



Canolfan Organig Cymru
Organic Centre Wales



Linking farmers: Growing and feeding oats for poultry in Wales

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- Peter Storrow, Rogerston Farm, Haverfordwest
- Liz Findlay, Nantclyd Organics, Aberystwyth
- Matthew Gee, Llanlyr, Lampeter

The Better Organic Business Links (BOBL) project, run by Organic Centre Wales, is a four year project designed to support the primary producer in Wales and grow the market for Welsh organic produce in a sustainable way.

The aim is to develop markets for organic produce whilst driving innovation and promoting sustainable behaviours at all levels within the supply chain, to increase consumer demand and thence markets for organic produce, especially in the home market, and to ensure that the primary producers are aware of market demands. The project provides valuable market information to primary producers and the organic sector in general.

Delivery of the project is divided into five main areas of work:

1. Fostering innovation and improving supply chain linkages
2. Consumer information and image development of organic food and farming in Wales
3. Market development
4. Providing market intelligence to improve the industry's level of understanding of market trends and means of influencing consumer behaviour
5. Addressing key structural problems within the sector.

In all elements of the work, the team are focused on building capacity within the organic sector, to ensure that the project leaves a legacy of processors and primary producers with improved business and environmental skills, able to respond to changing market conditions, consumer demands and climate change.

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Executive Summary

Organic poultry producers consistently cite access to traceable organic feed at economically viable prices as the biggest issue they face. In general organic poultry rations are heavily dependent on imported ingredients, and this project assessed the potential that naked oats grown in Wales can make to addressing this issue with respect to cereals. Specifically it:

- ... Compared naked oats with other organic feedstuffs being grown for poultry
- ... Explored the barriers and opportunities and challenges of agronomy, harvest, storage, rationing and economics.
- ... Linked Welsh organic farmers to grow and supply new varieties of naked oats for poultry feed.

The results confirmed that naked oats are a valuable poultry feed and, nutritionally speaking, compare favourably to both husked oats and wheat. Naked oats are a versatile crop; they can be grown in all cereal producing areas in Wales and can be introduced at any point in an organic rotation.

Restricted availability and low awareness of the crop among farmers are barriers to increased production. In addition, the yield of naked oats is significantly lower than husked oats, although this can be offset by an increase in nutritional value if arable and poultry producers enter into mutually beneficial, direct relationships. These relationships can improve the supply of quality, traceable organic feed from Wales, reduce the carbon footprint of the enterprise and bring the production systems closer in line with the organic standards.

1 Introduction

Organic poultry producers consistently cite access to traceable organic feed at economically viable prices as the biggest problem they face. In general organic poultry rations are heavily dependent on imported ingredients. While the most acute problems are related to the heavy reliance on imported soya to make up the protein requirements, there potential to increase the proportion of cereal ingredients grown in Wales. It is the latter issue that this project seeks to address.

2 Objectives

- ... Compare naked oats with other organic feedstuffs being grown for poultry
- ... Explore the barriers and opportunities and challenges of agronomy, harvest, storage, rationing and economics.
- ... Link two or more Welsh organic farmers to grow and supply new varieties of naked oats for poultry feed.

3 Project activities

These objectives were met through the following activities:

- Build on earlier initiatives and review progress drawing on experience from other organic farmers who have grown naked oats in 2008, 2009 and 2010
- Naked oat crops of different varieties were established on three organic farms (Table 1), to monitor yield and quality
- Other crops grown for poultry feed, against which the yield and nutritional value of naked oat varieties were compared, were grown (Table 1)
- Participants were interviewed on all aspects of growing and feeding
- Ration planning advice was provided from a specialist organic poultry nutritionist
- Workshops and open days were organised in partnership with Farming Connect.

Farm	Description	Naked oat variety	Comparison Crop
Rogerston , Haverfordwest	160 Mixed farm, beef, sheep and arable. Supplies grain off the farm for livestock feed.	Bullion (2Ha) Lennon (2Ha)	Triticale (4Ha)
Nantclyd, Aberystwyth	11Ha mixed farm with 1800 layers, horticulture and a small flock of Poll Dorset sheep	Bullion (0.5 Ha) Lennon (0.5 Ha)	Husked oats and peas
Llanllyr, Lampeter	Organic beef enterprise	Bullion (4Ha) <i>(Due to poor conditions crop taken as arable silage)</i>	None

Table 1 Details of participating farms and crops grown

4 Naked oats as poultry feed

Organic feed is very expensive, especially in Wales where haulage distances can increase costs further, and on-farm production can make a real contribution to reducing feed bills. So while the opportunities for off-farm sales to millers or feed compounders are

limited, oats are an excellent option for home feed use. Naked oats thresh free from their husks when combining, increasing the density of nutrients that offer real advantages to pigs and poultry. There are new winter varieties like 'Hendon', 'Expression' and spring varieties like 'Zuton' Lennon and 'Bullion'

There is particular interest in naked oats for non ruminants like pigs and poultry, because of the high energy content (over 16ME in new varieties) and crude protein values at up to 14.8%. In addition, the amino acid profile of the protein means that naked oats are a rich source of the first limiting essential amino acids, lysine and methionine. Standard nutritional values for naked oats, husked oats and wheat are shown in Table 2.

Nutrient	Wheat	Naked oats	Husked oats
Crude protein (%)	11	10.3	9.1
Total oil	2.3	10.0	2.3
Starch	60.0	52.5	38.3
ME (ruminant) (MJ/ Kg)	11.9	13.0	10.5
ME (poultry) (MJ/ Kg)	13.0	15.0	10.5
Dry matter (%)	87	87	87
Lysine (%)	0.31	0.42	n/a
Methionine (%)	0.17	0.20	n/a
Essential fatty Acids (%)	0.94	3.69	n/a

Table 2: Standard figure for the nutrient content of naked oats, husked oats and wheat

Source: Pers. Comm. S .Cowan, IBERS; C Nixey PoultryXperience

The nutritional value of naked oat crops and a wheat crop (for the purposes of comparison) were analysed over two years on each of the participating farms (Table 3, and the appendix). Although there was considerable variation both Bullion and Lennon were comparable to the standard naked oat nutritional data, suggesting that from a nutritional point of view, the potential of naked oats can be realised under organic conditions in Wales. A degree of deviation can be explained by variety; standard data are based on winter varieties where as those on participating farms used spring varieties which tend to be higher in protein and lower in starch, oil and ME. This was true for protein and oil, but starch was consistently higher than expected and ME figures were very close to the standard.

It also demonstrated that the naked varieties were superior to husked oats (grown on the same farm at the same time) with respect to all the nutrients tested, although the difference in protein was small. The same was true of wheat with the exception of protein, which was higher in wheat.

Producer experience appears to back this up. Liz Findlay at Nantclyd has fed her flock of 1800 birds on an 80% naked oat diet and there was a noticeable increase in egg weight and better quality.

Having established the credentials of naked oats as a feed, the next section looks at the crops from agronomic and economic point of view.

Nutrient	Naked oats (Lennon)		Naked oats (Bullion)		Husked oats (Atego)	Wheat (Ameretto)
	Lowest	Highest	Lowest	Highest		
Crude protein (%)	10.9	11.9	6.4	12.4	8.9	12.6
Total oil (%)	6.6	8.8	8.2	8.9	3.7	2.5
Starch (%)	57	58	55.5	64.1	38.5	51.2
ME (ruminant) (MJ/ Kg)	15.2	15.5	15.5	15.6	10.3	12.5
ME (poultry) (MJ/ Kg)	13.8		14.0	14.6	9.19	11.4
DM (%)	80.4		82	88.8.	84.5	85.4

Table 3: Nutrient content of naked oat and comparison wheat crops grown on participating farms

5 Growing the crop – agronomy and economics

While organic farmers can grow any of the main cereal species, oats are particularly well suited to organic systems, especially in the marginal cereal growing areas that cover much of Wales; they are good competitors against weeds; they tend to be more disease resistant; and they thrive on low fertility.

The agronomy of naked oats is similar to husked oats. It is important to store the crop carefully as the high oil content means that they need to be dried to a maximum of 14% moisture. Care needs to be taken to remove as many of the fine hairs when combining to reduce the ‘dust’ content, while not incurring high in-field grain losses.

Oats is a versatile crop. This reflected in the different rotations used in each of the participating farms, and the different growing systems employed (Table 4).

Nantclyd	Rogerston
Clover ley+poultry->kale->oats +peas->oats undersown Notes: <i>Peas + oats (50:50) were sowed @80kg/acre in April. It was combined in September and treated with ‘Propcorn’¹</i>	Red clover->S. Wheat->S. Oats or triticale->White clover ley-> S. wheat->.naked oats. Notes: <i>Naked oat crops were sown in April Bullion and Lennon cvs were grown in each of two years. Yields varied between 3.0 t/Ha and 5.4t/Ha. (1.2 - 2.2t/acre).</i>

Table 4: Rotations on Nantclyd and Rogerston farms

Both Liz Findlay at Nantclyd and Peter Storrow at Rogerston have, on the whole, had positive experiences growing naked oats. Due to the feed supply challenges faced by pigs and poultry producers, producers who grew and fed naked oats in 2008 have since changed their stocking enterprises mix. However, they found that naked oat crops grew well and suited the new system. Both have found the crop establishes and grows as well as husked oats.

¹ A preservative for cereal grains and pulses harvested at up to 25% moisture to guard against the formation of yeasts, moulds and mycotoxins during storage

Liz Findlay has grown them as a single crop, undersown and in a mixture with peas, and is able to produce about 10% of her requirements off the farm. For Peter Storrow, naked oats fit as well in his rotation as husked wheat typically, and usually go at the end of the cropping phase. Naked oats have proved to be as versatile as husked oats in the commercial farm systems participating.

In common with all other cereal producers in Wales, the climate makes harvesting a grain crop unpredictable. Both Peter and Liz have crimped/ 'Propcorned' the grain in some years to deal with the difficulties caused by limited sunlight (which leads to late maturity) and heavy rainfall. At Llanllyr, conditions in the year naked oats were grown meant that it was impossible to get a grain crop at all, and it was taken as wholecrop silage.

With regard to naked oats specifically, one of the main drawbacks is yield; the absence of a husk means that the yield is about one third less than a husked variety, and this means that the production costs per tonne are higher. At Rogerston, over the two years yields varied between 3.0 t/ha (1.2/ ac) 5.4 t/ha (2.2t/ac). It is difficult on the data collected to make generalizations with respect to varieties. In 2012 Lennon yielded approximately 15% more than Bullion and seemed less susceptible to crown rust. However at Nantclyd in 2011, Bullion out-yielded Lennon highlighting differences in results from commercial farms due to weather and soils.

6 Barriers to production

IBERS has a long history of breeding oats. In recent years, the focus has been on higher yield and quality; stiffer straw; improved harvest index (i.e more grain less straw); thinner husks and improved milling quality; and higher oil content. The main reason that naked oats are not more widely grown is the lower yield, limited availability of seed and lack of awareness. Building direct relationships between farmers allows the qualities of naked oats to be valued and agreeing a mutually beneficial price is an important part of developing the links between farmers

The availability of organic seed of recent spring varieties is an issue and organic farmers may have to use untreated seed under derogation from their organic control body.

7 Linking farms

One of the key objectives was to help to develop links between farms to address the feed for poultry within Wales. Over the last four years Nantclyd and Rogerston have developed a well established link, where Peter grows approximately 20 t/ year for Liz per year. If land becomes available, Mathew Gee, at Llanllyr, may grow organic naked oats for Liz in the future.

For Liz it is important to source organic feed from as close as possible to the farm, a desire which is very much in keeping with the organic principles and significantly reduces the carbon footprint of the system; sourcing grain from Pembrokeshire is a better alternative to other cereals that could be from Eastern Europe.

It is also important to Peter that the supply chain is kept short, and he is pleased to be able supply organic poultry producers within Wales. Price negotiations are sensitive and depend on other markets for organic grain and ensuring strong relationships with other livestock farmers in Wales.

8 Conclusions

Naked oats are a valuable poultry feed and their nutritional values compare favourably to husked oats and wheat. Naked oats are versatile; they can be grown in cereal producing areas in Wales and introduced at any point in an organic rotation. They can be crimped/ 'propcorned' which is especially useful in years when weather conditions prevent complete grain ripening. If necessary they can be harvested as whole crop silage for ruminants.

The yield of naked oats is significantly lower than husked oats and this can be a disincentive when sold onto the grain market. There was also considerable variation between sites and growing system, although perhaps no more so than any other cereal crop.

The lower yield, however, can be offset by an increase in nutritional value, and by establishing direct links between arable and poultry producers, it is possible to recognise and reward this. At the same time, these direct relationships can improve the supply of quality, traceable organic feed from Wales, reduce the carbon footprint of the enterprise and bring the production systems closer in line with the organic standards

9 Next steps

The priority for the remainder of the BOBL project is to build on experience and extend the principle to more farmers and other livestock enterprises. This will be achieved through the following activities:

- Publish a summary and send it all organic poultry and arable producers in Wales
- Assist producers to establish direct relationships (Liz Findlay is already looking for more growers in Wales for cereals and particularly naked oats).
- Disseminate technical information on growing naked oats, and particularly explore the benefits of growing naked oats with peas or other combinable pulses together. This will be done by a combination of resources and workshops (working through Farming Connect)
- Disseminate the case study arising from this work
- Link to the QUOATS as appropriate
- Developing the market
- Increasing the availability of organic naked oat seed, and cereal seed more generally, following poor 2012 harvest
- Gather information on the price and quality of imports compared with UK/Wales crops