HENFAES CEREALS

CALU DEVELOPMENT FARM FACTSHEET FIELD GUIDE
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Winter cereals

All winter cereal plots were sown on 26 September 2008. See field plan.

Plot 1.Winter rye

This has received only 50 kg/ha N fertilizer, which is a little mean, but the crop has an excellent ability to scavenge N from the soil. Rye is very competitive against weeds, so no spring herbicide was needed. Rye is resistant to most diseases, though brown rust is a problem on some varieties in favourable conditions. This variety, Lichtkornroggen, has good resistance to brown rust, so no fungicide was used. Although rye is easy to grow and tolerant of most soil types, the area of rye grown in the UK is limited by low demand. Rye bread is a niche product and rye grain is less useful than wheat as feed due to anti-nutritional factors.

Plot 2.Winter wheat

This cereal is potentially high yielding, but requires high levels of inputs. Most crops will receive 150-250 kg/ha N, 3-4 applications of fungicide plus a PGR (plant growth regulator or straw shortener). The three varieties in the trial here are: Hereward and Solstice – hard endosperm, high protein wheats for bread making; and Claire – soft endosperm for biscuits. These varieties are industry standards for quality, but newer varieties offer higher yields and better disease resistance.

Plot 3.Spelt and einkorn

These are ancient wheats. These are much lower yielding but resistant to disease. Neither has received any fungicide but have cleaner canopies than the modern wheats that have had full doses. Spelt is tolerant of poorer soils, winter cold and is increasingly popular in speciality breads. Einkorn is not very winter-hardy, it competes poorly with weeds, matures late and has too low a yield to be commercially useful. However its impressive resistance to *Septoria tritci*, the most troublesome disease of wheat in the UK, is being investigated by scientists at the John Innes Centre with a view to use in wheat breeding.

Plot 4.Winter barley

These plots are traditional landrace varieties from the Himalayas and Japan and breeding lines from ICARDA in Syria. These naked barleys are being tested for their winter-hardiness, and to see if their habit is more suited to an autumn rather than a spring sowing. Crop establishment was better in the warmer early autumn soil than in the spring. Disease is more prevalent than in spring barley, especially *Rhyncosporium secale* (scald, often known as Rhynco), which develops in cool damp conditions in early spring.

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Spring cereals

All spring plots were sown on 19 March 2009 and are mostly naked barley varieties for human consumption. See field plan for location of plots.

Plot 5. The first two blocks are untreated and fungicide-treated breeder's lines of naked barley from Germany, along with UK covered varieties as controls. Untreated plots are to test disease resistance, and treated plots test the yield potential in the absence of disease. Therefore full rates of fungicide are used on these plots. The UK controls are the popular malting varieties Optic, Tipple and Cocktail, and the feed variety Static. Optic has been the dominant variety due to its popularity with maltsters, but resistance to mildew and *Rhyncho* is poor, as can be seen in the untreated plots. The naked barley lines are unreleased lines from the breeder of 'Lawina', the variety we have in small-scale commercial production. As well as improved yields and disease resistance, some of these lines have enhanced nutritional value.

Plot 6. The next block consists of spring sown Himalayan and Far-Eastern landrace varieties, along with two old Welsh landraces of covered barley, one being the local Haidd Enlli. The Himalayan varieties are quick to mature, tall, susceptible to mildew and have a low yield. However, their vigour and good quality naked grain is useful in crosses. Some of the Japanese and Korean varieties are of the dwarf type known as 'uzu'. These are dark green with thick stems and leaves and very short awns. Grain is small and round, suitable for cooking with rice. The autumn-sown uzu plots have much greater biomass, more ears and will yield more than the spring plots. They are also taller, as the upper stem of uzu barley elongates in cooler temperatures, losing the dwarf characteristic. All the 'exotic' varieties received a full fungicide programme, as most have no resistance to UK strains of disease.

Plot 7. The Himalayan vigour of the Skardu landraces of Pakistan shows through in the HSX07 lines. These lines were multiplied from ears selected from bulk populations in the wet summer of 2007, and show mildew resistance and straw strength derived from the UK variety Static.

Plot 8. There are also mixed populations derived from the same cross. These are testing the effects of natural selection under field conditions on the populations.

Plot 9. Until improved varieties are available, management of Lawina needs to be optimised to get the best from this variety. Our previous trials have shown Lawina to have a weak stem-base and root cone. We are testing whether the PGR Moddus, which shortens straw and is claimed to improve rooting is helpful.

Plot 10. The final plots are only four rows wide, as seed was limited. There are more lines from the Skardu-Static programme and mixed F2 (2nd hybrid generation) populations from new crosses made in 2008. These were sown on 23 April and 20 May, as seed was harvested from the glasshouse-grown F1 plants. These crosses are between the best of the HSX07 lines and UK varieties such as Tipple and Westminster. These could be grown as mixed populations for several seasons under field conditions and the best ears selected. If funding is available, a handful of the estimated 70,000 F2 plants in these plots could be developed into commercial varieties.