THE ORGANIC RESEARCH CENTRE

ELM FARM

In this issue:

Tree fodder
Alun Jones pollarding a young ash at Hamstead Park, Newbury, that was previously cut four years before.

ORC E-Bulletin

Subscribe free of charge to our E-bulletin service, with monthly updates on our work and events.

Just go to our home page at www.organicresearchcentre.com and click on the Register for E-bulletin link.

Organic Research Centre

Bulletin

No. 110 – Autumn 2012

News in brief

ORC in evaluation of EU Organic Regulations

ORC is to participate in an evaluation of the EU organic farming regulations. The 10 month project, led by the von Thuenen Institute in Germany, will focus on the changes introduced in 2009 and will assess impacts and issues that need to be addressed in future changes. ORC's role will be to examine scope, production rules and options for simplification, and to develop an effects model. We will also carry out data collection in the UK and contribute to the overall reporting of the project.

Lessons for UK in Nuffield agroforestry study

Organic farmer and adviser, Stephen Briggs, has spent the last 18 months on a Nuffield Scholarship visiting agroforestry systems in New Zealand, China, North America and Europe looking at the *Adoption of commercial agroforestry and its applicability to UK and temperate farming systems*. Stephen found successful agroforestry on farms in Canada, the USA, China and more than 18 EU countries. He concludes that modern agroforestry systems are compatible with present day agricultural techniques and that tree densities of ca. 100 trees/ha allow alley crop productivity to be maintained. His report is now available online.

The challenges of organic animal husbandry

Over 180 participants from more than 40 countries discussed the current state of organic animal husbandry and its future challenges at the 2nd IFOAM Animal Husbandry Conference held in Hamburg, Germany, in September 2012. ORC researchers Katharine Leach and Rebecca Nelder presented papers. Differing visions for the future of animal production in the face of growing population pressure and environmental problems were presented in the keynote sessions and participants were keenly aware that the productivity of organic and extensive systems is a challenge that may limit organic agriculture's effectiveness. Research priorities which emerged from the workshops included animal health, feed conversion efficiency, animal behaviour and welfare, selection of appropriate breeds and overall sustainability of farming systems with mixed crop and animal production. The need for more effective farmer engagement and dissemination of research results were recurrent themes.

ORC student wins Young Researcher Prize

Alexa Varah, a PhD student with the Organic Research Centre and University of Reading, won a prize for her presentation at the SCI Bio-Resources Young Researchers conference at Reading in July 2012. Alexa is in the second year of her PhD investigating ecosystem service delivery from UK agroforestry systems, funded by the ORC and Reading University. Reporting on her findings from her first year of studies, she presented evidence that agroforestry supports higher biodiversity compared to the agricultural control (see ORC Bulletin 108), and was awarded a prize for the best oral presentation.

New paper on public goods by ORC team

An article on public goods and farming by ORC staff led by Catherine Gerrard has been published in *Sustainable Agriculture Reviews*. As well as discussing public goods in general, the article reports the results of the pilot study of the public goods appraisal tool developed at ORC with financial support from Defra through Natural England.

Gerrard CL, Smith LG, Pearce B, Padel S, Hitchings R, Measures M. 2012, Public goods and farming. *Sustainable Agriculture Reviews: Farming for food and water security*, 10:1-22.

Tumours, premature death in rats fed GM maize

Using the same type of rats as industry and government trials, but keeping them for more than 90 days, independent researchers have found that GM maize, GM maize sprayed with Roundup and Roundup itself cause tumours, multiple organ damage and premature death. The research, published in the peer-reviewed scientific journal *Food and Chemical Toxicology*, was carried out by a team of researchers led by molecular biologist and endocrinologist Professor Gilles-Eric Seralini, of the University of Caen in France. Seralini is an authority on studies into the health impact of GMOs and pesticides. The findings question the whole basis of GM regulations that GM and non GM crops are 'substantially equivalent' and raise concerns about past safety assessments. The study has been subjected to a barrage of industry, European Food Safety Agency and GM researcher criticism, but France, Russia and a number of other countries have called for an urgent review of the findings (see www.gmeducation.org).

Iconic organic brands oppose GM labelling

The large corporation owners of many popular organic brands in the US are helping to fund big business opposition to labelling of GM food. General Mills, Kellogg and Dean Foods, who own iconic organic brands like Cascadian Farm, Kashi and Horizon Organic, are trying to overturn a Californian State Ballot that could for the first time give US citizens the right to know when GM ingredients are being used in their food. Agri-business and the biotech industry have raised nearly $30 million to defeat Proposition 37. The Cornucopia Institute has developed a chart and graphic illustrating the donations of 'Big Organic' (see www.cornucopia.org/2012/08/prop37).

Editorial sources

Smith-Spangler *et al.* 2012. Are organic foods safer and healthier than conventional alternatives? A systematic review. *Annals of Internal Medicine* 157:349-369.

Brandt K, Leifert C, Sanderson R, Seal CJ. 2011. Agroecosystem management and nutritional quality of plant foods: the case of organic fruits and vegetables, *Critical Reviews in Plant Sciences* 30: 177-197

Benbrook C. 2012. Initial reflections on the *Annals of Internal Medicine* paper. Center for Sustaining Agriculture and Natural Resources, Washington State University. www.tfrec.wsu.edu/pdfs/P2566.pdf

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

About us

ISSN 1367-6970

Bulletin editor
Lawrence Woodward OBE

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/agro-ecological 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.

Registered in UK as
Progressive Farming Trust Ltd.
Company No. 1513190
Charity No. 281276
VAT No. GB314668159

Registered address
Organic Research Centre
Elm Farm
Hamstead Marshall
Newbury
RG20 0HR

T: +44 (0)1488 658298
F: +44 (0)1488 658503
elmfarm@organicresearchcentre.com
www.organicresearchcentre.com

Editorial: Organic foods are safer and healthier

Or at least that is my conclusion having read all the reviews of the scientific literature that have come out on the subject over the last few years. There have been at least four that are described as comprehensive or systematic or a meta-analysis; plus several other pieces of work that offer extensive perspectives and insights. The latest, carried out by a team from Stanford University, received much media attention and came to conclusions that are completely different from mine.

Of course, my views can be dismissed as biased and theirs accepted as scientific and objective. I can be suspected of having a vested interest, but academics, even coming from a university that receives large amounts of money from agro-chemical and GM companies, are free of such things. Moreover the work was published in a peer reviewed journal.

It's obvious therefore whose opinion should be listened to – except that a study published last year by researchers from Newcastle University, a meta-analysis also in a peer reviewed journal, came to conclusions closer to mine than to Stanford's. The one before that, commissioned by the UK Food Standards Agency, is more Stanfordian than Woodwardian, but the one before that, undertaken by French researchers, was the other way around. And so on and so on; a research tit for tat, a 'meta' merry go round that is as unedifying as it is un-illuminating.

The remarkable thing is that all of these studies review, to a large measure, the same papers. There are some differences due to focus and publication dates, but there is a significant overlap in the source material studied. So how come they vary so much?

In fact they don't – at least not in what they say about the raw data. They all broadly agree that there are not enough studies of similar quality or make up to draw definitive conclusions about nutrition and health impacts, even though some of them go on to do just that.

Where they overlap, they show that there are clear differences and that in general (i.e. not in all cases) and in relevant foods, organic tends to contain more nutritionally desirable components (some vitamins, omega-3, secondary metabolites etc) and less undesirable ones (pesticide and antibiotic residues, nitrate etc) than conventional. In the case of pesticide residues these differences are manifest and highly significant.

What really varies between the studies is firstly, their use of statistics – how the findings are grouped and assessed, and what degree of significance is used to determine whether a specific difference has an impact or, in some cases, is even real – and secondly, how they judge what is nutritionally or clinically significant.

These two factors largely determine the differences in the conclusions drawn. So both the FSA (completely) and Stanford (for the most part) studies exclude the impact of pesticide residues because they judge that below maximum residue levels pesticides have no health or clinical significance. Similarly, some nutritional differences are dismissed as irrelevant in the context of a 'normal' diet.

In contrast, the Newcastle review takes an arguably much more sophisticated, but certainly more nuanced, view of the nutritional differences between organic and conventional fruit and vegetables and what these might mean in terms of life expectancy and health care.

Dr. Charles Benbrook of Washington State University in a robust critique of the Stanford study highlights that the researchers do not define what they mean by 'significantly more nutritious' or 'clinically significant'. He uses the example of several studies on the impact of organic diets in reducing levels of organo-phosphorus pesticide (OP) residues in children to show where organic food does have a direct and significant effect on health. Yet the Stanford study was 'subdued' in its discussion of this research.

However, like the FSA report before it, the Stanford review was anything but subdued in its conclusions, which seem to have been written in a manner designed to excite the media and drum up anti-organic headlines rather than further an understanding of the links between food production and health. But that was probably the point.

Lawrence Woodward

Sources: see page 2

Tree fodder: Is the past the key to the future?

The use of tree fodder to feed livestock was part of European agriculture for centuries. It played an important role in nutrient flows and the creation of landscapes as well as in animal health. Interest in the practice is now being revived as farmers, researchers and policy makers turn their attention to the potential of agroforestry systems. ***Ted Green*** *(Ancient Tree Forum) and ORC researchers* ***Katharine Leach*** *and* ***Jo Smith*** *review the possibilities.*

Frans Vera in his book *Grazing Ecology and Forest History* put forward his theory on the original European landscape (Vera, 2000). He explains that man, grazing and browsing animals have always played a significant role in the shaping of the countryside. Man is not seen as being responsible for clearing vast areas of continuous dense forest because this dynamically developing landscape was made up of savannah, scrub, scattered parkland trees, wood pasture, groves and significant areas of woodland of varying density.

While the earliest stages of agricultural history were dominated by shifting cultivation, with alternating periods of agriculture and forestry, agriculture developed into more settled systems involving woodland grazing and silvopasture with transfer of fertility from woodlands to cultivated crops via manure.

For example, Eckert (1995, in Eichhorn *et al.*, 2006) estimated that in the period up to 1500, 75% of the nitrogen and 90% of the phosphorus needed for arable production in Germany's Neidlingen valley came from the forests via fodder residues, manure, litter and ash from domestic fires.

Producing tree fodder

Many species of deciduous trees were used for fodder, in particular *Ulmus glabra* (Wych or Scots Elm), *Fraxinus excelsior* (ash), *Betula pendula* (silver birch), *Betula pubescens* (downy birch), and *Salix caprea* (goat willow) (Austad and Hauge, 2006).

Pollarding, the practice of cutting branches from trees two to three metres above ground level to obtain leaf fodder for feeding livestock and/or wood for fuel or other uses, has been an important component of European agriculture over the centuries. Archaeological excavations have uncovered pollards dating back to the Iron Age, and a fossil oak pollard found during gravel extraction in the UK has been carbon dated to 3,400 years old (Butler, 2006).

Cutting trees for 'tree hay' is still carried out in a few of the more remote and poorer regions scattered across Europe. It is presumed that its decline as a winter food began in the UK with the arrival of the turnip.

Charlie Burrell feeding tree fodder to free ranging Longhorn's at Knepp re-wilding project, West Sussex.

There has recently been a revival of interest in the use of tree fodder for livestock, particularly in a silvopastoral agroforestry approach, where trees are integrated into pasture to provide multiple benefits (Smith *et al.*, 2012).

Ecosystem and nutritional benefits

Silvopastoral systems offer two main advantages for the animals. First; trees modify microclimatic conditions including temperature, water vapour content or partial pressure, and wind speed, which can have beneficial effects on pasture growth and animal welfare (Bird, 1998; Jose *et al.*, 2004). Second, trees provide alternative feed resources during periods of low forage availability, particularly in climates with seasonal droughts such as the Mediterranean (Papanastasis *et al.*, 2008).

Tree fodder contains anti-nutritional factors such as tannins and other phenolic compounds that may reduce digestibility and availability of protein, palatability and intake. However, at low levels these can have a beneficial influence, by reducing protein degradation in the rumen and increasing the flow of protein and essential amino acids to the intestine (Rogosic *et al.*, 2006).

Dietary condensed tannins also show some anthelmintic properties for ruminants (Houdijk *et al.*, 2012). Other secondary compounds may have medicinal properties; for example, willow contains the phenolic glucoside salicin which has anti-inflammatory properties. However, it has not been widely evaluated in terms of its content within tree fodders or consequent effects on animal performance.

Back to the future

In Hamstead Park, Berkshire, Alun Jones is trying (on a small scale) reverting to the old methods and is pollarding some ash trees, aged up to about 40 years old, for tree hay. Following suggestions from Ted Green, he has experimented with using billhook and pruning saw, and cutting at various positions (see front cover).

Charlie has also planted a 500 metre stretch of 'fodder hedge' – using thornless species that will be cut and used for winter fodder for his cattle and sheep.

In some trees, to encourage more foliage growth for future use, he has cut higher than for traditional pollarding for obtaining wood, with the aim of creating a spreading canopy, more along the lines of fruit tree pruning. The branches are stored under cover and will be fed as tree hay to his sheep in January.

On Knepp Castle Estate, West Sussex, Charlie Burrell has been feeding pollarded tree fodder to his free-ranging Longhorn cattle and Exmoor ponies. In April 2011, Charlie planted a 'fodder hedge' consisting of thornless species that will be harvested on a 2-3 year rotation as a cut and carry fodder for winter feeding (see pictures on previous page).

ORC, as part of the Sustainable Organic and Low Input Dairying project (SOLID), is investigating a novel approach that integrates bioenergy production from short rotation coppiced willow with livestock production (see ORC Bulletin 104 for more detail).

We also want to look in more detail at the role of hedgerows in providing browse material for livestock. There are anecdotes from many livestock farmers about the selection of certain hedgerow species by cattle at particular times of the year. We would like to collate such observational evidence to try to identify patterns of use and pinpoint whether certain hedgerow species are preferred, and whether they provide particular medicinal compounds or meet nutritional needs at different times of the year.

If you are interested in getting involved, please contact Jo Smith (jo.s@organicresearchcentre.com, Ext 531) or Katharine Leach (katharine.l@organicresearchcentre.com, Ext 537) at ORC (Tel: 01488 658298).

References

Austad I, Hauge L. 2006. Pollarding in western Norway. 1er colloque europeen sur les trognes, 26-28 October, Vendome.

Bird PR. 1998. Tree windbreaks and shelter benefits to pasture in temperate grazing systems. *Agroforestry Systems* 41:35-54.

Butler J. 2006. Ancient pollards and maidens - securing their future. 1er colloque europeen sur les trognes, 26-28 October, Vendome.

Eichhorn MP, Paris P, Herzog F, Incoll LD, Liagre F, Mantzanas K, Mayus M, Moreno G, Papanastasis VP, Pilbeam DJ, Pisanelli A, Dupraz C. 2006. Silvoarable systems in Europe - past, present and future prospects. *Agroforestry Systems* 67:29-50.

Houdijk JGM, Kyriazakis I, Kidane A, Athanasiadou S. 2012. Manipulating small ruminant parasite epidemiology through the combination of nutritional strategies. *Veterinary Parasitology* 186:38-50.

Jose S, Gillespie AR, Pallardy SG. 2004. Interspecific interactions in temperate agroforestry. *Agroforestry Systems* 61:237-255.

Papanastasis VP, Yiakoulaki MD, Decandia M, Dini-Papanastasi O. 2008. Integrating woody species into livestock feeding in the Mediterranean areas of Europe. *Animal Feed Science and Technology* 140:1-17.

Rogosic J, Pfister JA, Provenza FD, Grbesa D. 2006. Sheep and goat preference for and nutritional value of Mediterranean maquis shrubs. *Small Ruminant Research* 64:169-179.

Smith J, Pearce BD, Wolfe MS. 2012. Reconciling productivity with protection of the environment: is temperate agroforestry the answer? *Renewable Agriculture and Food Systems* In press.

Vera FWM. 2000. *Grazing Ecology and Forest History.* CABI Publishing, Wallingford.

Sustainability training for organic advisers (STOAS)

ORC and IOTA (the Institute of Organic Training and Advice, now part of ORC) have recently teamed up with organisations from six other European countries to provide training to advisers on methods of assessing farm sustainability. Here, ***Mark Measures*** *outlines what STOAS is about.*

Organic production standards define what organic farmers can and can't do in practice, but they are not very good at telling us about the consequences of management, particularly in terms of the production, environmental, social and financial impacts. Merely fulfilling the requirements of the EU organic regulations or certification is not sufficient to deliver well-performing, profitable businesses providing multiple benefits in the form of public goods and services.

If organic farmers want to develop their systems, processors and retailers want to be able to demonstrate how good their suppliers are, and governments wants to see the benefits of their investment in organic grants, then there is a need for producers and advisers to track and develop farm sustainability performance.

Over the last few years, there have been several initiatives to develop sustainability assessment tools for producers. Working with a group of organisations across Europe, funding has been secured from the Leonardo da Vinci Transfer of Innovation programme for the STOAS project to provide training to advisers on three such methods:

- The RISE (response-inducing sustainability evaluation) tool, developed in Switzerland;
- The PG (public goods) tool, developed in the UK by ORC/IOTA with funding from Natural England/Defra;
- The Bioland tool, developed by the Bioland producers' association in Germany.

All three tools have similar underlying approaches, focusing on core sustainability/organic principles, with advisers working with producers for 3-4 hours to produce a farm sustainability assessment covering 10-11 key themes (such as soil management, biodiversity, water management, energy and carbon, animal health and welfare, profitability and food security).

In the RISE and PG Tool cases, the tool produces a graphic demonstration of the results, providing evidence of the sustainability strengths and weaknesses of the farming system, and can be used by the farmer and adviser to compare progress over time or with other farms and to focus on future development.

Two courses, each of two days, will be offered during the next few months: one on 29th November 2012 for more experienced advisers and those working at a policy level; and one on 11th December 2012 for advisers working on a regular basis with farmers and those less experienced in this type of sustainability assessment.

For further details and to be kept informed of the workshops, please contact Mark Measures by e-mail at: mark@organicadvice.org.uk

Towards protected cropping standards – a principled approach

This highly specialised form of horticultural cropping has never been completely covered by the EU organic regulations or the private organic standards of certifying bodies. There is now a push within the EU to bring it fully into the regulation. This is a difficult process as there are strong and conflicting views within the sector and EU Member States have implemented differing interpretations. As a contribution to the resolution of these issues, ORC has been considering the basic principles of organic production that are applicable, while acknowledging the specialised nature of protected cropping.

Reviews of organic protected cropping standards have previously been undertaken by the former Defra Advisory Committee on Organic Standards, the Soil Association, the Organic Growers Alliance, the IFOAM EU Group and others throughout the EU. These have generated debate, some conflict and much angst. We have set out the key areas previously (see ORC Bulletins 98, 104, 107).

There is now some activity at EU level, potentially leading to new regulations in 2013. A COST Action project on sustainable organic glasshouse production started in spring 2012, the EU Expert Group for Technical Advice on Organic Production (EGTOP) will look at the issue this autumn and the IFOAM EU Group is trying to finalise its position in order to present it to the EU Commission before it grapples with the issues next year.

For this reason, we want to set out here our view on the key questions. We have had much internal debate and have found a broad level of agreement that is robust in some areas and, admittedly, less so in others.

What do we mean by protected cropping?

Protected crop production encompasses cultivation of crops within permanent buildings and growing frames, with or without heating, made of glass or plastic or other material that lets daylight through.

Differentiating urban food production and commercial protected cropping

In discussing the issues, we believe it is necessary to separate the issue of urban food production from that of commercial organic protected cropping. Urban food production, including allotments, park gardens and roof-top containers, is vitally important and should be encouraged. The use of organic methods, the concepts and appreciation of the living soil and links to quality and health are highly relevant. However, urban food production requires a high degree of flexibility in respect of space, growing media, and considerations of pollution, energy and water which are qualitatively different from commercial production. As urban food production is essentially for local domestic/community consumption, we see no reason for certification. The following principles are therefore proposed on the basis that the focus of organic regulations should be on commercial production systems, not urban domestic/community gardens.

Should protected cropping be soil-based?

The principle of soil-based production in organic farming is fundamental. This encompasses the concept of the soil as a living ecosystem, the maintenance of its biological activity and the interaction between soil, sub-soil and bedrock. While biological activity would be considered by many to be most important, the principles and concepts of organic production have been developed on the basis of a holistic perspective of soil which encompasses all these facets. Therefore, protected cropping systems should not normally take place without both a biologically active soil and connectivity with the subsoil and bedrock present.

Should demarcated beds be permitted?

No. The use of demarcated (containerised) beds contradicts the basic principle that organic production should be soil based. It has been argued that some exceptions might be justified, but we have not been convinced by any examples or proposals given to date. We do not accept that there can be country-wide exemptions or any proposal that would lead to containerised production becoming a normal part of commercial organic protected cropping systems.

How should fertility be maintained?

In accordance with the principle of 'feeding the soil, not the plant', fertility and crop nutrition should primarily be provided from the soil and its interaction with fertility building crops, recycled material and low-solubility nutrient sources, with soil biological processes releasing nutrients to the plants gradually over time. Liquid feeding may conceivably be used as a 'top-up' to the system provided that the materials used are compatible with promoting soil biological activity and do not represent the primary nutrient source for the plants. We are however concerned that some commercial protected cropping systems seem to rely on liquid nutrient sources as a significant or even the primary source of nutrition. We do not believe that this neo-conventional approach is compatible with organic principles nor with the goal of achieving consistently high quality food and high environmental outputs.

The organic principle of feeding the soil not the plant was evolved on the basis that the slow release of nutrients is more compatible with natural cycles, biological processes and plant physiology, reducing excess uptake of nutrients such as nitrates that might lead to plant health and product quality problems, and reducing the risk of environmental pollution. However, we acknowledge that crop demands in protected cropping make this challenging. We believe that a greater use of fertility management plans and strategic use of 'top-up' inputs could bring benefits, but the use of such inputs must not become the mainstay of plant nutrition in protected cropping systems.

Can pot plants be considered organic?

The idea of organic pot plants is problematic, as growing plants in pots conflicts with the principles of soil-based production and the rejection of containerised cropping that follows from it. Routinely removing soil from the holding may also be unsustainable. It can therefore be argued that commercial operations selling plants in pots do not meet organic principles and should not be certified.

However, there is a market demand for such products, and the not dissimilar practice of producing organic transplants for use by other organic growers is already well accepted. In the latter case, efforts have been made to develop appropriate growing media and reduce the quantities of soil exported with the crops.

Mindful of consumer choice and recognising that people want to buy herbs in pots, living salads and ornamentals grown in a way otherwise consistent with organic principles, we believe that a possible way forward would be to link the regulations for this kind of production to that of transplants for use by commercial growers. It would also be possible to insist that sales are accompanied by advice and guidance on recycling the material into compost facilities (home or municipal) at the end of use.

Our key concern is that regulations should be framed in such a way as to ensure that this exceptional approach to organic production does not become the norm. However, defining appropriate restrictions is extremely problematic. It might be that some sort of supplementary – or complementary – labelling scheme for such products is needed.

What should be the conversion period for existing structures and enterprises?

We believe that, consistent with current regulations for other crops, a minimum conversion period of 12 months should apply with no exceptions – i.e. this should be uniformly applied across all member states. The conversion period is designed both to encourage the establishment of soil-based fertility management, including the growing of fertility building crops, and also to create optimal conditions to maintain plant health without reliance on pesticides and fungicides. The conversion period is also intended to act as a barrier to producers switching between organic and conventional production in alternate years. A 6-month conversion period, as has been proposed by some, is effectively only the winter period between harvesting one crop and planting the next, and would not allow either these husbandry or administrative conditions to be met.

While we acknowledge that the financial impact of converting capital intensive enterprises can be high, this needs to be balanced against the requirement to establish an effective organic system, with conversion plans that should include a primary focus on the restoration of soil condition and biological activity. It should be accepted that some systems may require a longer conversion period. Notwithstanding the financial arguments, too short a conversion period undermines the credibility of organic production and is likely to result in poorly functioning and therefore unsustainable systems.

Should soil sterilisation be permitted?

The use of various techniques (including steam and other non-chemical methods) to 'sterilise' or disinfect soil as a means of controlling plant pathogens is not consistent with the principle of promoting a biologically active soil and should not be part of organic protected cropping. Soil hygiene should be maintained through rotations and by encouraging a diverse ecology of micro-organisms that suppress problematic pathogens, for example through regular additions of compost and other sources of organic matter, as many growers have demonstrated in practice.

Should external energy be used for heating?

Heating should only normally be used for the maintenance of a frost free environment, seed germination and transplant production. Additional heating should only be permitted where heat is available as a genuine by-product of a combined heat and power (CHP) or other appropriate renewable energy system. While fossil fuels have been traditionally used for many northern European systems, the use of renewable sources in such structures should be given priority when available.

Should CO_2 enrichment be permitted?

Carbon dioxide is a natural component of the air and a key part of biological processes such as respiration and photosynthesis. Enrichment can provide benefits for plant growth, productivity and quality (Vitamin C, dry matter, sugars). In organic protected cropping systems with biologically active soils and regular organic matter inputs, 'natural' enrichment of the atmosphere in enclosed spaces may occur. Therefore, enrichment *per se* does not contradict organic principles. However, artificial enrichment, where fossil fuels such as gas are burned specifically to generate CO_2 for enrichment, is not consistent with organic principles. There is a broad consensus that if CO_2 enrichment is applied, it should only be used when sourced as a genuine by-product of the heating system. Future technical developments in this area should be monitored for their impact on crop production and quality and consistency with organic principles.

Should the use of water be controlled?

As a valuable resource with sometimes variable supply the answer is yes. We support the consensus that there should be maximum recycling within systems, compliance with the Water Framework Directive and maximum efficiency of use. Technology is available that allows the matching of supply to crop demand with little or no loss to the environment. Ideally, these factors should be set out in a water management plan that forms part of the overall management plan for the enterprise. However, we recognise that there are differing levels of expertise and development within and between member states and further work is needed before a regulation could be implemented.

Should the use of peat be allowed?

We believe that peat should be phased out of use in organic production globally, due to the impacts on biodiversity and habitats and particularly due to the loss of long-term, organically-bound carbon back into the atmosphere. We do not accept the argument in some EU Member States with large areas of peat reserves that, if managed sustainably and with due regard to biodiversity, the use of peat should be allowed. A practicable and enforced timetable for prohibition needs to be set now.

Let us know what you think

We would like to hear what you think about our position. E-mail us at: comment@organicresearchcentre.com.

UK organic production in decline: a wake-up call for policy-makers

In July, Defra released the latest national statistics on the organic farming sector in the UK (www.defra.gov.uk/statistics/foodfarm/enviro/organics). They show a decrease in UK organic land area of 9%, to 656kha, between 2010 and 2011. This continues the downward trend reported last year when there was a 3% decline. However, trends vary between the four home nations (with Scotland seeing the largest decline over a longer period) and between crop types. ***Susanne Padel*** *considers the figures.*

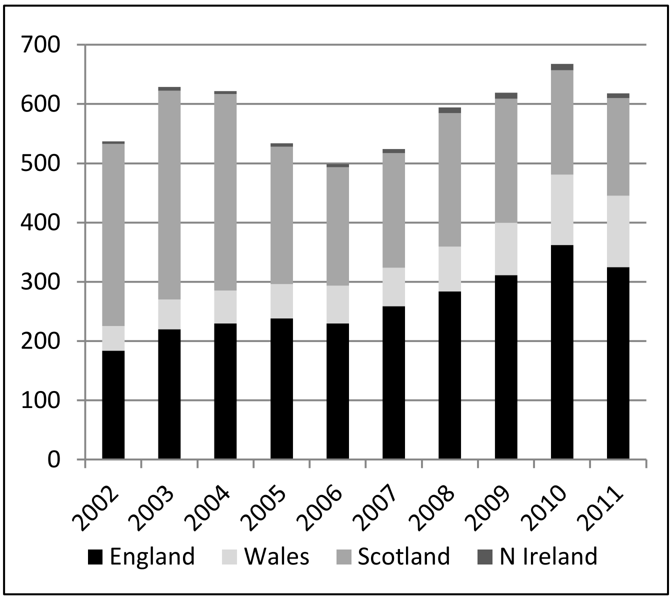


Figure 1: Certified fully organic land area (kha) in the four UK nations, 2002-2011

While the decline in the UK organic area up to 2010 could be attributed to a decline in Scotland only, with England and Wales still increasing, in 2011 only Wales maintained the size of its organic land area. Over half of the UK's organic area is in England and this decreased by 10%. Northern Ireland has the fewest organic producers and in 2011 suffered the largest percentage decrease of 23%.

Conversion rates have also declined substantially (Figure 2), with virtually no land in conversion outside England. Rates are now lower than the previous low point in 2004.

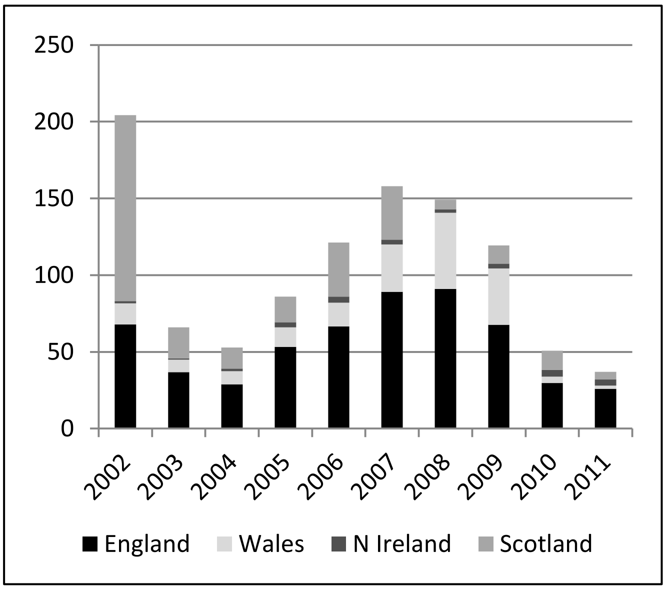


Figure 2: In-conversion land area (kha) in the four UK nations, 2002-2011

Trends also vary between different land uses. Temporary and permanent pasture provide the UK's largest organic land use types (approx.18% and 66% respectively; see Figure 3). There was a decrease of 7% (to 116kha) in temporary pasture and a 9% decrease (to 435kha) in permanent pasture. The cereals area decreased 8% (to 52kha) and the vegetables area (including potatoes) decreased by 13% (to 16kha).

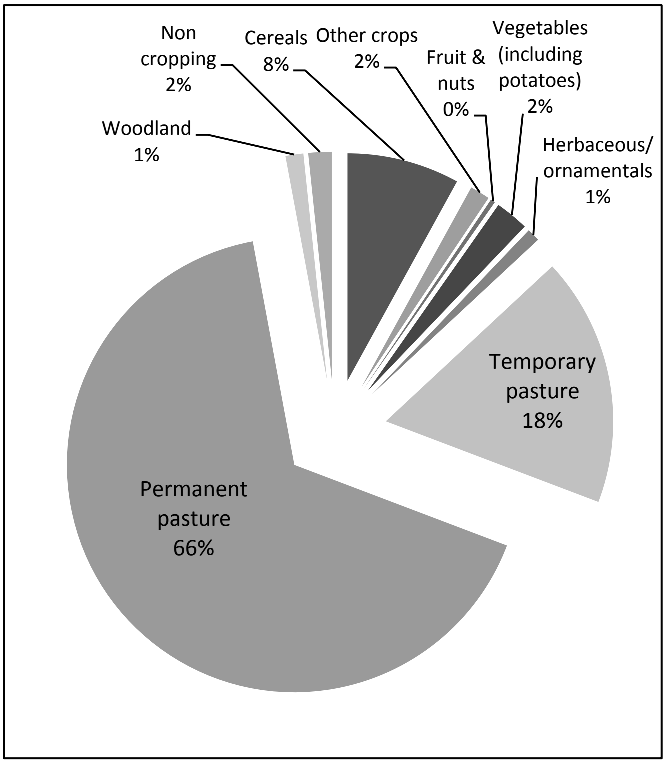


Figure 3: Total UK organic and in conversion land area by land use type (%), 2011

There is some uncertainty about the accuracy of the livestock data. However, it is reported that cattle numbers decreased by 4% from 2010 and poultry showed a sharp decline of 27%. In contrast, sheep numbers increased and after a decline in 2008 the organic pig population appears to have levelled out over the last couple of years.

2011 also saw a decrease in the number of certified organic operators; down by 5% to approximately 6,900. Of those 4,450 (4,741 in 2010) are agricultural producers (farmers and growers), 2,279 (2,338 in 2010) are processors and 200 (208 in 2010) are mixed businesses with both production and processing activities.

Why is this happening?

There are no survey data to explain why some producers are leaving the organic sector and others are staying and remaining in business. Nor is it clear how many producers are returning to conventional production or whether they are leaving farming altogether. It is therefore difficult to be definitive about what lies behind these figures. Several possible explanations have been put forward.

Firstly, there is a 'normal' rate of decline due to farmers moving to a new farm or going out of business, e.g. due to retirement or death without succession. When conversion rates are high, these losses, which may be as high as 5%, are less obvious.

Secondly, there are market factors, including the reported reductions in organic sales in the last few years; increases in production costs, particularly of animal feeds; changes in conventional prices, e.g. in the grain market; reduced premiums for milk and meat; or other factors in the organic marketplace such as supermarkets delisting organic products and promoting other brands. Some producers lack confidence that the organic market will recover. Coupled with increases in input prices this is likely to result in de-certification, especially if they sell only a small proportion of their output to specialist organic markets.

Thirdly, there are policy factors. With policy support normally tied to five-year agreements and significant penalties for early exits, many producers lacking confidence in the market are holding out until they are free to leave without penalty. For some, the five-year agreements are now coming to an end and they are choosing not to renew, although not all are decertifying at the same time. With significant CAP policy changes in the pipeline, including the proposal to include organic farming in Pillar 1 greening, new scheme commitments are being avoided until there is more certainty about future policy support.

Policy/market failure: sides of the same coin

If the current trends continue, there are likely to be shortages of domestic supplies for key commodities in the near future, even without further market growth. This, according to classic supply and demand theory, will result in improved prices, with producers returning to organic production to meet the shortfall. We are already seeing this in the case of beef.

However, while market signals are important, in the EU organic sector, policy support is too. Apart from payment levels, the suitability of the support options and a clear statement of government commitment to organic agriculture matter enormously in terms of building producer confidence to take on the risks of conversion. As was shown in a recent study of support schemes across the EU (see ORC Bulletin 109), support in the UK languishes at the bottom of the EU league table.

There also appears to be lack of awareness and commitment to promote the organic farming option to other low-intensity farmers who could benefit from organic options even without seeking to market all their products as organic. And not knowing the reasons why producers leave makes it difficult to target support schemes so they are more attractive. More pre-exit advice could also help.

Throughout the EU, governments are ensuring that organic agriculture plays a key part in farming and food systems. Hopefully, these disappointing figures will act as a wake-up call for the UK governments and that they will renew their efforts to achieve the same thing here.

Collecting organic market data in the UK

ORC is participating in the *European Data Network for Improved Transparency of Organic Markets* (OrganicDataNetwork) project. This aims to increase the transparency of European organic food markets through better availability of market intelligence about the sector.

As part of this project we recently brought together organic data collectors within the UK to discuss the current situation and to identify areas for improvement and where greater use could be made of existing data.

Participants included Defra, control bodies (Soil Association Certification and Organic Farmers and Growers), commercial data providers (Kantar Worldpanel) and a number of organisations working with data including Saxon Agriculture, Organic Arable, Garden Organic, Aberystwyth University/Organic Centre Wales and the Scottish Agricultural College.

Discussion about production data (such as land area data and livestock numbers) focussed on Defra's annual report (see above), which is based on information collected by control bodies as part of the annual inspection. Because its publication process is slow, due to the need to bring together the detailed data from the various different sources and systems, it cannot be used readily for forecasting production and there is as yet no information on production volumes.

At present there are virtually no data on commodity prices and price trends, which would be useful for business decision making; although some levy boards may hold, or be in a position to collect, relevant data.

After a presentation from Finn Cottle about the Soil Association's Organic Market Report 2012, the discussion moved on to organic market data; in particular the retail panel data provided by Kantar Worldpanel; and to assessing whether other approaches are needed to collect data from the non-multiple end of the market (e.g. box schemes, farmers' markets, farm shops).

The categories used in market reports differ considerably from those used in production returns, making it difficult to compare supply and demand trends. For example, production data commonly report on the land area for cereal crops, but in market data reports the output of this is hidden in a larger category of 'ambient groceries' which also includes non-cereal-based products.

The lack of data on the availability of organic food, which is known to influence purchasing behaviour, was identified. Opportunities and difficulties in gathering import and export data were also discussed.

We shall report further on the progress of this work in future Bulletins.

Susanne Padel

For further details, visit www.organicresearchcentre.com

Organic farm incomes hold up again

*The latest Defra-funded report on Organic Farm Incomes in England and Wales for 2010/11 found that incomes on organic farms remain competitive with those of comparable conventional farms, despite challenging organic market conditions. **Nic Lampkin** and **Simon Moakes** (Aberystwyth University) report.*

Data on organic farm financial performance in England and Wales are collected by the Farm Business Survey and analysed annually by the Institute of Biological, Environmental and Rural Sciences (IBERS, Aberystwyth University) and the Organic Research Centre (ORC). The 2010/11 report (see http://orgprints.org/21018 for the full version) includes farm business data for 212 organic farms.

Farm Business Income (FBI, £/ha, a measure of profit) for most organic farm types was higher than or similar to that of comparable conventional farms. The highest positive differences were found for LFA dairy and cattle & sheep farms, and the largest negative differences were for horticulture, but sample sizes for horticulture and LFA dairy were low and the results should be treated with caution. For other farm types, the differences were insignificant.

The project also assessed year to year changes, by comparing profitability for an identical farm sample in 2010/11 with results for 2009/10. Substantial increases in profitability were observed on organic and conventional cropping and horticultural holdings, with some increase also seen on LFA dairy holdings. Profitability decreased for other organic mixed, dairy and livestock farm types, though not significantly, whilst conventional cattle and sheep farm profitability decreased significantly.

Output values (£/ha) were similar between organic and non-organic across most farm types, with premium prices and higher agri-environmental payments compensating for lower yields and stocking rates. Horticultural output was much lower on organic farms, in part a result of the requirement for fertility building crops, but also (as evidenced by the land/rent costs/ha) lower land quality.

As might be expected, crop costs (ferts, sprays etc.) were lower on most organic farm types, while livestock costs (feed etc.) were higher, reflecting higher prices for feed and in some cases higher numbers of livestock. Fixed costs, such as land and machinery, tended to be more similar, while labour costs show a mixed picture, lower in some cases and higher in others.

Gross and net margins were also calculated. Organic livestock net margins were characterised by similar financial output, with less physical output but higher prices, lower variable costs such as feed and fertiliser, but higher fixed costs per head due to lower output per hectare. Both organic and conventional net margins tended to be negative once the value of farmers' own resources (land, labour and capital) was included, with similar performance for beef and sheep but a lower margin for organic dairy cows. However, the inclusion of support payments resulted in a superior organic financial performance overall.

Crop net margin results were generally higher in 2010/11, with organic enterprises out-performing their conventional counterparts. Similar output, lower variable costs and higher support payments resulted in substantially higher organic net margins.

The fact that organic farm incomes remain competitive with conventional, and that we have seen an increase for cropping and horticultural holdings, is very encouraging. Many farmers have been looking at the statistics on retail sales and premium prices and wondering whether they should stop farming organically – these figures show it still pays to look closely at the bottom line for both organic and non-organic farming before making a decision.

	Cropping		*Mixed*		*Horticulture*		*Dairy (Lowland)*		*Dairy (LFA)*		*Cattle & sheep (Lowland)*		*Cattle & sheep (LFA)*	
	Org	*Conv*	*Org*	*Conv*	*Org*	*Conv*	*Org*	*Conv*	*Org*	*Conv*	*Org*	*Conv*	*Org*	*Conv*
Sample (n)	33	250	22	101	15	57	48	249	6	22	38	215	50	321
Size (ha)	254	221	198	174	23	20	154	134	98	93	123	104	167	142
Livestock (LU)	71	45	179	147	9	3	215	224	148	147	112	97	141	138
Output (£/ha)	**1518**	**1469**	**1319**	**1411**	**11683**	**24583**	**2437**	**2680**	**2165**	**1989**	**998**	**951**	**900**	**826**
of which:														
Livestock	192	124	586	585	286	88	1973	2178	1784	1572	490	496	422	450
Crops	856	943	268	420	10353	20098	73	154	25	71	45	76	25	18
Misc	155	152	129	140	821	4196	93	90	45	43	91	136	47	32
Agri-env	102	45	128	46	94	29	81	24	85	70	166	53	176	91
SFP	212	205	209	221	129	172	218	234	225	232	205	190	230	235
Input (£/ha)	**1139**	**1077**	**1064**	**1147**	**10220**	**21966**	**2022**	**2181**	**1624**	**1553**	**763**	**757**	**606**	**615**
of which:														
Livestock	112	74	293	334	138	50	860	890	843	658	211	196	162	201
Crops	176	308	75	164	3521	8439	49	198	49	144	23	57	26	57
Labour	194	126	127	109	3063	7026	266	208	37	72	57	70	47	27
Machinery	364	334	312	314	1632	2318	466	519	407	410	232	235	196	181
General	132	123	151	120	1613	3737	207	226	178	157	135	120	83	79
Land/rent	160	111	106	105	253	396	174	140	111	111	105	79	91	70
FBI~ (£/ha)	**379**	**392**	**255**	**264**	**1463**	**2617**	**415**	**499**	**541**	**436**	**235**	**194**	**294**	**210**
% change*	53%	80%	-10%	12%	467%	133%	-14%	3%	17%	12%	-22%	-3%	-17%	-13%

* derived from an identical sample in 2009/10 and 2010/11

Do wheat populations adapt to organic farming?

For a long time, organic plant breeders and researchers have called for plant varieties that are specifically adapted to organic agriculture. Can we use nature to produce such varieties? ORC set up an experiment to find out. ***Samuel Knapp*** *from the University of Hohenheim in Germany,* ***Simon Griffiths*** *and* ***John Snape*** *from the John Innes Centre, ORC's* ***Thomas Döring*** *and* ***Martin Wolfe****, and* ***Hannah Jones*** *from Reading University report on recent results.*

Wheat composite cross population at Duchy Home Farm

When Charles Darwin explained his theory of evolution and natural selection in *The Origin of Species* more than 150 years ago, he used the example of plant and animal breeders who are able to improve plant performance by targeted selection. Darwin even complained about naturalists who tended to neglect agriculture as a source of information for understanding nature. Today, evolutionary biology can inform agriculture and plant breeding, thereby repaying Darwin's debt to agriculture (Denison, 2012).

One approach to use evolutionary thinking in plant breeding is called, unsurprisingly, evolutionary plant breeding (Döring *et al.*, 2011). The fundamental requirement for this approach is the creation of high genetic diversity within the crop, such as developing composite cross populations of many different lines.

In a composite crop population virtually every plant is genetically different. The principle is then to let natural selection act on these diverse crop populations to select the plants that are best suited to the prevailing conditions.

Plants are subjected to consistent biotic and abiotic environmental conditions for several generations. Those plants that are best adapted to these conditions are expected to produce most seed and therefore their share in the population will increase over time. Thus, the population as a whole should adapt slowly to the prevailing conditions and improve in performance.

No farm system impact

In theory, this approach could also be used to produce plant populations that are specifically adapted to organic conditions. The aim of our study was to test whether this idea can be applied in practice. In particular, our objective was to assess whether any signs of natural selection can be detected on the genetic level in evolving composite cross populations of winter wheat that were subjected to organic versus conventional management conditions.

To this end we grew winter wheat populations for eleven generations at two organic and two conventional sites in South England. About 400 plant individuals of each population were genetically characterised at early and late generations by using genetic markers; yield and yield components were also measured.

To investigate the signs of natural selection several methods from the field of population genetics were used. An association mapping approach was employed to relate any genetic changes to traits observed in the field in order to give insights into the role of plant traits in the selection process.

Results showed that the levels of genetic diversity within the populations were maintained over the generations. Contrary to our expectations, adaptation to management (organic vs. conventional) or to sites could not be detected. In other words, the genetic make-up of the populations did not change in expected ways at the four sites.

The main reason for this lack of divergence seems to be the relatively strong year-to-year variability of environmental conditions at each site. In relation to this variability, site and system conditions may just not have differed sufficiently to allow for any differential selection within the studied timeframe.

Adaptation to other plants not environment

However, consistent adaptation within the populations was observed over time, in particular for traits such as height and photoperiod sensitivity. Over the generations we observed a continuous reduction in the frequency of genotypes with reduced height, i.e. the shorter plants were eliminated.

This suggests that adaptation took place towards growing in a mixed stand population rather than to environmental conditions: Which means that competition among crop plants in a diverse population selects for stronger competitors. This could be detrimental to crop production because less of the biomass is put into grain, but it could probably also be positive for weed suppression.

These results provide useful information for breeding programmes that aim to select genotypes for specific conditions. They indicate that artificial selection to promote the positive properties of diverse mixtures, e.g. the restriction of foliar diseases, may be necessary to produce more agronomically adapted populations.

References

Denison RF. 2012. Darwinian Agriculture – how understanding evolution can improve agriculture. Princeton University Press, Princeton.

Döring TF, Knapp S, Kovacs G, Wolfe MS, Murphy K. 2011. Evolutionary plant breeding in cereals– into a new era. Sustainability 3:1944-1971.

Farming systems, tillage and earthworms

Soil management supported by biological processes is a key feature of agroforestry and organic cropping systems. Earthworms are affected by soil management, but they also make invaluable contributions to soil structure and fertility by their burying and feeding activity. Different types of earthworms live and work in different ways; assessing their contribution to the soil ecosystem is not just a matter of numbers, but also of function. In these two articles, we highlight some impacts of soil management on them.

Impacts of tillage on soil conditions and earthworm species

Maria Teresa Lazzaro** (ORC intern, 2012), **Oliver Crowley, Jo Smith** and **Thomas Döring

Tillage can affect earthworms directly because of the cultivation operation (e.g. by killing them), and indirectly because of changes in the soil environment. However, previous research on the effect of tillage on earthworm populations has revealed contradictory findings (Chan, 2001). Also, there is currently very limited information about the influence of reduced tillage on earthworms in organic systems.

Therefore, we used a field trial set up at Duchy Home Farm in Gloucestershire to compare the abundance and community structure of earthworms in ploughed fields with reduced tillage. Three fields were each split into two tillage treatments: cultivation with standard mouldboard ploughing and non-inversion tillage using the EcoDyn combined driller and cultivator (www.eco-dyn.com; see also ORC Bulletin 109).

In May 2012, earthworm populations under a winter rye crop were sampled from blocks of soil each with an area of 25x25cm and a depth of 20cm. Soil samples were collected at two different depths of the topsoil: 0-7.5cm (the maximum soil depth worked by the EcoDyn cultivator), and 7.5-15cm (the maximum depth of the plough).

Changes in the earthworm community

An average density of 228 earthworms per square metre (ew/m^2) was found for EcoDyn cultivated soils and 172 ew/m^2 for ploughed soils (Figure 1a). However, this increase in earthworm density of around 25% in the reduced tillage plots was not reflected in the biomass as the average earthworm biomass per sample in EcoDyn plots was 40% lower than in the ploughed plots. According to a multivariate analysis of the earthworm species data, the tillage used had a significant effect on the earthworm community.

The average bulk density of EcoDyn cultivated soil in the upper 15cm was higher than that of the ploughed soil (Figures 1b, c); the difference was statistically significant ($p<0.05$) at 7.5-15cm depth. Although values vary with soil type, high bulk density figures indicate comparatively greater soil compaction and lower soil porosity.

As in this study, a pattern of higher earthworm density and lower biomass in a reduced tillage system has been described by Berner *et al.* (2008). In our study, this finding can be explained by the higher presence in the EcoDyn plots of individuals of the small endogeic earthworm species *Murchiona muldali*, which has a low biomass (Figures 2, 3). Indeed, 90% of the adults sampled for this species were found in EcoDyn samples.

Earthworm ecotypes

Endogeic earthworm species make extensive non-permanent horizontal burrows in the upper mineral layers of the soil, and feed on small particles of organic matter; **epigeics** live in and feed on the leaf litter layer on the soil surface; and **anecics** live in permanent vertical burrows and feed on leaf litter that they pull into their burrows from the soil surface.

The high presence of small endogeic species has already been reported as typical for heavy soils (Chan, 2001). *M. muldali* is possibly better adapted to the higher levels of compaction of the topsoil in the EcoDyn plots, whereas the species *Aporrectodea caliginosa* and *A. chlorotica* were found in the relatively less compacted ploughed plots.

Conclusions

In order to draw conclusions from experiments on the effect of reduced tillage on earthworm abundance, it is important to consider some details of the systems in comparison. In our case, the trial is part of an organic farm with a six year rotation which includes the use of cover crops in between the economically productive crops; the mouldboard plough treatment consists of a relatively shallow operation at a depth of 15cm. So the plough system is already relatively sympathetic to earthworms. As the use of reduced tillage was able to increase the number of earthworms in the soil, the comparison of the EcoDyn machine with a deeper ploughing system is likely to reveal even greater differences.

However, our study provides clear evidence that the number of earthworms is only part of the story. The earthworm community changes significantly when tillage intensity is reduced, and increased soil compaction under reduced tillage is a key driver for this change. In the long run, however, the earthworm community might contribute to a decrease in soil compaction by their relentless burying activity.

Acknowledgements

We would like to thank David Wilson for his support in this project. The compilation of results has been achieved in TILMAN-ORG, within the framework of the 1st call on Research within CORE-Organic II, with funding from the UK Government Department for Environment, Food and Rural Affairs (Defra).

References

Berner A, Hildermann I, Fließbach A, Pfiffner L, Niggli U, and Mäder P (2008). Crop yield and soil fertility response to reduced tillage under organic management. *Soil & Tillage Research* 101: 89–96.

Chan, KY (2001). An overview of some tillage impacts on earthworm population abundance and diversity-implications for functioning in soils. *Soil & Tillage Research* 57: 179–191.

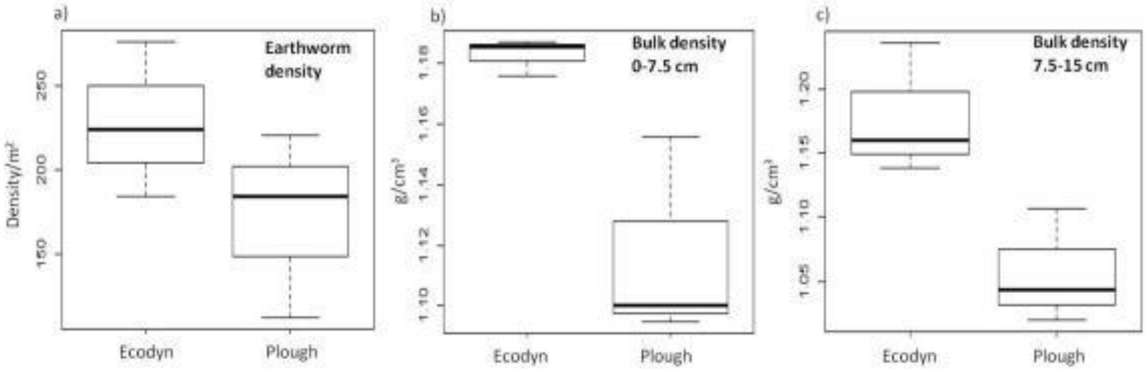


Figure 1: a) earthworm density/m²; b) bulk density at 0-7.5cm soil depth; c) bulk density at 7.5-15cm soil depth. The black lines in the middle of the boxes show the average value recorded.

Figure 2: Individuals of Murchiona muldali (small worm, on left), and Aporrectodea caliginosa (large worm on right)

Figure 3: Murchiona muldali individual in the soil

Soil conditions and earthworm biodiversity in organic arable and organic agroforestry systems

Murielle Rüdy (ORC intern, 2012) and Jo Smith

Does an agroforestry approach improve soil physical properties and earthworm populations? We considered this question at Wakelyns Agroforestry in Suffolk this spring, and looked at the spatial variation within the agroforestry systems to find out how far into the crop alley the influence of the trees reached.

Murielle collected samples from three systems: the diverse agroforestry system consisting of rows of seven timber tree species and apple trees separated by a 10m crop alley ('mixed' system); a willow agroforestry system consisting of twin rows of short rotation coppiced willow for bioenergy, again separated by a 10m wide crop alley ('willow' system) and an organic system without trees ('control'). In all cases, the agricultural component was a fertility-building species-rich ley that was two years (willow and organic control systems) or three years (mixed system) old.

Within the agroforestry systems, soil cores were collected from three locations within the crop alley: from the edge of the alley adjacent to the tree row, from halfway between the edge and centre, and from the centre. In all systems, three replicates were collected. Soil cores were taken at two depths: 0-15cm and 15-30cm.

From the same locations, another set of soil cores were sampled for earthworms by hand sorting. The earthworms were identified and assigned to their ecotypes. Surprisingly, there were no overall significant differences in soil properties between the agroforestry and control systems. Within the agroforestry systems, however, there was an increase in soil bulk density and decrease in soil porosity in the upper layer of soil from the edge to the centre of the alley (Figure 4). This was particularly noticeable in the willow system and may be due to the action of the trees roots in improving soil porosity.

The agroforestry systems contained more earthworms and more species than the treeless organic control. Abundance of earthworms was highest in the willow system; and the endogeic species were the most common in all systems (Figure 5). The absence of the anecics from the no tree control indicates how more comprehensive and possibly resilient the contribution of agroforestry to soil health might be compared to simple cropping systems.

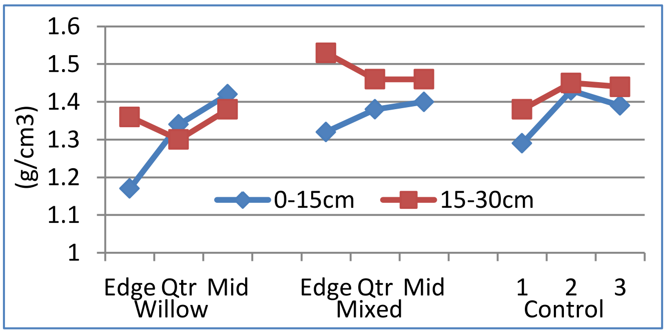


Figure 4: Soil bulk density in willow, mixed agroforestry and treeless organic control plots

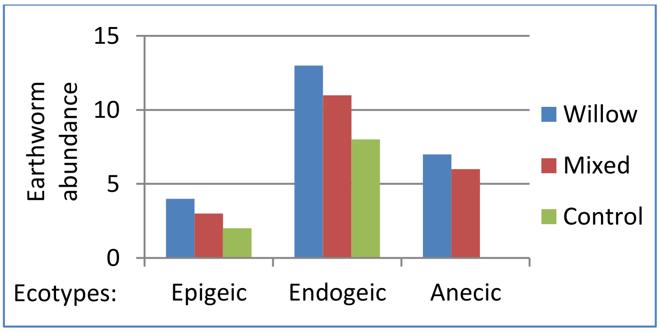


Figure 5: Earthworm abundance (ew/sample) in willow, mixed agroforestry and treeless organic control plots

Producer participation is central to future organic research

ORC's research comprises a wide range of projects that provide practical solutions for commercial producers as well as feeding into UK and EU organic farming policy. Whether with producers or processors, our focus has always been research on farms and within businesses, ensuring research is close to the needs of producers and is put into practice. ***Bruce Pearce*** *reports on new developments at ORC.*

In the last few years we have sought to involve farmers and growers more fully in planning and actively participating in research and development. This participatory approach is now embedded in our Participatory Research and Demonstration Network (PRDN) and will characterise much of our R&D programme.

All our researchers engage with the PRDN, but thanks to financial support from the Duchy Originals Future Farming programme (see ORC Bulletin 109), we have identified key team members who will act as sector champions and co-ordinators for the network. They are:

- Oliver Crowley (arable)
- Anja Vieweger and Roger Hitchings (horticulture)
- Becky Nelder (pigs/poultry)
- Mark Measures (beef/sheep)
- Katharine Leach (dairy)
- Bruce Pearce (overall co-ordinator).

What are your research priorities?

To make sure we are on the right track we have begun a wide-ranging consultation and conversation with stakeholders. We have also set up an online consultation to make contact with as many people as can. Please look at http://svy.mk/RyvRq2 and let us know your views.

As part of the Duchy Originals Future Farming programme, we are working with a wide range of producers and groups to identify participatory research priorities. Where other organisations, such as the Organic Growers Alliance, have already canvassed views on research priorities, we aim to work with and build on these priorities.

A series of sectoral stakeholder meetings and consultations have started and more are being planned for the autumn. These include the Duchy Originals Farmer Field Labs, the Soil Association Soils Symposium and the ORC/Soil Association poultry conference. We will publicise these via our website and social media as the dates are firmed up.

This will all lead up to our conference in January 2013, where we will present our findings and build groups of producers who wish to join with us in implementing this new research agenda.

Talk to us, join us, participate with us

These consultations and conversations about research priorities will help us identify what needs to be done and how best to undertake it. However, if you have pressing needs or are already doing some research, but want to join with other producers or to make your own trials more scientifically rigorous, please e-mail us at research@organicresearchcentre.com.

ORC Organic Producer Conference
Aston University, Birmingham, 22-23 January 2013

Join ORC's Participatory R&D Network

You can now join the ORC Participatory Research and Demonstration Network for a subscription cost of £50 plus VAT (£60 total) per year.

Benefits include: the ORC printed Bulletin and e-Bulletin; the Organic Farm Management Handbook; priority access to research reports and technical guides; free or reduced-rate access to events; access to participatory research e-discussion groups; opportunities to participate in research projects and much more.

If you are interested, please e-mail research@organicresearchcentre.com for a registration form and further info.

Participatory research in action

Grower evaluation of purple/green sprouting broccoli

Growers in East Anglia are working with us to test progeny of a diverse Italian population of sprouting broccoli. These flavoursome landrace plants differ from sprouting broccoli commonly seen in UK shops, being more tender, bright green in colour, and very big and bushy.

Growers will integrate the plants into their growing system and treat them as an ordinary commercial crop. Assessments will be made by the grower over the course of the season. When the plants start cropping in early spring, they will be rated for ease of harvest and sprout quality. The growers' own impressions of each trial entry overall, as a commercial prospect, are important.

Project co-ordinator, Louisa Winkler will visit the growers during the growing season and keep regular contact with them via phone and email. The ORC crops research team will analyse the results, discuss the findings with the growers and work with them to disseminate the outcomes.

Dairy producers developing project ideas

As part of the SOLID (Sustainable Organic and Low Input Dairying) project, a consultation has been carried out to discover topics suitable for participatory research of interest to organic dairy farmers. Workshops were held at the ORC Producer Conference in January 2012 and at a stakeholder meeting in May. Ideas have also been identified during project visits to 17 farmers.

Farmers identified needs in a broad range of subjects including: soil, animal health and welfare, feeding, forage utilisation, and forage production. In several areas – especially health and welfare aspects such as mastitis control – a considerable amount of research knowledge already exists and the need is for effective knowledge transfer. There is a similar situation with management of clover and efficient utilisation of manures.

Specific suggestions for on-farm research include: the performance of particular grass-legume mixes under organic grazing; forage crops for dry conditions; improving soils where low biological activity leads to low productivity; the effects of reducing protein in the dairy diet; how to deal with changing availability and quality of forage and the best ways of supplementing grass in organic and low input systems.

Katharine Leach is now working with dairy farmers to translate these ideas into participatory research topics and activities. We will report how this work progresses in future Bulletins.

Arable producers tackle beans and cereals

We have also been able to move forward and develop participatory trials with a group of arable producers who were interested in trialling bean varieties, in particular for Chocolate Spot resistance. One interesting proposal being looked at is based on anecdotal evidence that bean/cereal mixtures can help to manage this diseases. Oliver Crowley has been working with six producers across southern England to plan and implement a trial with support from the Organic Seed Producers Ltd (OSP) and Organic Arable. We will keep you posted as this work develops.

We are looking at how organic cereal variety trials can be extended throughout the UK. There will be more consultation on this soon but as an interim measure we have agreed with OSP and Pearce Seeds that we will combine their variety trial data where possible and publicise the information more widely to organic producers.

Mixing varieties to beat disease

Organic Arable's Andrew Trump has been advising farmers to take heed of ORC's research showing how growing variety mixtures successfully combats disease.

In an article in the OA member's newsletter (www.organicarable.co.uk) he writes:

"This has been a horrendous season for disease and yet very few producers have heeded the advice that has been available for several years about growing variety mixtures. By planting a mixture of varieties the spread of disease through the crop is slowed and it has been shown that this produces a more stable yield over time."

This has been shown to work in a number of different crops including potatoes and wheat, and most recently in oats as part of the Oatlink project (ORC Bulletin 91): "the mixture had 18% less disease than the average of its component varieties. This is consistent with the 2005/06 results, where the mixture had 25% less disease than its component varieties and continues to show the effectiveness of mixtures at controlling the spread of disease."

Andrew continues: "If you are growing for the feed market (or oats as millers are not variety specific) there seems little to be gained by growing a single variety. This season with seed in short supply perhaps getting a little of several varieties and seeing how you get on will be an effective strategy."

Book review: *The Development of the Organic Network*

The subtitle of Philip Conford's latest book on the history of the UK organic movement is 'Linking People and Themes, 1945-95', which he does in an awesomely comprehensive and insightful way. Conford's mastery of the myriad of strands, events and personalities, of these 50 years of organic matters is monumental. He writes with a clarity and verve that makes it alive and vivid.

Conford says this book should be regarded as a 'starting point' and not a definitive history; that he is only mapping out the territory to which others – especially those who disagree with some of his perspectives – can bring evidence and insights to add to its features and colour.

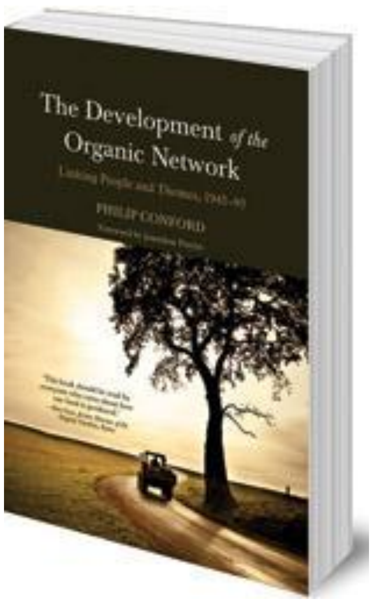
This may prove problematic. As Philip notes, few of the organic 'activists' who played a large part in the second half of this period have been adept diary keepers or recorders of events; minutes of meetings tended to be functional or sometimes too coloured by political considerations to be a trusted historical record. I don't think any of us gave a second thought to recording things for posterity and certainly my 'archive' consists of no more than bits of damp paper in the garden shed and garage.

If Philip Conford's books turn out to be the definitive organic history then we will have been well served. This one enhances his earlier work *The Origins of the Organic Movement*. While I disagree with his emphasis in some parts, I think his overall synthesis of the strands, ideas, links and events – which he calls the 'Organic Network' – rings true and clear and is compelling and educative.

He notes my reluctance to use the term 'organic movement', but he uses it and points out: "Among members of the organic movement one can find every shade of political opinion; a variety of religious faiths, as well as a rejection of the 'spiritual'; a desire to change the system from the inside and determination not to compromise with the system; a belief that the case for organic cultivation can be made on purely scientific grounds and that the case is essentially ethical: and so on."

All of which is true and set out in this excellent book.

Lawrence Woodward



The Development of the Organic Network: Linking People and Themes, 1945-95
by Philip Conford, with foreword by Jonathon Porritt, is published by Floris Books and costs £25. ISBN 978-086315-803-2

Events and announcements

Forthcoming events

ORC's 7th Organic Producer Conference

22-23 January, 2013 – Aston University, Birmingham

Please see the separate enclosure with this Bulletin for outline programme and registration details. Further details and on-line reservation/payment facilities are available at: www.organicresearchcentre.com.

Other events:

11 October 2012: ORC/SA Organic Poultry Conference with focus on future of poultry feeding and breeding

29 November 2012: STOAS project policy-oriented sustainability assessment training event

11 December 2012: STOAS project farm adviser-oriented sustainability training event

Further details: see Events at www.organicresearchcentre.com. Friends of ORC may qualify for free or reduced rates on events. Please check for details. Not a Friend yet? See our appeal

New position at ORC

We are currently looking to recruit an

Information/Education officer/Researcher

to support our work with producing:

- **Technical Guides, Fact Sheets and Research Synopses** as part of the Duchy Originals Future Farming programme
- the **ORC Bulletins** (printed and electronic)
- **ORC website** content
- **Conference and event programmes**
- assist development of new **education/training initiatives**

and to support our policy evaluation work, in particular

- **Evaluation of the EU organic regulations** for the European Commission

These activities comprise a full-time role but job share may be possible.

Application details: www.organicresearchcentre.com

Application deadline: **9am Monday 5th November 2012**

Support our 2012 Financial Appeal!

We've raised £40,000 towards our target – please help us raise another £60,000

For many of our activities, including the Bulletins, our website, pilot projects exploring new ideas, PhD projects and policy advocacy on behalf of the organic sector

ORC as a charity depends on public donations.

Like many charities, we have experienced a significant reduction in donations during the economic crisis.

Now, more than ever, we need your support.

To ensure that we can close the funding gap for this year and next, we need to raise a total of £100,000.

Can you help?

If you would like to support a specific project, we have lots of ideas for new projects and activities to share with you. Please get in contact.

You can now donate on-line via our website: www.organicresearchcentre.com

Alternatively you can use the 2012 Appeal form obtainable by e-mailing: elmfarm@organicresearchcentre.com