

## MENTERRA NAKED BARLEY TRIALS

Barley, along with wheat, was the first domesticated crop and has been cultivated for around 10,000 years. Normally, during grain development the outer cases of the flowering structures (known as the *pales*) fuse together and adhere tightly to the grain to form the hull or husk found on conventional barley. In naked barley, the gene that produces the glue-like substance needed to attach the hull is mutated and defective. The result is that the grain will thresh free from its hull.

The reason for naked barley's usefulness is that it lacks the hull of conventional barley, which is indigestible and difficult to remove. Naked barley is therefore used as human food while hulled barley is used for malting (to produce beer and malt whisky) or animal feed.

Naked barley was perhaps the most important cereal for the earliest farmers in Europe but began to decline following the introduction of bread wheat (*Triticum aestivum*), which had superior bread making properties to barley and the early einkorn and emmer wheats. Naked barley continued to be grown in areas such as Scandinavia, where the climate was unsuitable for wheat, and was taken by Viking settlers to Iceland and possibly even Greenland. Until the late 19<sup>th</sup> Century barley was an important ingredient for bread in Wales.

Urbanisation, wheat imports from North America, the introduction of the factory-produced white loaf and the adoption of potatoes lead to a decline in cereals such as naked barley, oats, rye and spelt wheat that were traditionally grown in marginal arable areas. As barley was no longer considered as a human food, naked barley varieties were entirely replaced by the higher yielding hulled barley, familiar to farmers today. Naked barley became a forgotten crop and there are no varieties available in the UK.

As a healthy food, barley has a lot to offer: The starch takes longer to digest and release sugar into the blood stream, hence is considered as a 'slow carbohydrate' or low glycaemic index food. This helps prevent the blood sugar and insulin peaks that lead to Type II diabetes. The  $\beta$ -glucan soluble fibre (also found in oats) can help lower cholesterol. Barley also contains between four and six times the levels of useful minerals such as calcium, magnesium and potassium and ten times more iron than wheat. In December 2005 the FDA in USA added barley to the specific health claims allowed for oats, following lobbying by Mid-West barley growers. In the EU similar claims are allowed for oats at the moment, and barley has a very strong case in light of the US experience.

Naked barley does not require abrasive 'pearling' needed to remove the hull of covered barley. Therefore it can be used in food products with minimal processing, and with the nutritious bran layer intact to get the full benefit of the wholegrain.

## THE MENTERRA TRIALS

Spring naked barley varieties, sourced from Germany, Sweden, New Zealand and the Czech Republic, were grown in trial plots at the Henfaes Research Centre. The objective of these trials was to investigate whether these varieties could provide acceptable yields in Gwynedd, and to better understand any special agronomic requirements of naked barley. A group of Gwynedd farmers also trialled 1.2 ha plots of a German variety, to evaluate how naked barley could fit into their farming systems.

Grain from the Henfaes trials was used for laboratory and baking tests, while produce from the farms was used by a number of processing companies to make trial batches of food products.

Seeds from the Himalayas were obtained from the John Innes Centre and tested in the glasshouse, then in small trial plots. A sample from Japan and Korea is now being tested in a similar way.

A large amount of data was collected from the trials over two years, and the key findings are summarised below:

- The naked barley varieties tested had a lower yield potential than hulled UK spring varieties. This yield decrease was mainly due to loss of the hull, which typically amounts to 15% of the yield of hulled barley, and could be compensated for if a small premium was available (as is currently the case for naked oats).
- Naked barley does not differ greatly in its agronomic characteristics, but does require care at harvest to maintain grain quality.
- There is wide variation in grain quality and starch chemistry, with different varieties being suited to different products – as is the case in wheat.
- Varieties from countries such as Tibet, Afghanistan, and Japan could provide novel characteristics for future naked barley breeding to compensate for the loss of diversity in Europe.
- Initial trials show excellent promise for a range of naked barley products: a range of bakeries, from smaller artisan to large commercial bakers have produced a variety of tasty breads; impressive results with domestic bread machines suggest that flour for home baking would be a potential market; barley flakes show promise for use in breakfast cereal and snack products.

It is intended to continue with all of this work during the 2007 growing season.