates for England announced by Defra represent a significant improvement on the original proposal for maintenance payments of only £17/ha and conversion payments seriously out of balance with originally proposed rates over £400/ha. The reduction in conversion payments now on offer represents a better balance with maintenance support, but farmers need to be realistic about the real costs of conversion and plan carefully as the payments only partly compensate for the costs. Unlike other CS options, the conversion and maintenance support is not geographically targeted. If they meet the targeting requirements, organic producers can qualify for other CS options, including specific ones targeted at organic land.

English conversion and maintenance payments (£/ha)

| | Conversion* | Maintenance |
|--------------------------------|-------------|-------------|
| Improved permanent grassland | 75 | 40 |
| Unimproved permanent grassland | 50 | 20 |
| Rotational land | 175 | 70 |
| Horticulture | 400 | 200 |
| Top Fruit | 450 | 300 |
| Enclosed (<15ha) | 8 | 8 |

*Years 1-2, Years 3-5 as maintenance

Defra's announcement, coinciding with the ORC conference in November, came after much hard work behind the scenes, both on the evidence for environmental and other benefits of organic farming and on the costs of organic management and conversion. Defra has recognised the role that ORC staff Nic Lampkin and Mark Measures played in the process of developing the new support options, but the efforts to secure change were strongly supported by the Soil Association, OF&G and OMSCO. Several administrative details relating to the operation of the new organic options are still in the process of being finalised.

Welsh producers sign up for Glastir Organic

Details of the Glastir Organic scheme, developed with the assistance of ORC and OCW partners ADAS and IBERS, were published in Summer 2014 (see ORC Bulletin 116). A window for applications, mainly targeted at the 600 existing organic producers, opened in October 2014. About 500 agreements were confirmed starting on 1st January 2015. Unlike the other parts of the UK, the Welsh scheme provides additional support per ha towards conversion costs, and it requires all agreement holders to complete an organic management plan, details of which are still being finalised.

Welsh conversion and maintenance payments (£/ha)

| | Conversion* | | Maintenance | Certification~ |
|---------------|-------------|-----|-------------|----------------|
| Horticulture | 600 | 400 | 400 | 80 |
| Enclosed land | 130 | 65 | 65 | 10 |
| Rough grazing | 15 | 15 | 15 | 3 |

*Years 1-2, Years 3-5 as maintenance

~ Certification cost support is capped at £500 per contract per year

Scotland's organic payment rates

The payment rates for Scotland's Rural Development Programme (SRDP) were also announced in November and 'calculated to strike the appropriate balance between facilitating conversion, and ensuring appropriate levels of ongoing compensation through the maintenance rate.'

Scottish conversion and maintenance payments (£/ha)

| | Conversion* | Maintenance |
|----------------------|-------------|-------------|
| Improved grassland | 140 | 55 |
| Unimproved grassland | 125 | 85 |
| Arableland | 280 | 65 |
| Fruit and vegetables | 400 | 200 |
| Rough grazing | 85 | 85 |

*Years 1-2, Years 3-5 as maintenance

Northern Ireland left in the cold

As the improved support rates in other parts of the UK and Ireland were announced, it became clear that the worst fears of organic producers in Northern Ireland were realised and all organic farming support was to be withdrawn, at least as far as the RDP proposal submitted to the European Commission was concerned. With support payment in the Republic of Ireland higher than in any part of the UK, the absence of any support in the North has significant cross-border implications. Following protests from several organic organisations, the situation is under review and some compromise proposals may yet emerge.

Making organic farming work financially

In all cases, support payments are calculated on the assumption that, once organic, products can be sold at a premium but during conversion organic rules still need to be followed but with no access to premiums so support is higher. In many cases, the number of processors specialising in organic produce may be limited and the cost of taking produce to the market is higher than selling via mainstream markets without a premium. Yields will be reduced, while input costs may also be higher than those of conventional farms.

These factors are considered in the support payment calculations. However, this is only part of the story. Organic farm income data analysed by Aberystwyth University and the ORC over many years has shown that, with the help of premium markets and agri-environmental support of this type, organic farms once converted can perform as well as non-organic financially while delivering significant environmental benefits. With the market recovering, and improved support including automatic qualification for Greening, the organic option deserves a fresh look. The Organic Farm Management Handbook, published by the ORC, provides detailed enterprise costings for organic crops and livestock that can be used to help evaluate the options.



Events and announcements - details at www.organicresearchcentre.com

National Organic Combinable Crops 2015

7 July 2015: Shimpling Park Farm, near Bury St Edmunds, Suffolk.

Organised by OF&G and hosted by ORC trustee, John Pawsey, this year's National Organic Combinable Crops event will give farmers the chance to hear industry specialists discuss critical issues from farm management and market volatility to soil condition and changes in the European organic regulations. There will be a farm walk including viewing of several ORC trials:

- Winter wheat lines bred under organic conditions and participatory plant breeding.
- Potential new clover and vetch species grown as a living mulch in spring wheat and barley.
- The DOFF sheep grazing trial looking at sowing timing and grazing of winter wheat with sheep to control black grass.
- We will announce the results of the 'Name our wheat population' competition.

Register at: www.organicfarmers.org.uk

Other events

28 April 2015: Fertility building leys and green manures. Field lab at Tolhurst Organic. Register at <http://www.soilassociation.org/fieldlabs>

18-19 May 2015: Farm Woodland Forum annual meeting at ORC, Elm Farm. Woodfuel from Agroforestry. More details: www.agroforestry.ac.uk

21 May 2015: Welsh Organic Supply Chains Conference. RWAS Showground Builth Wells. More details: www.organiccentrewales.org.uk

28-29 May 2015: EU Commission Conference 'Organic Production, Research and Innovation: setting priorities for the future.' Expo 15, Milan, Italy. Admission by invitation only, contact ORC to request nomination.

11-13 June 2015: IFOAM EU 9th European Organic Congress, Latvia. <http://organic-congress-ifoameu.org/en/>

26-29 June 2015: Celebrating Soil, Celebrating Life Conference, Amsterdam. www.saveoursoils.com

8-9 September 2015: Designing the World We Want: the 12th International Permaculture Conference at 'The Light' Conference Centre, Euston, London. <https://www.ipcuk.events/conference>

27-30 August 2015: International Conference on Research in Biodynamic Agriculture, Italy <http://www.icoriba.org/>

Save the dates!

26 January 2016: SOLID Organic dairy research event, Bristol

27-28 January 2016: 10th ORC Organic Producers' Conference, Bristol

ORC needs your support!

Much of what we do, including this bulletin and the policy work described on page 27, is supported by donations. Small investments can make a big difference (see the video and *What is ORC?* on our website). This year, we still need to raise £25,000 for our policy work and £75,000 for our other activities, including bursaries for training events and conferences, and funds for PhD studentships and pilot projects. We are also raising funds for the development of our farmhouse as a residential facility for training and other events.

Can you help us?

Donations large and small can be made using credit/debit cards or Paypal via our website using the *Donate* button. Cheques payable to Organic Research Centre can be sent to the address on page 3. If you'd like to make a regular standing order or bank transfer, please e-mail elmfarm@organicresearchcentre.com or phone 01488 658298 for details.

The 'Pye Challenge' – double your support!

For the third and last year in 2015, our valued major donor, the Mr & Mrs JA Pye Charitable Settlement, has promised to match donations if we reach a target of £25,000 received from new or former donors. If you are not already a current donor, send us a donation now and we can do even more with your support!

Become a Friend of ORC

Individuals willing to donate at least £50 per year, preferably by standing order, qualify for a free ORC bulletin subscription, discounted access to ORC events and other benefits.

Become a member of our new Farmer and Business Supporters Group

In April 2015, we are launching our new supporters group to encourage larger (£100 or more), regular donations. With baseline benefits similar to our Friends of ORC scheme, members will also get the opportunity to attend special events, help us set our research priorities, participate in bids and projects if funded, and get early access to research reports, as well as a copy of the Organic Farm Management Handbook on publication.

Will you remember us in your will?

Legacies are an important source of income for ORC. Please remember us when drawing up your will. Further details are on the *Support Us* page on our website.

Did you know?

On our website you can also:

- Register for our monthly e-bulletin free-of-charge
- Subscribe to the quarterly ORC bulletin for £25/year
- Order the Organic Farm Management Handbook for £20 plus P&P