

Issue No. 5 - Summer 2006

menterra



The Gwynedd Agri-Innovation Initiative Newsletter

## Introduction

*As the Senior Portfolio Leader for Development in Gwynedd Council, it is my pleasure once again to welcome you to a further issue of the MENTERRA newsletter.*



This ambitious 3 year project is fast drawing to a close and it is by now pleasing to see the innovative research work undertaken bearing fruit. The yields of the initial trialled crops, Linseed, Naked Barley & Oats, Crambe, Camelina and Soft Fruits have, and continue to be researched for their various attributes. It is early days for the trials which commenced this spring with Exotic Mushrooms and Salicornia but it is evident from the articles within this newsletter that there is considerable interest in these products.

“Cash is King” and by now, based upon the information gathered from the research, considerable emphasis is being placed upon the importance of marketing the produce, with many contacts being developed. I look forward to the publication of the Product Packages which will be prepared over coming weeks as these will

disseminate the information gathered and provide valuable support to the farmers who wish to diversify within the industry.

I make no appologies for reiterating that a thriving agriculture industry is essential to sustain a strong economy and community in our rural areas and the success of this verture, with the willing co-operation of many Gwynedd farmers proves that the will to venture lives on in an industry which continues to face many challenges. Thank you for your contribution to the inovative culture within the County.

*Councillor Dafydd Iwan  
Portfolio Leader – Development  
Gwynedd Council*



# WELCOME

*Welcome to the fifth edition of the MENTERRA newsletter which summarises the latest position as we approach the end of the project.*

Since the launch in October 2004 and the opening of the Agri-Innovation Centre on the University of Wales Bangor site at Henfaes, Abergwyngregin, the main focus has been on selection of suitable crops, growing them in trials on various farms throughout Gwynedd and researching into the various attributes of the crops to seek out a market. Whilst this work continues, we have now reached the analysis stage where the expertise of the University, the field experiences of the Cymad Agri-Innovation Officers, and the research and marketing skills of BIC Innovation will be combined to prepare Product Packages, which will be produced in 2007.

Without doubt, this project has given some Gwynedd farmers an ideal opportunity to take part in developments, which have proved that different crops to those normally seen locally can be successfully grown, crops which will provide a new opportunity in an old industry.

If you would like more information, or if you have an interest in receiving details of the product packages, contact the Agri-Innovation Officer, Hazel Jones or John Roberts (01766 542036/038). You can also visit our web site on [www.menterra.org](http://www.menterra.org)

*Gareth Wyn Williams  
Menterra Co-ordinator*

## *What happened to the boar?*



*One farmer, who has previously farmed different animals, expressed keen interest in establishing a wild boar farm and is currently assessing the commercial obligations, together with evaluating health and safety issues. Menterra have created a comprehensive information package and it is possible to obtain a copy from Gwynedd Council.*

Meanwhile, DEFRA have announced the results of their recent consultation on how to control the wild boar population in England. This document can be read on the DEFRA website or by directly following the link:-

[www.defra.gov.uk/corporate/consult/wild-boar/responses-summery.pdf](http://www.defra.gov.uk/corporate/consult/wild-boar/responses-summery.pdf)

Whilst the report is not relevant to Wales, it notes the public opinion together with that of the relevant bodies in England in trying to determine the fate of this hairy creature.

*Huw Watkins  
BIC Innovation*

## *Oilseeds could add value on Gwynedd farms*

Consumption of omega-3 fatty acids has been shown to have many benefits, including promotion of cardiovascular and neurological health. These compounds have also been linked with control of behavioural problems such as attention deficit hyperactivity disorder (ADHD) in children. The current major source in the human diet is fish oil, but with declining fish stocks and recommended increased consumption of oily fish, alternative sources of omega-3 are being investigated. Work within Menterra at the University of Wales Bangor has progressed to look at ways of increasing the omega-3 fatty acid content in lambs, by supplementing their diet with linseed, an oilseed crop, with high levels of omega-3.

In 2005 lambs were fed on a standard finishing diet for either 4 or 7 weeks supplemented with different levels of linseed. A straight concentrate diet was also included as a control to fully determine the effects of each treatment. Following slaughter, the fatty acid profile of the meat samples was analysed. Differences were found between the lambs fed purely on grass and those that were supplemented. The experiment is now being repeated to confirm the results. If successful, linseed could provide the opportunity to market premium branded products with superior characteristics, including health benefits and traceability.

## *Birds and the damage they do are one of the major problems faced by growers when growing any soft fruit.*

Well it looks like it's going to be a bumper crop this year for the Blueberry and Aronia triallers. The plants have developed well and are looking really healthy with excellent fruit laden branches.

Birds and the damage they do are one of the major problems faced by growers of any soft fruit, and following our experiences last year, we have to tackle the threat this year so that the berries can be harvested for product development trials. There are many different types of ready made cages, netting, hoops, pegs, lines, drapes etc. on the market at different prices and we have decided on 3 different types for the trial. This will enable us to ascertain which system will be the most suitable and economical way of protecting the fruit if it were done on a commercial scale.

So during the next couple of weeks we'll be fighting with bird netting, sticking in hoops and jumping on pegs trying to get the systems up before the fruit ripens and the birds attack. Then hopefully, lots of fruit picking for the growers!



*Hazel Jones*

*Cymad Agri-Innovation Officer*

## *Naked Barley*

*In the summer of 2005 a range of naked barley varieties was tested at the Henfaes Research Centre. Yields were good with no major agronomic problems encountered, proving that naked barley is a viable crop in Gwynedd. Successfully growing a crop is only half of the story - processing to create a marketable product is the next step. Wheat varieties are assessed and grouped according to their suitability for different products e.g. bread or biscuit making. Such variation in barley has not been studied until now and a successful variety must combine good agronomic characteristics, such as high yield and resistance to disease, with bread making quality.*

We are conducting a series of baking trials at Henfaes to investigate the bread making properties of the varieties, an obvious, though technically challenging procedure. Loaves are tested to find which flour characteristics are important in determining bread quality.

Barley does not contain the high-molecular-weight gluten that is unique to bread wheat. This is an insoluble elastic protein that acts like bubblegum, trapping the gas bubbles produced by the yeast, causing the bread to rise. Barley can be used to make flat bread, but wheat flour must be added to make leavened bread. Therefore a second objective of the trials is to assess how much barley can be included without degrading loaf quality.

In 2006 the Henfaes trials have been expanded to include more than 30 varieties of barley from around the world. They are grown in trial plots, which will be harvested, milled and the grain quality analysed. We are also growing a range of wheat varieties as controls to compare the grain quality of the barley flour to industry standard bread and biscuit wheat varieties. For further comparison, and product development, we have included rye (which has weaker, sticky gluten) and einkorn wheat (a primitive wheat with weak gluten) in the tests.

Our aims during the remaining period of the trials, are to run a second set of baking tests on the European varieties from the 06 crops to see if there are environmental differences between 05 and 06, and test the range of Himalayan varieties, which we didn't grow in the field last year.

*Dr Edward Dicken*  
*University of Wales Bangor*



## Shiitake mushrooms – the first three months

*Two large containers, normally seen on the back of a lorry, is the basis of my venture, purposely adapted and isolated using a system developed by Humungus Fungus from Carmarthenshire. The secret is to create a hot summer atmosphere for them in one room and then cool them and create humidity in the other room.*

Two large containers, normally seen on the back of a lorry, is the basis of my venture, purposely adapted and isolated using a system developed by Humungus Fungus from Carmarthenshire. The secret is to create a hot summer atmosphere for them in one room and then cool them and create humidity in the other room.

The culture room is maintained at a constant temperature and it is here that the plastic bags containing oak saw-dust (and other contents) which have been seeded with mushroom spores develop. Some 40 new bags arrive every fortnight and over a period of 4-6 weeks, the mycelia grows through the saw-dust until the contents in the bag turn into a solid white block. Then, a brown crust develops and within say 2 weeks, small cracks appear which is a sign that the blocks are ready to fruit.

They are then moved into the growing unit in the second container where three essential elements are controlled – temperature, moisture and light. Within a

day or two, the blocks are covered in cracks with small mushrooms sprouting from them, a process which will continue for some 10 days. The mushrooms must be cut off the block before the cap fully opens and drops its spores.

What therefore are the virtues of the Shiitake mushroom? The caps are on average 8 to 10 cm in diameter of a rich hazel colour and tend to weigh around 50 grams. The taste is delicious, having a full body which does not become watery and wither when cooked. There has been an excellent response from the market, the challenge now is to manage the process so that we produce a regular supply of this class product. This is the market requirement and we must respond accordingly to have a sustainable business.

*Cynan Jones - Trialist for the Menterra Exotic Mushroom Project*



## Shiitake mushrooms

*Since the 1940's, worldwide demand for Shiitake mushrooms has placed its market volume second only to that of the common white mushroom. As more consumers become aware of the additional culinary and nutraceutical characteristics offered by Shiitake mushrooms, demand for this exotic fungi is likely to increase significantly.*

The growth in demand for speciality mushrooms has paralleled the growth in demand for other exotic vegetables. This market reflects consumer desires for greater convenience and adventure in their food habits. Many consumers are seeking greater diversity in their meal options and choices and are using increased amounts of mushrooms in the preparation of ethnic foods e.g. Chinese, Mexican, Thai.

Such growth in demand may be directly attributed to

their strong selling points. Fresh, the caps have a chewy texture and a full-bodied aromatic flavour. They are low in calories (125 Kcal per fresh pound), low in fat and have more fibre than the commonly marketed white button mushroom. They can also be a source of B vitamins and minerals. Drying with sunshine or ultraviolet light increases their Vitamin D content and protein content is in the range of typical vegetables. These mushrooms also have a long history of use in traditional Chinese medicine to promote good health and vitality and to increase the body's adaptive abilities.

Shiitake mushrooms can be eaten raw, with a faint peppery bite, but they are generally cooked before eaten. Their slight slippery texture particularly enhances Chinese and oriental dishes. Shiitake can be sautéed, broiled, baked, grilled, stir fried or sliced thin and used raw in salads. Its meaty flavour enhances almost any dish and they have a shelf life of 7-10 days.

## *Shiitake mushrooms*

Shiitakes are often dried and sold as preserved food in packages. These must be rehydrated by soaking in water before using. Many people prefer dried shiitakes to fresh, considering that the sun-drying process draws out the superior umami flavour from the dried mushrooms by breaking down proteins into amino acids. The stems are also rarely used in other cuisines, primarily because the stems are harder and take longer to cook than the soft fleshy caps.

Several direct marketing opportunities exist and include high-quality restaurants, organic retailers and markets, independent health food stores and farmers' markets. Other realistic routes to market are the fashionable gourmet chefs, internet sales and via mail order. Further value can be added to the product by additional processing to produce processed products such as sauces, soups, teas and other functional extracts to extend their culinary appeal.

They have also been researched for their medicinal benefits, most notably their anti-tumor properties. These studies, the earliest dating back to 1969, have also identified the polysaccharide lentinan, a (1-3)  $\beta$ -D-glucan, as the active compound responsible for the anti-tumor effects. Extracts from shiitake mushrooms have also been researched for many other immunological benefits, ranging from anti-viral properties to potential treatments for various allergies.



*Huw Watkins  
BIC Innovation*



## *“TOWARDS COMMERCIALISATION - what will we achieve?”*

*It pretty hard to predict the future so perhaps the title of this article is something of a hostage to fortune, but I thought it was a good idea to try, at the very least, to explore where Menterra will finish.*

There are some certainties –

- The Menterra project will end in early 2007
- No products will have been taken to market, as this is prohibited by the project funding rules.
- Most product ideas will have been prepared to a point that with little or no further work they are “market ready”
- Each of these ideas will be supported by a Product Package that will be available to support anyone who wants to take the idea to market.

**Ok so what's a Product Package?**

This will be a set of guidelines for each product area with a statement that we believe, through the work done under Menterra, that this product has the potential to add value to an agricultural enterprise willing to explore new ideas and new markets. They will scope out the idea, suggest routes of entry to the market and will be backed up by data from extensive research trials that will support any claims that can be made for the product.



Not all product packages are yet at the same stage of finalisation because further trials are to be completed this growing season, or clear routes to market are yet to be identified. Crops may also need further processing trials to give a really market ready product. So perhaps some examples of the products & issues that exist in relation to their market readiness will give you some idea of what Menterra still needs to achieve to reach the outcome of a successful Product Package for each idea.



If you recall in a previous newsletter we talked about *“that cup of naked oats coffee”* and issues that we needed to resolve to be able to market the product.

Real progress has been made with small scale malting trials producing oats with a more complex flavour that will need to be repeated on a larger scale when this year’s crop is available. Then off to Lincolnshire to conduct further trials with a professional coffee roasting company and the product becomes market ready.

Oil crops have now jumped the processing hurdle so that trial quantities of a range of Gwynedd grown & processed oils are available. However these oils will largely be technical products so performance in use is the key to how they are marketed and sold. What is needed next is full physical and chemical analysis of these oils so that we can establish the petroleum based equivalent to which they best compare.

These crops have also been used in the Omega 3 Lamb trials which last year showed such promise. This trial is being repeated to provide more data to substantiate claims that can be made for the end product. This data will be a vital part of the Product Package as it will be key to gaining approval of supermarkets to sell product with such a claim, as well as being somewhat important in meeting food regulation requirements!!



*“Mushroom growing – exotic mushrooms at that - is now a reality in Gwynedd”.*

This trial is now established with samples already on consumer test, and being made available to the Food Technology Centre at Coleg Menai in Llangefni for further product development work. The mushroom group’s progress is the subject of another article, the comprehensive product package will outline capital costs of start up, tips on set up and implementation etc for potential mushroom growers.

Hopefully this short article gives you some idea of progress made, the challenges to be addressed in Menterras remaining months and some idea of specific outcomes expected from the commercialisation end of the project.

“So we can see that products bearing the Menterra brand will be ready to emerge from the project as it draws to a conclusion in early 2007” was how I signed off my last article – we can now say with certainty that this will be the case.

Will farmers be ready to pick up product packages and run with ideas in 2007? – This is the final question we need to answer.

Will that farmer be you?

***CHRIS PRICE-JONES – TECHNOLOGY  
DIRECTOR – BIC INNOVATION***



# *Salicornia – the vegetable alternative*

*Spring saw the start of the Salicornia project, an innovative venture investigating a production method for the cultivation of Salicornia in Wales as a sea vegetable and an oilseed crop.*

Salicornia is a succulent, leafless annual which grows naturally in coastal estuaries and saline environments all over the world and is a common site on the salt marshes along the coastline of North Wales. The name Salicornia comes from the Greek words sal, "salt," and cornus, "a horn," due to the salt-loving (halophytic) nature of the plants and its hornlike branches and is also referred to as samphire, sea asparagus, sea beans, sea fennel, sea pickle and passe-pierre. Originally, picked in the Middle Ages by fishermen's families living near the coasts of the Netherlands, Northern France and Great Britain, more recently its popularity is going global and it has become a highly sought after delicacy and it is currently featured in gourmet restaurants from New York to London, Paris, Brussels and Amsterdam. Commercial cultivation of the plant to date is limited to isolated ventures in Mexico, Israel, India and France and given its high market value as a seasonal delicacy, a gap exists for UK based production of this speciality vegetable, which can be eaten fresh, cooked or pickled and is often used as a garnish in salads and fish dishes or mixed with other vegetables to add a distinct salty flavour.

Although Salicornia is in demand as a speciality sea vegetable, current research suggests it may also offer human health benefits being known for its digestive and anti-flatulent properties. Culpepper wrote in the 17th century that samphire was useful in curing ailments relating to "ill digestions and obstructions," while being "very pleasant to taste and stomach." It also contains diuretic and depurative properties; it's cholesterol-free, low in calories and fat, whilst rich in iodine, phosphorus, calcium, silica, zinc, manganese and vitamins A, C and D. When pickled, it was often taken along by sailors on ocean voyages to combat scurvy.

In addition, this salt-loving plant may also offer a possible solution as a biofilter to the problem of nutrient rich saline aquaculture effluent and its oilseed may also have industrial and pharmaceutical applications, as it contains about 30% oil (particularly linoleic acid) and about 35% protein (similar to that of soybean and other oilseed crops). The oil is polyunsaturated and similar to sunflower oil in its fatty acid composition. In studies in Mexico, it displayed a

seed yield similar to that of soybean and sunflowers, which highlight the growing economic potential of Salicornia sp. and its diversity as a natural resource.

The project first and foremost, aims to establish a viable production method for the cultivation of Welsh Salicornia at Llyn Aquaculture Ltd., an aquaculture company based at Afonwen farm, Pwllheli. The trial will also explore the use of Salicornia beds as a filter for the nutrient rich, saline water which is produced as a by-product of the fish farm, thereby making the aquaculture system more environmentally friendly. Running in parallel with the cultivation trial will be a number of scientific experiments that are being conducted by the University of Wales, Bangor. The experiments will hopefully allow us to quantify the nutrient removal capacity of Salicornia from saline waste water and shed some light on the role nitrogen plays in the plant.

*By Julie Webb,  
University of Wales, Bangor*



# ECOTEC Research and Consulting

*ECOTEC Research and Consulting and ARAD Consulting Ltd were appointed to carry out an evaluation of Menterra, the brief included consideration of the 'added value' contribution of the project in the context of the wider range of development activity in the agricultural sector. The extracts below are taken from the interim evaluation that comes 2 years into the 3-year pilot project.*

The Menterra Agri-Innovation Initiative was launched with the help of a £2.6m funding package secured through Objective 1, WDA and Gwynedd Council. It is a highly ambitious project that has brought together a number of strategic partners from the public and private sector. Its aims are to create and embed a culture of innovation within SMEs in the agricultural sector in Gwynedd as a means of ensuring the economic viability of rural areas. Menterra aims to encourage modernisation and diversification through the trialling of new and innovative products and the project objectives include: - To establish innovation through R&D of new natural products and associated technologies so as to open up new directions, fields of activities, commercial products and markets;

To support and extend agri-sector businesses, clusters, groups, networks and consortia in Gwynedd including an understanding of the workings of the market so as to identify further research and viable production opportunities;

To develop the potential of the Menterra initiative as a model capable of transference to other areas of research activities, and to other sectors and geographical areas, so

as to maximise the potential of academic research and technology transfer as a contribution to economic renewal.

Menterra is designed to fulfil a well established need within the sector in Gwynedd and is very much about diversification in agriculture where market liberalisation in the sector have been declining prices and profits. Adjustment requires diversification away from traditional products. Menterra is clearly linked to this premise and with regard to its ethos, aims and objectives, achieves a strategic fit.

Participant respondents were asked to assess the degree to which the Menterra trials had an impact on both their farm income and workload. Whilst trialling has not been without difficulties, the overall impression appears to be positive with the trials not being particularly imposing on the day-to-day workload.

With just under a year left to run on the project, the Menterra team have the opportunity to focus delivery to maximise the sustainable outcomes, focussing on flagship products with the most potential to create real and sustainable results within the time constraints of the project. Addressing the gap between triallers and the market should be a key focus of the remainder of the study. Creating sustainable outcomes will depend to a great extent on the project demonstrating and publicising the successful commercialisation of 'champion' trialled products.

There appears to be no question that Menterra is adding value to the sector in Gwynedd in terms of the support it provides, rather than displacing or duplicating resources. A positive outcome for Menterra would be to witness a significant proportion of farmers continuing to grow the trialled crop after the end of the Menterra project.



MENTERRA is pleased to recognise the financial support of these bodies:

