



ELM FARM RESEARCH CENTRE

The Organic Research Centre

Bulletin

*with Technical Updates from
The Organic Advisory Service*

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ELM FARM RESEARCH CENTRE is an international research, advisory and educational organisation based in the UK.

The business of Elm Farm Research Centre is to develop and support sustainable land-use, agriculture and food systems, primarily within local economies, which build on organic principles to ensure the health and wellbeing of soil, plant, animal, man and the environment.

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A King-sized cock-up...

...actually a disaster for organic and free-range poultry; and a body blow for good sense, proportionality and rational thinking seems inevitable following Professor Sir David King's rash statements about Avian 'Flu.

The government's Chief Scientific Advisor rightly concludes that Avian 'Flu is likely to become endemic in our wild bird population for a significant period. Then with a patrician-like carelessness, he nonchalantly consigns organic and free-range poultry production to oblivion.

All poultry will have to be kept indoors for the duration - up to five years - is Dr. King's decision; regardless of the fact that consumers increasingly want outdoor poultry products. He ignores the fact that indoor, industrialised systems appear closely implicated in the genesis and spread of this (and other) virus; dismisses the evidence that the transmission of the virus from wild birds to extensive, outdoor poultry systems is much less likely than was initially feared; and crucially, discards preventative vaccination as a sure, proven and scientifically robust way of protecting outdoor poultry from the virus.

There has been much misinformation about the efficacy of preventative vaccine because of a clash of agendas and muddled thinking - the classic ingredients of a cock-up. The fact is, it does work and it can effectively protect organic poultry against Avian 'Flu.

Dr. King is a man of much influence and power in government. He is obviously a man of some intellect but he is not a virologist, not a veterinary epidemiologist - many of whom support the case for vaccination. As in the FMD epidemic, he is blinkered to the value of vaccination. Or he is pursuing another agenda on global trade about which he is less than transparent?

Others in government and, in particular, Defra should be standing up for the organic sector - one of the few bright stars in our agriculture and food system. Dr King should not pass unchallenged in his proposal to destroy the organic poultry sector.

Lawrence Woodward

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Testing for Tolerance - a pragmatic view

There are two sides to every story, and at the risk of resurrecting a story that the press may think is long dead, I think there needs to be some explanation of the European Commission's decision to allow the threshold for GM contamination in organic produce to be set at 0.9%.

The issue arose in Europe because there was a need to define what a GM material is (there needs to be a legal definition of what it is before you can ban it). Soil Association organic standards say "you must not use GMOs in organic production or processing" and "organic products must be free of contamination from GMOs or their derivatives." That seems fairly clear, - no GMs. However it is very difficult to prove a zero. What most laboratory analysis will tell us is that GMs are absent to a declared tolerance level. It is generally accepted that the lowest reliable tolerance for testing is 0.1%, so although the Soil Association standards say zero, in fact, what they mean is below 0.1%. The laboratory analysis (PCR test) for the presence of GM material is quite expensive (in the region of £150 - £200 a time), but there are other, less sensitive tests available at lower cost.

To take an example of a consignment of 5,000 tonnes of organic soya beans in the hold of a ship. That soya is worth around £300 per tonne, so the value of the consignment is about £1.5 million. If the beans were non organic and GM, the consignment would be worth about £140 a tonne or £0.7m for the lot. So there is £800,000 riding on the GM analysis. Who takes the sample? How many samples do you take? Where do you take them from? If there are 10 samples taken and 1 of them shows a positive for GMs, does the whole shipment lose its organic status? If the consignment clears all the hurdles, does there need to be further testing on individual lorry loads as it makes its journey from ship to animal or human mouth? PCR test results normally take 10 - 14 days to come back from the lab. Does the consignment sit on the ship until the results arrive (at a cost of several thousand pounds a day), or does it carry on its journey on the assumption that it clears all the hurdles? If it has been fed to animals by the time the results come back, do the animals lose their organic status?

The "instant" test is reliable to a tolerance of 1% at very low cost and gives a result in about 30 minutes, working on the same principle as a home pregnancy test kit. Using either of these testing methods does not ensure that GM material is absent, just that it has not been

detected. But neither does it show or imply that GM material is present at a low level or that every hundredth mouthful of organic food you eat will be GM - that patently is alarmist nonsense.

The cost implications of the worst case scenario in all the above questions can be enormous. It is all very well to say that the biotech companies should pay for any contamination, but who do you sue? It would be very difficult to make a case against Monsanto if it is not clear how or where the contamination could have occurred. I fear that very small tolerances and the threat of punitive action for transgressors is more likely to penalise the smaller merchants and middle men and may well discourage them from involvement with organic products at a time when we are trying to make organic food more "mainstream."

The more zealous GM campaigners may suggest that the 0.9% threshold would allow a shipper to put 45 tonnes of GM soya into that 5000 tonne consignment, and get away with it, but surely no shipper would work right up to the limit if he ran the risk of losing the best part of £1 million on the value of his cargo.

With very sensitive testing, and draconian measures taken against any producer or supplier growing or handling any GM material, (even if it is inadvertent and unavoidable) there would probably be a massive reduction in the incidence of GM contamination in organic production. But I think it is likely that the reduction in GMs would be a result of a reduction in organic production because of the catastrophe potential for any business involved in organics. A weaker organic food industry would weaken the effectiveness of lobbying against GMs and may well result in the more extensive use of GM material in non organic farming. It would be a great irony if the campaign to protect organic farming from GMs resulted in a reduction in organic production and an increase in the use of GMs in non organic farming.

With the high cost and time lag involved in testing at the highest level of sensitivity, monitoring of the incidence of GM contamination will be less effective and less frequent and may well let some GM contamination under the wire simply by not testing often enough, or allowing its use before test results come back from the lab.

I know there are those who see this decision as allowing the contamination of Europe with American GM material so that the companies controlling GM technology can get a foothold and eventually colonise Europe with their products.



A clearer perspective shows the EC commission is not allowing genetic contamination of organic farming, it is taking a pragmatic approach to the policing of GM contamination. Could we be more likely to keep GMs at bay, and crucially, keep GMs out of organic production if there is constant monitoring and testing for contamination at every point in the supply chain?

Yes, it is possible that some materials in the chain will contain contamination at up to 0.9%, but the majority will contain none or almost none if there is regular testing to a tolerance of 0.9%. It is not an ideal solution,

but in a world where the GM genie is already out of the bottle, we may be more secure with regular, frequent testing at a limit of 0.9% than less frequent monitoring with tighter tolerance limits. I am sure we are agreed on the need to exclude GMs from the UK and, in particular, to exclude GMs from organic production, but let's not throw the baby out with the bathwater.

Andrew Armstrong

feed manufacturer and EFRC farmer group member

Dr Bruce Pearce of EFRC comments:

We understand and support Mr Armstrong's position as it hits the crux of the debate for many within the organic movement on matters such as sampling and testing. It is an issue we have visited many times in the pages of the *Bulletin*. But, if we are to engage in the debate on co-existence does this mean we have capitulated to the GE industry and accept that they have a right to grow their crops? Are we smoothing the way?

Although we would rather see a ban on the growing of GE crops in the EU, until much more is known about their effects on human health, environmental safety and social impacts, we accept the fact that these crops are here and that the ban is not going to happen. We have to join the debate to ensure that the most stringent co-existence measures are in place in the UK and that organic farmers are not unduly impacted by these measures.

GM debate bubbles below the surface

The media coverage of genetically engineered (GE) crops has abated since the big public debate and other activities in 2003/04 but the threat to our food supply and the environment through contamination by GE food has not.

Although there are currently no GE crops grown commercially in the UK - and government sources suggest that it is highly unlikely that any will be before the next decade - the march to commercialisation continues.

The Austrian EU presidency recently hosted a conference on GM and non-GM crops coexistence (http://europa.eu.int/comm/agriculture/events/vienna2006/index_en.htm) in Vienna.

The conference started with two premises - that GM crops had a right to be grown in the EU as long as they were deemed to be safe (i.e. having passed through the EU approvals process which is a debateable hurdle) and that adventitious presence of below 0.9% would not need to be classified as GM.

It is clear that there is no consensus between the GE industry and the NGOs, between the European

Parliament and the Commission. There is also no consensus between Commissioners on co-existence and what should be included in any regulations. There has been a dispute between the elected European Parliament, which believes that co-existence regulations should be set at a community level, while the appointed Commission has declared that it is an issue for the individual member states. Co-existence is a national issue, they say, but within set boundaries.

The Commission has issued guidelines (the Christmas tree as they like to call it) to help Member States with their different types of agriculture, topography and climate to develop national strategies and best practices (decorate the tree). Currently only Denmark has legislation in place. Hungary has brought forward tough draft recommendations that the Commission rejected.

It is clear that not only has the Commission presented the EU family with their Christmas tree to decorate but also provided them with a rather limited box of decorations from which to choose.

Dr Bruce Pearce



Vaccination nation - to jab or not to jab...

So, Avian Flu H5N1 has reached the UK and the sky hasn't fallen in. On reflection, the demise of a single Whooper Swan at Cellardyke in Fife has turned out to be something of a "dream" event. It has proven that H5N1 is not highly virulent from a point source, that proportionate response (without shutting down the nation's poultry sector) works and that UK consumers can be convinced not to panic unduly. It has allowed Defra's contingency planning to be road tested and despite some concerns about the turn around time of samples and carcasses, the consensus is that it has acquitted itself well.

The Cellardyke event has, though, focused minds on the density of poultry production even in areas such as Fife, not viewed as an intensive poultry region.

The bird surveillance zone imposed after the swan was found stretched to 2500 sq km, affecting 175 farms with 3.1 million birds. Nearly 50 of these farms were free range or organic with some 260,000 birds shut up, in an effort to remove wild bird contact. The one big element missing from the Defra game plan for Cellardyke and elsewhere is preventative vaccination.

EFRC considers the continuing antipathy of Defra and the UK Government to preventative vaccination as a precaution against the spread of H5N1 Avian Influenza is outdated and misguided. Like many Governments across the EU, the UK claims to be confident that slaughter and, possibly, ring vaccination around any focus of infection will stamp out the disease.

Such a policy is flawed in at least two ways. It relies on rapid and accurate identification of infected holdings. This in turn relies on extensive, active surveillance using on-site diagnostics and epidemiological predictions of the onward spread of the virus - not an easy job when wild bird movements are involved.

Two doses of vaccine are needed over a four week period before birds are protected - too long to help shut down virus spread in an emergency. And once unprotected flocks are infected, huge amounts of virus are shed by infected birds, putting people as well as other poultry and livestock at risk.

True preventative vaccination, targeted in intensive poultry areas and in organic and outdoor flocks is the only logical defence against H5N1. Vaccinated birds display far greater resistance to infection and if they are infected they produce and shed far less virus.

Arguments against preventative vaccination focus on "spread by stealth" allowing the virus to circulate

undetected in treated birds which display no outward symptoms. There are also fears that virus circulating in vaccinated birds can mutate into potentially more lethal forms.

We have a sophisticated animal health network in the EU which can tackle both these perceived problems. The international veterinary body, the OIE, supports preventative vaccination when it is monitored by testing and the use of sentinel birds. Vaccination would be with a marker vaccine - such as H5N2 - which allows subsequent antibody tests to distinguish clearly between naturally infected birds and treated birds.

There are Avian Influenza preventative vaccination success stories elsewhere in the world. In Northern Italy, vaccination programmes against H5 and H7 avian flu have worked in an area that was suffering repeated outbreaks. Hong Kong has been successfully protected by vaccination against the threat of infection by H5N1 from mainland China.

We have a window of opportunity now to prepare for the wave of infection that may come in the autumn when migrating wildfowl return to these shores from infected regions. We must use that window for preventative action.

Meanwhile EFRC continues to lobby hard for preventative vaccination to be a core part of UK Avian 'Flu control strategies.

Swayne, D.E., et al (2006) Inactivated N American and European H5N2 avian influenza vaccines protect chickens from Asian H5N1 high pathogenicity avian influenza virus. *Avian Pathology* 35(2) 141 - 146

Capua, I and Marangon S., (2003) The use of vaccination as an option for the control of avian influenza. *Proceedings of the 71st session of the OIE, Paris, May 2003*

www.grain.org/go/birdflu; www.warmwell.com;

www.bva.co.uk/policy/issues

Richard Sanders

Flawed tests miss the virus?

Scientists are puzzled that so few of the swab tests carried out recently by Defra have shown positive for the range of Avian Flu types commonly carried by birds.

International experience shows that between 6 and 7 per cent of birds tested are positive for low pathogenicity Avian Flu. Figures published in *New Scientist* show that Defra found just 0.06 per cent positive results in the 3,343 samples they tested last December.

The collection method may be the key. The Defra system is to take a sterile swab and collect a faecal sample which is then stored in a fridge. Scientists say such swabs should be immersed in a saline solution and then frozen to prevent drying out and the loss of any virus present.



Letter to the Editor: Derogations damaging committed organic producers

John Burns
Middle Whitecleave
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Sir -

Lawrence Woodward recently stated the case for ending derogations which allow use of non-organic items in organic food production. His comments were spot-on.

My five years' experience running an organic goose breeding flock have shown me that (in poultry at least) it is almost impossible to survive commercially as an organic breeder operating in a dual market in which derogations to use non-organic day-olds are readily granted by all the certifying bodies.

Organic day-olds are more expensive to produce than non-organic. It's not just that organic feed costs more. Smaller scale makes advertising and delivery less cost-effective, and it is difficult to match production with demand in a dual market. Non-organic hatcheries can and do import "day-olds" to make up temporary shortfalls in their output.

It seems unfair that committed organic producers who pay extra for their organic day-olds still have to sell their end product in competition with those who started with a

cheaper non-organic day-old. The savings can be significant. A big company which runs both organic and non-organic poultry units could, by combining its orders, squeeze a hatchery to supply it at less than half the price of organic day-olds.

Organic day-olds not taken up by organic producers have either to be killed or sold to non-organic producers in competition with non-organic day-olds produced at much lower cost, including imports.

I know of no fully organic poultry breeder whose business is thriving as it ought to, in view of the commitments made in good faith in the naïve belief that by now any organic oven-ready bird would have to start life as an organic egg.

Until that is a reality, there is little point in producers like me struggling on.

Lawrence Woodward pointed out that consumers will eventually realise that much organic produce is a con.

How, then, will the industry produce overnight the necessary truly organic breeding flocks? It will have to be done overnight because no one will ever again believe false promises on transition periods.

Yours

John Burns
www.organicgeese.com

Letter: A place for sewage sludge

Dr Brian Crathorne, Head of Environment at Thames Water, wrote to comment on the article in *Bulletin* 82, regarding the sewage sludge debate at last January's Soil Association conference.

"The authors note that '**With marine dumping of sludge now banned, water companies do have to find a use/outlet**'. Disposal of sewage sludge to sea ceased at the end 1998 and, at this time, this outlet took around 30% of the UK's sludge. Additional outlets were therefore required but the practice of recycling treated sewage sludge (also known as biosolids) to land is by no means new and has been applied to agriculture for over 4 decades under increasingly stringent regulatory control.

'All water companies are having problems persuading conventional farmers to use sludge'. Agricultural use represents the largest outlet for sludge in the UK, accounting for around 60% of the sludge currently produced. Contrary to your statement,

conventional farmers are usually very happy to take our products.

'In Germany its use is banned on conventional as well as organic farms'. This statement is incorrect - it is permitted to apply sewage sludge to arable crops such as cereals and sugar beet and a motion to ban sludge to agricultural land was defeated in the Bundersrat in April 2002. Application of sewage sludge to land is explicitly supported by the European Commission, which keeps to its plans to encourage agricultural use in Europe. Germany is a federation of 16 regional states (Lander). The Lander have legislative powers but also have a role in federal legislation and implement their own federal law. Some Lander encourage recycling to land and others favour incinerators. It is important to note that recycling biosolids are widely in use in the USA and most European agriculture."

Brian Crathorne, Thames Water



Future shape for Organic Conversion Information Scheme - OCIS

The Organic Advisory Service (OAS) of EFRC has delivered OCIS in England since 1996 and the contract has recently been extended to March 2007, which will give a period of 10 years continuous delivery. The only disruption to the service was, of course, the foot and mouth outbreak in 2001.

Prospective producers will continue to be encouraged to contact the OCIS Helpline on 0117 922 7707 where they will be introduced to the service, provided with information and, where appropriate, passed on to the OAS for the delivery of the free visits that have been the trademark of the service.

The Defra website www.defra.gov.uk/farm/organic/farmers/ocis.htm has the following statement: "The amount of money available annually for OCIS is determined in advance. In order to avoid budgetary overrun, Defra in collaboration with OCIS needs to ensure that the service is channelled to those businesses capable of making a viable contribution to achieving Defra Organic Action Plan commitments for the long term sustainable growth of the sector. In order to do this, it should be pointed out that not every call to the Helpdesk will necessarily lead to an on farm visit."

Defra has focused considerable attention on OCIS in recent months with the commissioning of what was the third major review of the service in its history. The review was carried out by ADAS Consulting and Organic Centre Wales. EFRC is a partner member of OCW and this led to the slightly bizarre situation of having to be excluded from some of the activities of, what is usually, a very open partnership. Anyone wishing to view the final report can do so on the Defra website at: <http://statistics.defra.gov.uk/esg/reports/organiccon/default.asp>. In broad terms the report concluded that OCIS provided a valuable service to farmers and contributed to the effective use of public funds such as organic conversion payments. It made a

number of recommendations intended to improve various aspects of the service. It also concluded that OCIS should remain a free service, it should be run as a separate service given the detailed and specific nature of conversion advice, it should remain a national service and not be regionalised.

The review has clearly set Defra thinking as a full consultation on the future of OCIS was announced on 12th April. The consultation net has been cast very wide across the food production sector, a wide range of environmental groups, development agencies, local councils, certification bodies and research institutions among others. Anyone can contribute to the consultation process by going to <http://www.defra.gov.uk/corporate/consult/ocis-future/index.htm>. If you have any views or have been a recipient of the service in the past I would encourage you to participate. It covers the structure of the service, access to the service, delivery of the service, the scope of the advice offered, signposting to and from OCIS, accreditation of advisors, and funding.

Defra is working on this consultation as part of an early start to develop proposals for taking the service forward from the start of the 2007/08 financial year. The consultation touches on specific areas as outlined above but responses need not necessarily be confined to the questions posed. It is clear that the organic market is continuing to grow with dramatic growth rates in some sectors. It is also clear from other work that we are doing in the organic vegetable sector that demand could run ahead of supply thus reversing the trend in import reduction seen in recent years. There is a clear case for continuing the service in my view but the shape that it takes will depend very much on the responses to this consultation. Do have your say...

Roger Hitchings

Top tips on weed control

"Practical Weed Control in arable and outdoor vegetable cultivation without chemicals" is a new manual on weed control in arable and vegetable crops. It is intended to be a guide for organic farmers and growers who need to control weeds without the use of chemicals but will also be useful for conventional farmers wishing to use less chemicals. Originally produced by the Applied Plant Research group at Wageningen University in Holland, the manual has been translated with the help of the HDRA Organic Weed Management Team. It contains 77 pages with over 100 colour photos and illustrations and has been produced as a handy ring bound book with plastic pages and tabs for easy reference in the field - ideal for practical farm use.

The manual is divided into four sections; prevention, weeds, crops and machinery. The section on preventing weeds includes information on the use of rotations, false seedbeds, sowing and planting methods as well as the use of mulches and intercropping for weed suppression.

The manual can be ordered directly from HDRA at a cost of £15 (incl. p and p). Contact Gareth Davies at HDRA, Garden Organic Ryton, Coventry, CV8 3LG by phone (024 76 308200) or gdavies@hdra.org.uk



Evolutionary wheat makes the grade?

EFRC's strategy of 'evolutionary, or population, breeding' challenges current pedigree line breeding approaches.

Composite Cross Populations (CCPs) are the collective progeny of multiple crosses of pure line cultivars. Such populations can be adaptable to different and changing environments over seasons.

For this project, three CCPs were produced from:

- 1.) *parent varieties selected for good milling potential- Quality (Q) CCP;*
- 2.) *parent varieties selected for high yield (Y) potential- YCCP; and*
- 3.) *both sets of parent varieties - YQCCP.*

The three CCPs are further divided into those without or with plants with heritable male sterility (ms), which facilitates cross-fertilisation amongst plants.

Evolution of winter wheat is continuing at Elm Farm Research Centre at four sites (two organic and two non-organic) in the East and West of England. Results from last season's trials (2004-05) give an insight into the potential of novel breeding methods and diverse populations in sustainable systems. Data from 2004's harvest were reported in *Bulletin 76*.

Establishment of CCPs and mixtures (relative to the parent cultivars) was greater in the organic systems than in the non-organic systems, which may suggest that the CCPs were better able to deal with the greater environmental variability at the organic sites. For establishment in non-organic systems, the yield and yield-quality CCPs had a significantly higher establishment than their equivalent physical mixtures.

Grain yields were considerably higher in the trials of 2005 than in trials of 2004 (7.9 and 5.1 t/ha @ 15% mc respectively, $p < 0.001$), a trend that was reflected across the country (Source:HGCA). However, the effect was much larger, relatively, in the organic systems than in the non-organic systems (Table 1).

Table 1. Grain yields (t/ha @ 15% mc) for organic and non-organic systems in 2004/05 and 2003/04, and % change across years.

System	Mean grain yield (t/ha @ 15%mc)		% change across years
	2003/04	2004/05	
Non-organic	7.9	10.0	127
Organic	2.6	6.0	228

In both organic and non-organic systems, CCPs tended to produce a greater grain yield than the means of their parent cultivars. This was more strongly evident at the organic sites - an early indication of the yield potential of the CCPs for organic management?

In both organic and non-organic systems the grain yield of the yield CCPs was significantly higher than that of the quality CCPs (e.g. Table 2).

Comparing organic and non-organic sites, there was a clear difference in relative performance of the modern varieties, in the sense that they produced high yields under non-organic conditions but relatively poor yields under organic conditions.

Importantly, the CCPs exhibited a greater stability of yield across organic sites compared with their parents and, encouragingly, to their physical mixtures. However, this effect was not evident under non-organic conditions.

Table 2. Mean yield, HI, Protein concentration and Hagberg Falling Number of CCPs at organic trial sites, 2004/05 (l.s.d. = least significant difference- any differences greater than this are significant).

	Organic CCP			
	Y	Q	YQ	l.s.d.
Yield (t/ha @ 15% mc)	6.1	5.6	6.3	0.46
HI (Harvest Index)	0.52	0.48	0.51	0.025
Protein (%)	11.4	12.1	11.5	1.21
Hagberg Falling Number (s)	159	189	183	20

In both organic and non-organic systems, the harvest indices of yield CCPs (YCCPs) were greatest, followed by YQ and Q CCPs. (Table 2).

Quality data (HFN and % protein) were as expected (QCCP > YCCP), with no compromise in quality from composite cross populations. The same trends were also evident for thousand grain weights (TGW) at organic and non-organic sites.

Seed borne diseases were generally at low levels. There were significant differences between systems, with lower *Microdochium nivale* levels on organic sites and lower ergot levels on non-organic sites.

This selected sample of the large volume of data for the trial season 2004/5 suggests that the composite cross populations are continuing to evolve under natural selection. Two more years of trials will investigate this possible trend.

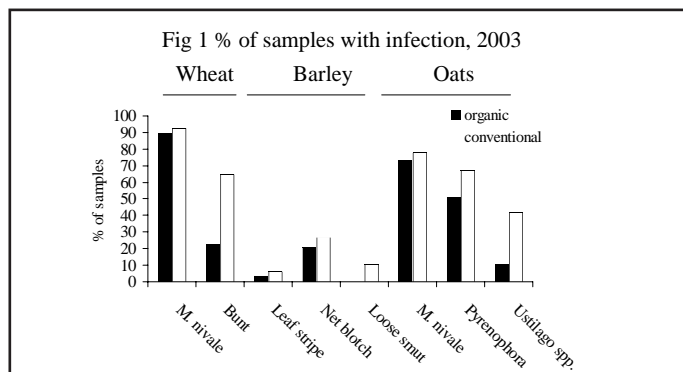
Kay Hinchsliffe and Dr Sarah Clarke



NIAB tracks health of organic cereal seed

Encouraging results from NIAB show it is possible to produce healthy, reliable organic cereal seed. Selection of cereal varieties for organic production has to take into account a wide range of characteristics, and the availability of organic seed of a preferred variety is essential to maintain successful production, and allow access to the newest developments from plant breeders.

The processes of organic seed production mean that the seed will have to have undergone at least two generations of multiplication without use of conventional treatments. The absence of treatments means that diseases such as smuts and bunt could multiply freely, and that in some seasons seed might be affected by high levels of fungi such as *Microdochium nivale* and *Septoria nodorum*. If planted, the presence of high levels of these seedling blights could lead to significant loss of plant population.



There has been concern that it would be difficult to produce organic seed reliably without health problems, and that the supply of seed could be affected, perhaps restricting access to some varieties. The Defra funded project (OF033) on participatory research processes for selection of organic cereal varieties has been examining the issue of organic seed health, and as the last testing season comes to an end, some significant information is emerging.

During the project, the performance of wheat varieties has been examined at 20 different participatory sites for two years. The same seed lots, free from bunt and with low levels of seedling blights, were used at all sites, and then harvested seed was tested at NIAB for the presence of disease. The harvested seed would be the equivalent of farm-saved if it was used for further crop production.

Levels of *Microdochium* seedling blight were generally low, and few samples exceeded the threshold of 10% infection, above which treatments are used in non-organic production. However, in each year, there were some higher levels of infection. These were site specific,

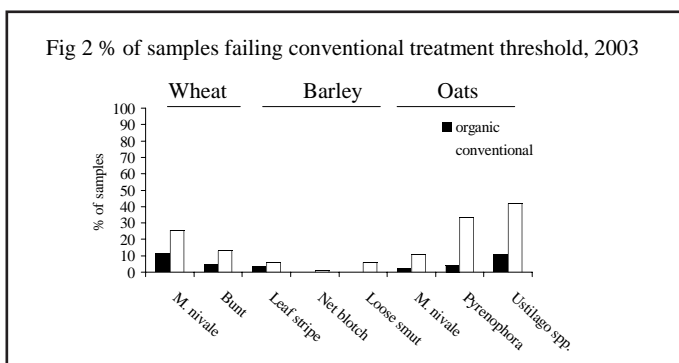
that is every variety at a single site was relatively badly affected compared with other sites, and clearly some aspect of local conditions influenced infection. Whether this was just weather or a more complex set of farm-related conditions, is not known.

Levels of bunt in both years were very low, and all of the harvested seed could safely have been used for further crop production. *Septoria nodorum* was found sporadically among the samples at low levels (around 1%).

Several of the samples had high ergot counts in each year, the highest being 35 ergots per kg. However, the occurrence of ergot has increased generally in conventional production over the last five years, and there is no indication that organic grain is either better or worse for ergot contamination than non-organic. Nevertheless, if the grain was kept for seed, cleaning would be advisable to avoid re-introducing the disease.

As well as participatory trials, samples have been tested from organic variety trials, certified seed production, demonstration trials and grower samples. Though organic sample numbers were much lower than those received for advisory testing from non-organic seed, it seemed clear that there was no trend for lower health levels in the organic seed. Fig 1 shows some incidence comparisons (% of samples infected with any level of disease) for wheat, barley and oats in 2003, and Fig 2 shows the severity figures (% of samples above conventional treatment thresholds) for the same sample set.

Though the health status of the great majority of seed samples examined in this project was high, there were still some causes for concern. Bunt in wheat was occasionally found at high levels, and if used, the infection would have caused extensive crop loss. Routine testing is needed to identify such high risk lots, and remove them from production.



Jane Thomas, NIAB

Further information jane.thomas@niab.com



Stopping erosion of soil quality - the organic way

Soil quality and health have moved rapidly up the political agenda with the production of the first Soil Action Plan for England. This plan has 52 action points that include soil management on farms; soils and biodiversity; and the role of soils in conserving cultural heritage. The action plan targets are an attempt to deal with soil degradation that has occurred as a result of intensive farming practices. This can be characterised by estimates suggesting an 18% reduction in soil organic carbon in arable topsoil between 1980 and 1995. Soil quality tracking is a core part of EFRC's work across the country.

In addition to the Government's Soil Action Plan a number of agri-environment schemes now require whole farm appraisals, a major component of which is detailed planning to improve and protect the soil resource within the farming system. This year English Nature will publish its position statement on 'the role of soil management and protection within statutory nature conservation sites' and Defra is working on identifying a range of national soil indicators, which will link into a wider European Scheme.

All these action points can be keyed in to the IFOAM principles of organic farming:

- ◆ *Principle of Health: Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.*
- ◆ *Principle of Ecology: Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.*
- ◆ *Principle of Fairness: Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities*
- ◆ *Principle of Care: Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.*

EFRC's Organic Advisory Service has always recommended regular monitoring of soils to organic farmers. It is particularly important to sample at the start of conversion and then at key points in the rotation, for example, when entering or leaving the ley phase or if there are fertility concerns.

As part of a continuing agronomic and environmental monitoring programme at Sheepdrove Organic Farm, EFRC has implemented a rolling soil analysis programme. The information gathered from this monitoring ensures that the farm's soil and nutrient resources are used optimally and it is building a picture of soil nutrient status across the whole of the Sheepdrove

estate. It is also beginning to reveal areas of potential or past problems that require specific management to address. In addition there are eight reference sites which are sampled annually in order to assess the differential nutrient status and soil biological activity between stable habitats, represented by old woodland and pasture and more disturbed/dynamic habitats that occur within the ley-arable rotation.

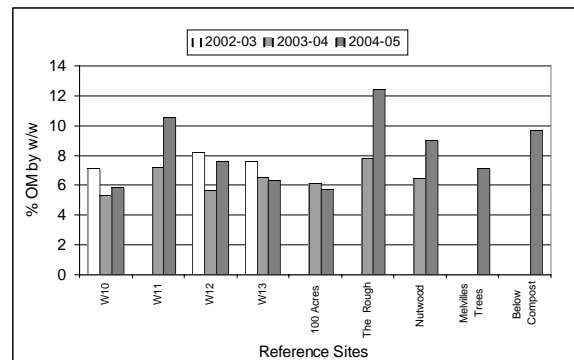


Figure 1 shows the organic matter levels for the Sheepdrove reference sites for the period 2002 to 2005.

The Sheepdrove soil monitoring programme has shown that soil organic matter levels remain above expected levels for conventionally managed fields on similar soil types. In addition, biological activity and soil respiration rates remain high.

According to the Environment Agency 'The proportion of agricultural topsoils found to have 'low' organic matter concentrations has increased and the number of agricultural topsoils with 'high' organic matter concentrations have decreased from 1980 to 1995.'

This maintenance of soil organic matter levels reduces the risk of soil erosion, preserves structural stability and provides a substrate for soil biological activity.

A third year undergraduate student from the Soil Science department at the University of Reading is undertaking a project focusing on these issues. The project title is: '*Investigation into soil aggregate stability and soil organic matter contents in land under different conditions at Sheepdrove Farm.*'

The aim is to examine the relationship between the soil organic matter content (including simple pools within the total) and soil aggregate stability. The project seeks to examine the hypothesis that land management practices which result in increases in soil organic matter content will result in increased aggregate stability, comparing cropped land, rough pasture, early stage woodland and established woodland.

Lois Philipps and Claire Aspray



Care needed to halt butterfly collapse

Letter to the The Guardian
 March 16 2006

Sir - There can be little doubt that organic farms are islands of biodiversity amongst an increasingly intensive European ocean of conventional, chemical farming. Yes, it is depressing that butterflies are in decline as key habitats of grassland, forest and wetland disappear. But, as Martin Warren of Butterfly Conservation says, they are very sensitive to change.

On-going research here shows that organic farming does protect and enhance butterfly (and moth) species diversity. We should take heart that change for the good in removing intensive pesticide inputs can allow butterfly numbers and diversity to recover. The mixed nature of organic farms also includes greater areas of key grassland habitat.

Elm Farm Research Centre, Newbury

Of the various agri-environment schemes, Environmental Stewardship, and particularly the Higher Level Scheme, has the potential to address many of the concerns highlighted in this report, and could make a big difference to butterflies as well as to other insects, mammals and birds that rely on them because they help to provide habitats which encourage and promote increases in biodiversity. Although the results of the Butterfly Conservation study are alarming, Dr Tom Brereton, who spearheaded the research, said: "...we are optimistic about the new (Environmental Stewardship) schemes" and said he feels that "...real progress has been made in understanding butterfly declines and what to do about it."²

Despite many positive comments on the current and future impacts of agri-environment schemes for butterfly numbers the release of the Butterfly Conservation report came amidst a flurry of press releases that painted a very bleak picture for the future of the UK's Lepidoptera.

The *Daily Telegraph* stated 'Farmland butterflies have declined by 30 per cent in the last 10 years. Four out of the eight most endangered species declined significantly even on protected land. 7 species improved, 20 declined and 13 remained steady'³.

The Guardian commented, 'Of the 300 moth species commonly caught in light-traps, about two thirds have declined since records began in 1968. If English humans suffered the same losses we would all now fit into Birmingham.'⁴

The *New Scientist* printed, 'Within Europe 71 of the 576 species are now classed as threatened and serious declines in butterfly distributions were found in almost every country. One problem is the decline in wet grassland habitats; modern technologies make them easy to drain for agriculture or development.'⁵

However, there is some hope, the Butterfly Conservation report states: the new agri-environment scheme in England, Environmental Stewardship, has the potential to be a big step forward as it addresses many of the concerns highlighted by the research. These include the need to: 1) more fully incorporate species and other site specific interest features into site management objectives; 2) have an outcome focussed approach when managing habitats; and 3) to monitor success¹.

It is widely recognised that the diversity and abundance of all farmland flora and fauna, not just butterflies, has dropped significantly in recent decades. In general these declines have been attributed to fundamental changes in

Butterflies are widely accepted as good indicators of ecosystem health - falling butterfly numbers show an environment under pressure. A recent study undertaken by Butterfly Conservation¹ released on 2nd March 2006 by Biodiversity Minister Jim Knight, investigated butterfly numbers. The study compared butterfly trends on farms operating with or without agri-environment schemes, a programme which is part funded by the European Commission and allows the Government to compensate farmers for undertaking environmentally sound and sustainable practices on their land. It highlighted a significant decline, of 30 per cent, in butterfly species abundance over the last 10 years with the majority of species having declined significantly. These declines are across the board and highlight the acute problems butterflies face in the English landscape as well as the considerable implications for other areas of biodiversity.

Despite this overall decline, there is some positive news. The study showed that agri-environment schemes were playing a positive role in helping to slow and, in some cases, reverse the declines of Biodiversity Action Plan (BAP) priority species, including significant improvements for the Adonis Blue, High Brown Fritillary, Heath Fritillary and Silver-studded Blue, which thrive in short and medium turf conditions. Mr Knight said "On sites covered by agri-environment schemes, we are seeing improved trends for six of the eight species listed as priorities under the BAP when compared to non-scheme sites."



conventional farming practices such as increased mechanisation and pesticide use, as well as the increased specialisation of farms. Organic farming provides an alternative to this. Although the butterfly conservation report praises agri-environment schemes for their positive environmental impact it makes no mention of the role that organic farming systems have to play in the protection, and recovery of the UK's biodiversity. A number of the options available to farmers within agri-environment schemes are practices that are required under organic standards for organic farms. For example, under organic standards it is required or recommended that farms be managed in sympathy with wildlife concerns and include infrastructure benefits such as hedges and ponds.

A study conducted in England over a two year period, by Feber et al (1997)⁶ surveyed the butterfly populations of 18 paired organic and conventional farms. They found there were no significant differences in the abundance of large white and small white (the two species of British butterfly considered to be agricultural pests) between the two farming systems. In addition the abundance of non-pest butterflies was significantly higher in organic than conventional systems during both years. In particular, the management of uncropped boundaries was found to have had a significant effect on non-pest butterfly abundance, with organic boundaries attracting higher numbers of butterflies than conventional. In addition, within the surveyed cropped habitats, the abundance of non-pest butterflies was also significantly greater on organic farms.

This evidence is not new. Similar results were identified in a review of published evidence of a biodiversity effect of organic farming, undertaken for the House of Commons in January 2001⁷. It reported that when comparing organic and conventional farming systems, there were higher numbers and greater densities of non-crop species (of wildlife) on organic farms.

Overwhelmingly, whether it is Birds of Conservation Concern (BOCC), BAP rare arable weeds or non-pest butterflies, the wildlife species which have suffered the greatest declines on farmland in the last fifty years, survive better under organic farming systems.

Another early review report, published in May 2000, for the Soil Association⁸, had similar findings. The report reviewed 23 independent studies that compared the levels of wildlife on organic and conventional farms. It found that in nearly all cases the levels and diversity of wildlife on the organic farms were substantially greater than on conventional farms. The report offers an explanation as to why this is the case. Organic farming

encourages and protects farmland biodiversity, as no synthetic chemicals are used that can reduce botanical diversity. Conventional systems simplify cropping patterns, restrict the base of wildlife food chains and hence reduce wildlife populations directly or by restricting their food supply. Another suggested reason is the more general and less specialised nature of organic farms, supporting both arable and livestock farming means there are arable and grassland rotations, which are good for nutrient cycling and pest control. As organic systems tend to use more spring-sown crops compared to conventional systems this has advantages for species, which benefit from bare ground in spring or late harvested crops.

At present organic farms occupy such a small percentage of UK agricultural land that the benefits for wildlife on a national scale are still small. The reports discussed above clearly demonstrate that the abundance and diversity of species found in organic systems compared with conventional, specifically the higher levels of endangered or declining species, suggests that by converting more land to organic management their decline may be to some extent reversed⁹.

There is clearly cause for concern when considering the overall decline of butterflies in the UK. The recent flurry of press releases has performed a role in raising awareness of the situation and bringing butterflies into the public domain. However, more effort is now needed to publish solutions and to promote the positive impacts of both agri-environment schemes and organic farming in tackling these issues.

1 Brereton et al, March 2006, Agri-environment schemes and butterflies: Re-assessing the impacts and improving delivery of BAP targets, BD1446, Butterfly Conservation

2 Anon, March 2006, News Release: England's butterflies "increasingly at risk", www.defra.gov.uk/news/2006

3 Sheppard B, March 2nd 2006, Butterflies Down by a Third on Farmland, The Daily Telegraph

4 Marren P, March 2006, Disaster: Britain's moths have suffered an alarming decline in the past 30 years and there is little hope of recovery, The Guardian

5 Anon, 18th March 2006, Butterfly Havens Vanishing, The New Scientist

6 Feber et al, 1997, The effects of organic farming on pest and non-pest butterfly abundance, Agriculture, Ecosystems and Environment 64 (1997) 133-139

7 Anon, January 2001, Annex 2: Review of the published evidence of a biodiversity effect of organic farming for The United Kingdom Parliament, <http://www.publications.parliament.uk/pa/cm200001/cmselect/cmagric/149/149ap39.htm>

8 Anon, May 2000, The Biodiversity Benefits of Organic Farming, sponsored by WWF-UK, The Soil Association

9 Centre for Rural Economic Research, University of Cambridge, Placed on website November 2003, www.defra.gov.uk/FARM/organic/actionplan/annex6.pdf

Claire Aspray



Aspects of poultry behaviour: How free-range is free range?

Free-range poultry are defined as 'having the opportunity to range freely for food, rather than being confined in an enclosure'. In most enterprises operating a free-range system this amounts to the provision of a basic pasture, grass ley around the poultry house, which is available for the birds to use, via doors or pop-holes on the house. The birds will either be given constant access to the range or access during daylight hours only as a measure to protect against predation.

Modern domestic chickens are all descended from the red jungle fowl (*Gallus gallus*) which inhabits forest edge environments. The red jungle fowl is a baseline on which domestication and artificial selection has acted to produce the modern domesticated poultry we farm today. This is true for both the animals' basic physical characteristics and behaviour.

Although domestication has acted quite strongly on the physical characteristics of red jungle fowl to produce modern poultry strains, the behaviour of the two species is still strikingly alike. Feral domestic fowl show a high level of similarity in their behaviour to that of wild red jungle fowl (Dawkins, 1989).

In a study observing flocks of 'wild state' red jungle in a captive area, the daily routine of different flocks of jungle fowl were mapped (Collias et al., 1966). A clear daily routine was identified; the flock would leave their roosting trees in the early morning and range out, foraging, generally returning to the roosting tree area during the day, with ranging distances in the region of 180 to 240 feet.

In spite of the extensive ranging of their wild counterparts, and despite being given access to a ranging area, many of the birds in free-range poultry production systems do not leave the houses. Many that do venture outside stay mostly within the immediate environment of the house (Weeks, et al. 1994). This is a worrying observation, suggesting that a large majority of free-range birds are free-range in name only.

A study by Dawkins et al. (2003) investigating range use by free-range broilers in a large-scale commercial flock, found that the number of birds utilising the available range was low. The maximum amount of birds observed outside during daylight hours at any one time was less than 15 per cent of the total flock. Another study by Bubier and Bradshaw (1998) found similar results, the mean percentage of hens outside on each farm during the course of the day was generally low. It was even lower in the farms with larger flock sizes (1400 -2450) less than 12 per cent. On farms with smaller flock sizes,

averaging 490 birds, the ranging figure was 42 per cent. However there was a complication with the larger farms as these birds were fed on a "mealtime" time feeding system, with birds therefore staying close to the house in anticipation of the feeder lines being activated. Evidence from organic egg laying flocks in Denmark suggests that on average 9 per cent of the flock used the range area (Hegelund et al., 2005).

There have been suggestions that this lack of range use by chickens in free-range production systems indicates a lack of motivation to use the range. However other studies point to the unsuitability of outdoor environment discouraging ranging; in particular the lack of suitable cover. Dawkins et al. (2003) found the number of birds ranging positively correlated with the amount of tree-cover the range area contained. Similarly, Rodenburg et al. (2004) identified that the presence of trees stimulated range use in free-range flocks, and research with 'Label Rouge' chickens in France suggested trees are attractive to the birds, as they offer a place of cover for rest and shelter (Lubac and Mirabito, 2001).

Other studies found that pasture and ranges containing artificial structures providing cover such as straw bales and conifer wigwams (Gordon and Forbes, 2002) and wooden pallets and cut fir trees (Roderick and Yates, 2004) promoted bird ranging. Artificial structures at range have been found to affect the distribution of hens on the range, by affording cover to the hens further away from the house, and attracting them to range out further (Hegelund et al., 2005; Bestman and Wagenaar, 2003; Zeltner and Hirt, 2003).

It has been found that the type and quality of cover is important to chickens as well. Newberry and Shackleton (1997) found birds preened and rested more in covered areas with responses consistently increasing with visual cover of up to 67%, but found 100% cover was not favoured by the birds. They suggest that this is because 100% cover would conceal a predator at close range. Newberry and Shackleton (1997) compare preference for this type of cover, with Venetian blinds - while providing concealment they afford a view of the external environment; a provision of discontinuous cover similar to the cover allowed by trees.

This research discussed suggests the provision of cover is an important aspect of pasture and range for free-range poultry that is often neglected in the development of sites. For chicken systems to be truly free-range in their operation as well as in name, we need to identify and then create optimum ranging habitats for them, that they



identify as suitable to range on safely to escape the confinement of their housing.

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Josie O'Brien

Big meet in Denmark

In May 2006 - for the first time ever - researchers from virtually all EU funded research projects in organic food and farming join the same congress to present their results for organic producers and processors, as well as for those interested in overall sustainable development in Europe.

The research being presented includes the integrated project "Improving quality and safety and reduction of cost in the European organic and "low input" food supply chain" (QLIF).

Other research projects like ENVIRFOOD, REPCO, INTERCROP and SAFO are focussing on the development of environmental friendly production systems, health and food safety in organic animal husbandry.

"Our goal is to organize a programme, which is rewarding for organic producers and processors seeking new knowledge on a specific organic production. At the same time the programme will provide an overview of current European research in organic food and farming and thus an impression of the possibilities to implement research results in an overall societal development", say the Danish hosts.

The event takes place on 30-31 May 2006 in Odense Denmark, held in collaboration with the biannual Danish Organic Congress. The EFRC Research Team will be in Odense in strength presenting papers and posters.



On choosing an organic wheat - Hereward or Claire?

In 2003-4 I took part in the EFRC participatory trials for the wheat varieties Hereward, Xi19, Solstice and a mix, which made me look again at the possibility of growing milling wheat on the farm (Park Hill Farm, Whitchurch on Thames).

For several years I have grown only Claire, which has averaged each year at least 5.56t/ha of the area combined and with up to 6.80t/ha on the best land is clearly the wheat to beat.

The soil on most fields is Chilterns brash, a free-draining medium loam which analyses well at about 18% clay but only after removing half the weight as cobbles and certainly not milling wheat land by traditional standards.

However, the trial in 2004 (see table) grown as strips in a field of Claire put Hereward in front at 6.10t/ha (Hagberg at 278 and a protein of 11.82%) with the yield of Claire based on the total combined at 5.8 t/ha - apparently a clear win for Hereward.

Table 1.

		CLAIRE	HEREWARD	SOLSTICE	Xi19	MIXTURE
2004	PLOTS	-	6.10	5.58	5.45	6.05
2004	FIELD	5.80	-	-	-	-
2005	PLOTS	6.70	5.80	5.80	6.50	6.40
2005	FIELD	5.56	5.0	-	-	-

I would have grown all Hereward in 2004 but could only buy the last 400kg of seed, which gave me a large scale trial, again with the trial strips, in a field of Claire from farm-saved seed.

This time the EFRC researchers kindly included the Claire in their sampling (see table) which gave 6.7t/ha closely followed by Xi19 and the mix, with Hereward at 5,8t/ha (Bushel wt 80, HFN 354, protein 12.6%).

However these figures were much higher than the actual harvested yields, based on careful surveying and weighed trailers. I am not sure why this should be, although the Claire sample plots were in the landwork with the others, and the field data obviously includes all the headlands (I do not have a combined yields monitor so cannot confirm this). However the Hereward yields area was all landwork and should have been given the same as the plots.

If there is a bias between the two types of data, that would invalidate the first year's trial against Claire, so taking the field data from 2005 as the most reliable comparison -

Claire	5.56t/ha x £140 = £778/ha
Hereward	5.00t/ha x £170 = £850/ha

Claire produced that yield disadvantage despite including the entire headland as well as areas of severe slug damage and poppy infestation. And remember if the Hereward fails to make milling quality one year in two that would cancel any gains.

So, it's Claire again. Next year, Naturastaror what about the mix?

James Norman
EFRC cereal trial host - Pangbourne

EFRC rises to local education challenge

The Food Farming and Environment Challenge is an innovative project organised by the West Berkshire Education Business Partnership (WBEPP), a local charity whose aim is to develop and promote effective and lasting links between education and business. It is a rare and valuable opportunity for students to develop and apply skills learnt in the classroom such as time management, communication and organisation. It also provides the chance to create, research and present a project from start to finish.

As the title suggests the projects must be based around food, farming and/or the environment, encouraging students to learn more about the origins of their food, food production systems and interactions with the environment. To EFRC this presents an excellent opportunity to work with students from the local community in order to help promote environmental awareness, sustainable land-use, agriculture and food systems.

Sheepdrove Organic Farm (SOF) in Lambourn and the John Simmonds Education Trust based at Rushall Organic Farm in Bradfield have supported this project for several years. EFRC has teamed up with these two organisations to provide a team of students from Theale Green Community School (near Reading) with the opportunity to complete a project. Their project is based around the on-going environmental monitoring programme EFRC undertakes at SOF.

The students have been identifying invertebrates from some of the pitfall traps placed around SOF in 2005 in order to look at the diversity of one aspect of wildlife on an organic farm. They have been doing a great job of sifting through the spiders, beetles, flies (to name just a few) and recently paid a visit to SOF to put their project into context. Amongst the many questions asked that day this one clearly demonstrates the students' excellent observational skills, 'Miss, why do sheep have woolly testicles?' Answers on a postcard please.

Claire Aspray



Warm glow from new Science Building at Wakelyns

The new Science Building at Wakelyns is now active. It's a brand new construction, finished in the 'Suffolk barn' vernacular, but, with only four rooms, it doesn't quite reach into the 'Grand Designs' category.

The first essential is, of course, a good level of insulation including double glazing all-round. This includes the conservatory, which is glazed with a form of eco-glass which allows solar energy in, but then limits significantly any outward radiation. This means that when the sun goes down, the conservatory temperature falls gently rather than plummeting downwards.

The major energy saving feature, integrated with the insulation and solar gain from the conservatory, is the ground source heating, which works superbly - 'like magic', being the common comment. This is because the heat source is a pair of plastic pipes buried about two metres deep in upright coils in two 30 metre long trenches. This is really a form of solar collection, which uses the stable, low temperature energy of the soil to heat underfloor water pipes in the building.

The key is, literally, a black box containing a heat pump, working exactly like a refrigerator to extract energy from the soil and feed it into the underfloor pipes. Vaporising the refrigerant in the heat exchanger needs energy -

which is transferred from the soil (at about 8 to 10 C) by the liquid in the field coils. Compressing the refrigerant back to a liquid in the other side of the heat exchanger gives off that energy which is picked up by the circulating water from the underfloor pipes. Running this cycle continuously gradually adds more and more energy to the underfloor pipes - which is stored in the floor mass. This floor heat escapes upwards, partly because heat rises and partly because the floor mass is heavily insulated underneath.

Electrical energy is needed, to run the pumps and valves, but the exciting part is that for every 1.5 kilowatts of electricity that we use to run the pumps, we get six kilowatts of heat - 400% efficiency.

These ground source heating systems are only just starting to catch on in this country, but in Sweden (think of those cold winters and frozen soils) 97% of all new buildings are heated by this kind of system.

The other big plus of the insulation is that the office is now very quiet - so, combined with a panoramic view of large-scale conventional wheat production, there's lots of encouragement for creative thinking...

Prof. Martin Wolfe

Big growth in UK organic vegetable market

The UK Organic Vegetable Market study, funded by Defra, reports that 152,100 tonnes of organic vegetables were traded during the 2004/2005 season, representing a total retail value of £223 million. More than 30 packers and wholesalers were involved in the research, which aims to provide detailed information on the total market and supply of individual organic vegetable crops. The rate of growth in the UK organic vegetable market exceeded the growth rates of both the conventional vegetable and total organic food markets. UK self-sufficiency in organic vegetables increased to 64 per cent during the year while self-sufficiency in conventional vegetables decreased.

Chris Firth, Senior Business Analyst for HDRA, said: "Our research shows that the organic vegetable market continues to grow, with traded volumes rising by 23 per cent in 2004-2005." There is a decreasing area of land in conversion, leading to a future shortage of suitable, converted, land for growing organic vegetables and a shortage of organic vegetables or increased reliance on imports. However the market is relatively small so supply changes must be made in line with demand with

speculative growing destabilising the market.

Pre-packers continued to dominate the market with 60 per cent of the tonnage traded, although their relative share fell from 67 per cent in 2003-04. This illustrated a reduced reliance on supermarkets by consumers, pre-packers and wholesalers.

Direct sales were surveyed for the first time this season. Sales through this outlet grew by about 30 per cent - exceeding average organic vegetable market growth and driven by the expansion of several large box schemes and their professional marketing. The survey highlighted the complexity of direct sales, and separated sales made directly from the farm to consumers from sales of vegetables that were bought in from other UK farms before being sold to the consumer. Direct sales accounted for 19 per cent of the market. The wholesale share increased to 16 per cent and processing accounted for five per cent of the traded tonnage.

Downward price pressures were reported to be most severe in the supermarket supply chain where high specifications also impact on prices per harvested unit.



How YOU can help Elm Farm Research Centre...

Our work at EFRC is unique and vital to the future of Organic Farming, but we need ongoing support that will enable us to continue our important research, training and policy work and to demonstrate solutions to seek permanence...

As an individual or as an organisation you can make a valuable difference if you help us in one of the following ways:

Become a **Friend** of Elm Farm Research Centre. In addition to the regular *Bulletin*, you will also receive newsletters on our activities, free EFRC publications, discount on specified events from our Annual Events Programme and many more of our Special Invitation-Only events. Please contact us for a Friends Donation form.

You can make a **Donation** to Elm Farm Research Centre, or if you have done so in the past, please contact us for a **Gift Aid** form as we can claim back the basic rate tax on your donation, increasing its value by 28%. Please contact us for a gift aid form.

You can donate **Shares** to Elm Farm Research Centre and significantly reduce your income tax bill as there would be no capital gains tax due on such a donation. This applies to many listed shares and unit and investment trusts.

You could leave a **Legacy** to Elm Farm Research Centre. By including EFRC in your Will, you are enabling us to continue to develop our work and activities.

As we are a charity, all legacies to EFRC are free from inheritance tax, so your family has less to pay. Please ask us for a legacy leaflet.

For more information on any of the above, please contact Rosie Jordan on 01488 658298 or email rosie.j@efrc.com

Thank you for supporting us.

Research & Development Programme - Events 2006

EFRC01: Organic wheat and oat production - moving forward - Suffolk - 21st June 2006

EFRC02: Organic wheat and oat production - moving forward - Berkshire - 27th June 2006

EFRC03: From Drought to Deluge? An Introduction to Integrated Water Resource Management - 11th July 2006

EFRC04: Organic Farm Management Practices as a Tool for Delivering Environmental Goods and Services - 1st August 2006

EFRC05: Organic Poultry: Is it for you?

EFRC06: Feeding 100% Organic Rations

EFRC 2006 Events - Booking Procedure

Payment can be made by cheque to: Progressive Farming Trust Ltd or by credit / debit card. All the events have a limited number of places available in order to ensure participation and relevance for all attendees. Places are booked on a "first come, first served" basis - book early to avoid disappointment!

To book your place on one or more EFRC 2006 Event, for further details or a programme contact EFRC's Education/Training Department on 01488 658298

Alternatively you can book over the telephone by credit / debit card on: 01488 658298 or 01488 657600

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