In hulless (naked) barley grain the lemma and palea are non-adherent. The hulless phenotype results from mutation in a gene on Chromosome 7H that regulates biosynthesis of the lipid that acts as an ‘adhesive’ in the wild-type. Hulless barley has generally been grown as a feed crop for non-ruminants, but there has been periodic interest in its possible use for malting, brewing and distilling.

**Filtration Problems and Industry Research**

Traditional distillery mash tuns use gravity to filter the wort and husk particles have been considered essential to form a filter bed, but recent research, within the whisky industry, has suggested that the extent of malt modification may be more important for rapid filtration. Industrial research does have some problems, however, in comparing hulled and hulless varieties, due to differences in genetic backgrounds. The alternative, i.e. using chemical de-husking to create a ‘hulless’ version of a malting variety, introduces an additional treatment effect, as it destroys any micro-organisms on the grain surface.

**Materials and Methods**

**Population**

We made use of a mutant population initially developed in the hulless variety Penthouse, to induce variation in grain morphology. 38 lines plus Penthouse and the malting variety Optic were included in a trial of 2 replications grown at SCRI, Dundee in 2008, using the standard agronomy for malting barley, with fungicide application to control disease.

**Matting and Malt Analyses**

Grain was malted according to the regime employed, to compare Optic and Penthouse, by the Scotch Whisky Research Institute. This enabled our comparisons, between these two varieties to have commercial relevance, while the mutant lines permitted variation in quality parameters to be assessed within a common genetic background. In addition to the grain characters Thousand Grain Weight (TGW), Grain Length to Width ratio (L:W) and Nitrogen (N) Content, we measured weight of grain not retained by a 2.25mm sieve (screenings), extent and evenness of water uptake in steeping, malt extract and predicted alcohol yield. Associations between the characters were also determined.

**Future Research**

There is requirement for further malting and malt analyses, to investigate variation in both growing and malting environments.

There appears to be real opportunity for hulless barley, due to its environmental credentials, but there is a clear need to increase grain yield.

The optimum phenotype for hulless malting barley needs to be established, since the proportion of endosperm components will be increased and the ideal balance may differ from that in covered barley.

There are further opportunities to characterise the mutants or to search for mutations in genes known to influence components will be increased and the ideal balance may differ from that in covered barley.

There is requirement for further malting and malt analyses, to investigate variation in both growing and malting environments.

There appears to be real opportunity for hulless barley, due to its environmental credentials, but there is a clear need to increase grain yield.

The optimum phenotype for hulless malting barley needs to be established, since the proportion of endosperm components will be increased and the ideal balance may differ from that in covered barley.

There are further opportunities to characterise the mutants or to search for mutations in genes known to influence quality. Those involved in synthesis of cell wall components could be a target.