

Scotland's Rural College

SAC Cereal Recommended List for 2010

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SAC Cereal Recommended List for 2010



INTRODUCTION

Recommendations are made by SAC and are based on data collected as part of the HGCA Recommended Lists' system. The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com): this includes information on varieties not mentioned on the SAC list. Some of the detailed agronomy advice is based on HGCA's RL Plus 'Varieties On Your Farm'; this interactive programme is available on the HGCA website and the CD HGCA Crop Oracle.

To improve the regional application of cereal trials, the UK is divided into several regions. The yields of winter wheat, spring and winter barley, given in the tables are based on trials in the arable east to the north of Durham. For minor crops the yields are UK yields; the spring wheat yields are from spring-sown trials.

A variety is not recommended until it has completed at least three years in trial. If the UK performance indicates a consistent economic benefit over the best existing comparable variety and there are no unacceptable weaknesses, the candidate is given a UK provisional recommendation (P); varieties that do not merit a UK recommendation but have a specific use are given PS. In the tables, fully recommended varieties are listed in order of fungicide treated yield; this is expressed as a percentage of the average treated yield of the control varieties.

A variety may demonstrate advantages or disadvantages under commercial production and marketing that are not evident in field trials. In due course this additional information is included in the notes on varieties. The disease resistance scores indicate the current situation; experience has shown that resistance to mildew and yellow rust may not be maintained.

Assessment of quality is provided by the Malting Barley Committee, the Scotch Whisky Association, the Scottish Flour Millers' Association, the Scottish Oat Millers and others assisting HGCA's Crop Evaluation Committees.

Supplies of multiplication seed (Basic and Certified 1st Generation) may not be generally available; C2 seed stocks of the newer varieties may be limited.

In case of doubt, or for information about varieties not listed, farmers should consult their SAC agricultural advisers or the HGCA website.

CHOICE OF VARIETY

Before choosing a variety consider the following factors and decide which restrict your choice:

- Sale for brewing, distilling or milling (check with your buyer).
- Specific weight.
- Earliness or need to spread the harvest period.
- Ear loss and sprouting risks.
- Disease risk (see below).
- Straw strength and length (barley straw can be of considerable value).

Having eliminated the inappropriate varieties, select from the remainder those with the highest yield potential.

There is a large wheat market for grain whisky production in Scotland. Although some hard wheat may be used, this can cause processing problems so there is a strong preference for **soft** grain of large grain size, low protein content, with good specific weight and low screenings. Ratings for distillery performance range from Good for Beluga, Istabraq and Viscount to Poor for all hard wheat varieties and those soft wheat varieties carrying the 1b/1r rye gene translocation; hard wheat varieties and those giving a reduced alcohol yield or process limitation are discouraged by distillers. In recent trials, a new soft variety called Warrior gave rise to the following distilling summary 'abysmally low alcohol yield, being significantly behind even other Poor rated varieties on every single trial site, whilst its residue viscosity (a measure of processing difficulty) was the highest on every site. A variety for distillers and alcohol producers **to expressly avoid** as its combination of very low alcohol yield and relatively high viscosity would harm distillery efficiency'.

Grain whisky production also uses high enzyme malted barley: sourced from Scotland, Decanter has dominated this sector. Belgravia is now fully Approved for the market and Forensic carries Provisional Approval.

For biscuit-making, soft wheats are preferred. The Hagberg Falling Number should exceed 100, protein should be above 10.7% (on a dry matter basis using the Dumas method) and the gluten must not be damaged by high temperature drying.

There is also demand for bread wheat but only if quality specifications are fully met. Because of our climate, Scottish wheat is generally lower in protein than its English counterpart. In wet harvests the Hagberg Falling Number is so severely reduced that grain is unlikely to meet bread-making requirements.

To assist exports and help foreign millers and bakers recognise the characteristics of UK varieties, HGCA promotes two brands. **uks** covers soft extensible varieties that can be used for biscuit-making or blended into a bread-making flour. **ukp** covers semi-hard varieties that suit both EU and non-EU bread-making.

The intervention market for wheat is restricted to common wheat; Cordiale, Einstein, Gallant and Solstice are eligible for intervention.

Barley quality requirements are becoming more precise especially as characters affecting processing are taken into account. In the malting market some varieties are acceptable for distilling but not for brewing. Some varieties are inclined to dormancy, this can prejudice their use by maltsters. Others are prone to splitting, skinning or pre-germination; these conditions may lead to rejection by maltsters. The IBD Approval system (formerly IoB Approval system) is based on malt use with separate Approval lists for brewing and distilling (see tables). As part of product protection, the Scotch Whisky Association will not support varieties which produce GN levels significantly above Optic; the distilling industry's long term requirements will be for GN 'non-producing' varieties such as Belgravia, Concerto, Decanter, Forensic

and Oxbridge. An asterisk carries Approval based on a minimum number of satisfactory commercial scale tests. (*1) is Provisional Approval based on satisfactory micro-malting or lab results; a variety is moved to Stage 2 Provisional Approval (*2) if the initial commercial scale tests are satisfactory.

There is some demand for winter malting barley but in practice only a small proportion of the Scottish crop meets the grain nitrogen and other specifications and none is used in the production of malt whisky. The Malting Barley Committee will grant (IBD) brewing Approval for winter barley grown in Scotland, Pearl and Cassata are the only currently Approved varieties.

About 80% of the oats that are sold go for milling. To meet this market it is important that grain is properly dried **before** quality is impaired. Milling specifications are likely to include specific (or bushel) weight and screenings in addition to moisture content, but in some markets kernel content and freedom from discoloured groats are very important. There is a developing market for pgr-free oats.

Specific weight is important in the marketing of grain; it is very dependent on growing conditions. High specific weight varieties are less likely to incur discounts or risk rejection.

REDUCING DISEASE RISK

(a) The most economic way of avoiding yield loss due to disease is to grow disease resistant varieties.

Disease ratings are calculated from assessments of disease in naturally infected trials throughout the UK and in inoculated tests. Ratings are UK ratings on a 1-9 scale, where 9 indicates good resistance and 1 poor resistance. A rating is an indicator of disease risk. It describes the likely severity of infection when conditions favour disease development and compatible races of the disease are present. Where conditions are less favourable to a particular disease, or compatible races are absent, a variety may appear more resistant than indicated by its rating. Occasionally, a variety may be less resistant than expected due to the emergence of a new race of disease which overcomes its resistance.

Varieties with a rating of 8 or 9 are sufficiently **resistant** that the disease is unlikely to reduce yield.

Varieties with ratings of 6 or 7 are **moderately resistant**. Disease may develop under favourable conditions, but yield is unlikely to be substantially reduced.

Varieties with ratings of 4 or 5 are **susceptible** and are likely to become severely infected under conditions favourable to the disease. Fungicides will probably be required.

Varieties with ratings of 1, 2 or 3 are **very susceptible** and are likely to become severely infected. Such varieties initiate epidemics. Routine fungicide treatment will be necessary.

Variety resistance can sometimes break down within season. This is most likely to happen where a variety relies on a single major gene for its resistance. If this occurs the rating may change from 9 (good resistance) to 4 or lower (susceptible).

Even though the winter barley *Rhynchosporium* scale has been stretched downwards, varieties with *Rhynchosporium* resistance ratings of 6, 7 and 8 should still be regarded as susceptible and those varieties with 5 or less are very susceptible. The presence of different *Rhynchosporium* populations in Scotland impacts on the susceptibility of winter barley varieties. Varieties of winter barley susceptible to mildew, yellow rust, brown rust, *Rhynchosporium*, net blotch or *Ramularia* may act as sources of infection for spring barley crops. Fungicides applied in the spring to winter barley will reduce disease spread to spring barley. Spring barley varieties susceptible to the prevalent diseases will also need to be protected by fungicide seed treatment or sprays.

Septoria tritici is currently the most common disease of wheat. Recent issues concerning fungicide resistance to strobilurin (QoI) fungicides and triazole (DMI) fungicides mean that varietal resistance is becoming more important to manage this disease: Alchemy (rated 7) is the most resistant of the recommended varieties.

Septoria nodorum has declined as a significant disease of winter wheat, however it can still occur and may be overlooked as symptoms are less easy to identify than those of *Septoria tritici*. Beluga, Cordiale, Gallant and Solstice are the most susceptible recommended varieties to *Septoria nodorum* (resistance rating 5).

(b) Diversification of varieties

Principles of variety diversification:

Overall levels of certain diseases, especially barley mildew and wheat yellow rust are increased if the more susceptible varieties are grown. The risk from these diseases is reduced if more than one variety of barley or wheat is sown, provided varieties which are to be grown in adjacent fields in the same year, or in the same field in successive years, or in a mixture, are not susceptible to the same races of the pathogens.

On the basis of information supplied by the UK Cereal Pathogen Virulence Survey, barley varieties have been grouped into Diversification Groups (DG) according to the races of mildew which attack them. Wheat varieties have been grouped according to the races of yellow rust to which they are susceptible as adult plants. These diversification groups are shown in the tables.

Winter wheat yellow rust:

Yellow rust is a serious threat to yield in certain varieties and ***this year the situation has seen significant infection affecting varieties that were previously in DG1***. The sudden appearance of new races on previously resistant varieties can occur and regular inspection of all varieties is important, irrespective of rating. This is particularly the case now that yellow rust has become a common problem in winter wheat.

The risk of spread of yellow rust is low where Alchemy, Beluga, Cassius, Istabraq, are grown together or with any one other recommended variety and where Cordiale or Grafton is grown with one of Einstein, Gallant, Oakley, Robigus, Solstice or Viscount.

There is a high risk of spread from any other combination of recommended varieties. There is an especially high risk of spread where DG2b varieties are grown together, these are Gallant, Oakley, Robigus, Solstice and Viscount.

Barley mildew:

Varieties in DG0 (Cassata, KWS Cassia, Pearl, Pelican, Retriever, Volume and spring varieties Forensic and Optic) do not contribute to the diversification of varieties to reduce the effect of mildew on the crop but note that DG0 varieties with high resistance ratings e.g. Pelican are effective at limiting the potential of an epidemic.

Varieties in Diversification Group 1 (Belgravia, Decanter, NFC Tipple, Propino, Publican, Quench, Waggon and Westminster) are currently resistant to mildew and are good partners to all varieties.

Saffron and Sequel (DG10) should not be grown together: in partnership with Oxbridge (DG14) they carry a medium risk of mildew spread.

EYESPOT AND SHARP EYESPOT

Recent research has developed a risk assessment for eyespot; it is available at www.sac.ac.uk/crops. High risk factors include wheat as the previous crop, ploughing compared to minimal tillage, early sowing, high spring rainfall and the presence of disease at GS31-32. Absence of disease at GS31-32, either visually or by diagnostic assessment, does not necessarily pose a low risk.

Sharp eyespot is less common, but when infection is severe, yield loss and lodging can occur. All varieties of wheat are susceptible to some degree.

SNOW ROT

Snow rot has receded as an important disease of winter barley but a move to short rotations, earlier sowing and minimum cultivations would encourage it. There is insufficient evidence to give susceptibility ratings. Consideration should be given to the protection of advanced lush crops especially where the previous crop was winter barley, snow is likely to lie or where crops are weakened by manganese deficiency.

SEED-BORNE DISEASES

Loose smut is a seed-borne disease found mainly on open-flowering barley varieties (most winter and spring varieties). Certified seed will have a guaranteed low incidence of loose smut but infection can build up rapidly in home-saved seed.

Leaf stripe became common in spring barley in 1990. Adoption of a voluntary standard for seed infection and the use of effective seed treatments have resulted in a significant reduction in its incidence; however, the disease remains a threat to spring barley.

Recent research has shown that *Rhynchosporium* and *Ramularia* can be seed-borne. *Rhynchosporium* on the seed can lead to widespread infections on winter barley in February.

Levels of *Microdochium nivale* on seed have recently been high. There is evidence from UK grain samples tested by INRA in France that this fungus has developed resistance to strobilurin fungicides.

Where loose smut or leaf stripe is found in a growing crop from which seed is to be taken, the seed should be tested for these diseases at the Official Seed Testing Station for Scotland, 1 Roddinglaw Road, Edinburgh EH12 9FJ.

It is recommended that all winter wheat seed is treated to protect against *Microdochium nivale* and Bunt.

BARLEY SPOTTING

Barley spotting has been common on several varieties in the last decade causing yield loss and high screenings. Spotting appears on the upper leaves at ear emergence; in extreme cases the top two leaves die. This damaging effect can be significantly reduced if protectant fungicides (e.g. triazoles, boscalid, chlorothalonil) are applied at the boot stage before ear emergence, but not all forms of spotting respond to fungicide treatment. These fungicides will improve green leaf area retention, but it is common for spots to appear late in the season in some varieties. Some fungicides (e.g. mildew eradicates) may even reduce green leaf area if applied late in the season under certain circumstances. Varieties have been categorised for their resistance to leaf spots (see thumbnail sketches) and also for green leaf area retention (see spring barley table).

In recent years, barley spots developed late in the season in winter barley causing early loss of green leaf area; this problem can be minimised with fungicides as used on spring barley. Of the recommended winter varieties, Cassata is the most susceptible to *Ramularia*, Pearl is the least affected.

BARLEY MILD MOSAIC VIRUS

This virus (BaMMV) and the close relative BaYMV are carried by a soil-borne fungus and can cause serious losses in winter barley. BaMMV is present on a small number of farms in Aberdeenshire and East Lothian. Use of resistant varieties is the only method of preventing the disease. The varieties on the SAC list that are resistant to the common strain are Cassata, KWS Cassia, Pelican, Retriever, Sequel and Volume.

ERGOT

Ergot can affect all cereals and it is common in seasons where the flowering period is extended by cool wet weather. It is becoming common: this is serious as some users have zero-tolerance at intake. Ergot triggers a critical control point in the SQC scheme requiring counter-measures. Ergot has been reported in a range of varieties. Maresi appears particularly vulnerable. In inoculated tests Decanter, Oxbridge, Riviera and Westminster showed symptoms. Triticale poses the highest risk, as do infertile secondary tillers. Grass-margins, grass weeds, set-aside and contaminated seed are potential sources of ergot.

CEPHALOSPORIUM LEAF STRIPE

Wheat crops grown in short rotation where straw has been incorporated or where shallow cultivations are practised can be affected by *Cephalosporium* Leaf Stripe. Varietal differences were observed in a field trial in 2009. Beluga, Cassius, Grafton, Invicta, Robigus, Solstice and Viscount were at the low end of the infection scale: of the recommended varieties, Oakley was the worst affected.

ORANGE BLOSSOM MIDGE

Orange blossom midge was rare in Scotland but it has been seen in crops as far north as Tayside so growers should be alert to it in future. Robigus, Oakley and Viscount have genetic resistance to this pest; see the HGCA website or Recommended List for other resistant varieties.

VARIETY RESPONSE TO DISEASE CONTROL

All trials include treated plots assessed for yield. As only a few trials have untreated plots that are assessed for yield, the untreated yield column in the tables, has been changed to indicate the UK yield penalty where treatment is not provided.

The programmes of fungicides for barley and wheat are comprehensive; the intention is to keep all diseases to a minimal level throughout the growing season thus allowing maximum yield potential to be achieved. For spring barley the programme consists of a two or three-spray programme depending on mildew and *Rhynchosporium* pressure. For winter wheat it is a three or four-spray programme and for winter barley a three or five-spray programme depending on disease incidence or risk. For oats it is a two or three-spray programme.

SPRING BARLEY

IBD support for distilling and brewing

CONCERTO (Nickerson)

A provisional recommendation; yields dipped a bit in 2009 with some disappointing results in Southern Scotland. It has IBD stage 1 Approval for both malt distilling and brewing based on micro-malting results. As a GN non-producer it meets the aspirations of distillers

and its very high malt extract suits brewing: it has already passed the first stage in its commercial evaluation for brewing. In similar trials, its grain nitrogen has been lower than Optic. Screening levels are low but not as low as Oxbridge. It is a relatively tall variety with average ratings for maturity, straw stiffness and brackling. Resistance to mildew is good but it is vulnerable to *Rhynchosporium* giving it a below average rating for green leaf area retention. There are preliminary indications that Concerto is more suited to early sowing and heavier textured soils.

FORENSIC (Syngenta Seeds Ltd.)

A provisional recommendation. It has IBD stage 1 Approval based on micro-malting results. As a GN non-producer it has potential for use in malt distilling and it has the enzyme content required in grain distilling providing the nitrogen specification is achieved. Like Publican it has a micro-malting analysis comparable with varieties that have been used for brewing. There is a possibility that some commercial brewing evaluation will take place so Forensic could achieve markets across the nitrogen spectrum. As a low accumulator of nitrogen, growers will need to manage the fertiliser inputs if a high nitrogen specification is required. It has short straw with good resistance to brackling. Forensic is now rated worse than Optic for mildew and unlike Optic it doesn't show adult plant resistance. It is as bad as Optic for *Rhynchosporium* giving it a low rating for green leaf area retention and a large response to fungicide. On current evidence it has yielded relatively better in North East Scotland and less well in the West. There are preliminary indications that Forensic is more suited to heavier soils, high yield potential and low-ground soils

OPTIC (Syngenta Seeds Ltd.)

IBD Approved for both brewing and malt distilling; it has markets across a wide band of nitrogen content as it is also recognised as an export variety. It is classed by distillers as a low GN producer. Its share of the Scottish malting market in 2009 was nearly 50%, clear evidence that the distilling industry is keen to retain Optic as a hedge against the unpredictable quality and supply of younger varieties experienced in the last three years. In England it has virtually disappeared with NFC Tipple dominating the brewing market. Its tendency to low nitrogen is attractive to distillers. Mildew resistance is poor especially at the seedling stage but it doesn't contribute to diversification for mildew as it is in DG0: it is vulnerable to *Rhynchosporium* but has good resistance to yellow rust. It is no longer later than average as the trend for modern varieties is to have similar or even later maturity. Brackling can be a problem in a delayed harvest and this may account for its lowish rating for ear retention. It is a rather high tillering variety so high seed rates should be avoided; early sowing has benefits both in respect of yield and grain size. There is a slight yield advantage in favour of the heavier textured low-ground sites.

IBD support for distilling only

PUBLICAN (Syngenta Seeds Ltd.)

A full recommendation with IBD Approval for malt distilling; despite a micro-malting analysis comparable to some varieties used for brewing, it was not put through formal IBD commercial brewing tests but there is an expectation that some Scottish bulks will be used for brewing. Like

Optic, it is classed by distillers as a low GN producer, so it meets the current requirements. Despite high yield, protein levels remain slightly higher than Optic so growers should be cautious over nitrogen rates. Screening losses are low. It has good resistance to mildew but low ratings for yellow and brown rust. *Rhynchosporium* was noted in one trial in July so growers should be alert to this risk which is probably more of a late season risk: it is also potentially vulnerable to yellow rust. It is later than Optic. The straw is above average in length and has shown signs of weakness especially in 2009. It yields relatively better on lower fertility sites and like Waggon is better suited to later sowing.

BELGRAVIA (Nickerson)

A full recommendation with IBD Approval for both malt and grain distilling: it is a GN non-producer. It rates well for disease resistance, including *Ramularia*, and has very good green leaf area retention and only a small yield penalty if untreated. Straw is tall and rather weak. There is tentative evidence that it is better adapted to low-ground and heavier textured sites and favoured by early sowing.

OXBRIDGE (Nickerson)

Fully recommended with IBD Approval for malt distilling; as a non-producer of GN with a high spirit yield it is viewed as having excellent potential within the distilling market but a series of problems has seen market share peak in 2008. Some distillers have experienced processing problems so check with your buyer to ensure you have a market. In 2007 some bulks of this large grained variety were rejected for skinning and in 2008 some bulks, particularly in SE Scotland, suffered pre-germination rejections in a wet harvest. Similar problems were again experienced in SE Scotland in 2009 leading to above average rejection rates. As a variety it carries a degree of weather-related risk. Although not viewed as a nitrogen accumulator, its nitrogen level now appears high; this is probably due to low yielding trials and the failure to dilute nitrogen. It has support for pearling, helped by a very low screening loss. With a low DP enzyme level it is unlikely to be used for brewing or grain distilling so growers should concentrate on the lower part of the nitrogen spectrum. It is in DG14 for mildew, rated 7 and is likely to need protection; it has better than average *Rhynchosporium* resistance. It is moderately vulnerable to yellow rust. It showed ergot symptoms in inoculated tests. It has stiff straw and good resistance to brackling.

It is better suited to early sowing and low-ground sites.

DECANTER (Nickerson)

In yield terms, Decanter is now outclassed but it carries IBD Approval for both malt and grain distilling: there is still a strong demand for grain distilling. It is a GN non-producer. It maintains its small market share despite a relatively low yield so it will fade fast once replacement grain distilling varieties such as Belgravia and Forensic gain commercial confidence. Small grain size can result in high screening losses over the conventional 2.5mm screen; it has sometimes been traded over a smaller screen. Husbandry measures, such as early sowing, reducing the seed rate and delaying the nitrogen top-dressing have a beneficial effect on screening levels. It has good ratings for ear and green leaf area retention as well as resistance to both *Ramularia* and brackling. Mildew resistance is good. It showed ergot symptoms in inoculated tests.

IBD support for brewing only

PROPINO (Syngenta Seeds Ltd.)

A new provisional recommendation with the potential to meet brewing requirements. Provisionally it may be acceptable for pearling but further samples need to be evaluated. Screening levels are low. Other than for brown rust, disease resistance is moderately good. It is early, tall and has good resistance to brackling. Its yield potential is especially strong in the North East and West of Scotland. There is provisional evidence that it is better adapted to early sowing, the lighter textured soils and high fertility conditions including after a break crop.

QUENCH (Syngenta Seeds Ltd.)

A very high yielding full recommendation but it does not qualify for distilling support as it fails to meet the requirement for limiting GN. It has full IBD Approval for brewing but hasn't so far taken much market share from NFC Tipple. The straw is short and stiff with good resistance to brackling. *Rhynchosporium* resistance is above average but it is potentially vulnerable to both yellow and brown rust. Maturity is similar to Optic. It appears better adapted to high yielding sites and early sowing.

NFC TIPPLE (Syngenta Seeds Ltd.)

Given the relatively small Scottish market for varieties that suit brewing, but not distilling, NFC Tipple's yield is beginning to look eclipsed by Quench and successors. It still enjoys strong support for brewing achieving nearly 80% market share of the English spring malting market in 2009; by comparison, its market share in Scotland was below 1%. It has potential in some export malt markets. It has good resistance to brackling: green leaf area retention is good but it is short for a feed variety. It has good resistance to mildew and brown rust, but weak resistance to *Rhynchosporium* and it is potentially weak for yellow rust. There are indications that it has done relatively better in SE Scotland, on lighter textured soils and on high yield potential sites.

Feed varieties

WAGGON (Syngenta Seeds Ltd.)

A fully recommended, very high yielding feed variety. Samples in 2009 were acceptable for pearling unlike the previous two years. There are concerns about its very low rating for *Rhynchosporium* resistance especially in the West of Scotland where its infection levels are generally worse than Optic: in the East its infection levels have been lower and it has appeared to be more resistant. Its straw is of average length, stiff with a good rating for brackling resistance. It is earlier than Optic. Apart from *Rhynchosporium*, disease resistance is good and so is its green leaf area retention. It is provisionally rated highly for BYDV resistance. It maintains its yield over a range of situations with evidence to support extra suitability where sowing is delayed and sites are of high potential and soils are heavier textured.

WESTMINSTER (Nickerson)

Although it carries IBD Approval for brewing in England, no Scottish purchases were reported in 2009 or 2008 and the English purchases in 2009 were below 4%. It may be bought for pearling but its main use in Scotland is as a tall feed variety with good disease resistance to both mildew and *Rhynchosporium*: it has a relatively small response to fungicide and good green leaf area retention. These resistances may contribute to its late maturity. It showed ergot symptoms in inoculated tests. It has potential for whole-crop. It maintains its yield over a range of conditions with a slight bias towards upland and lower potential sites.

WINTER BARLEY

IBD Approval for brewing

CASSATA (Nickerson)

A provisional recommendation as a specialist brewing variety, it carries IBD Approval for brewing and following commercial purchases in 2007, 2008 and 2009, there is strong support for the variety from the only Scottish maltster who currently sources winter barley. It provides an alternative to Pearl with advantages in stiffer straw, lower risk of dormancy and resistance to BaMMV. Compared with Pearl, it is weaker for mildew and *Ramularia*: it is very vulnerable to yellow rust. The provisional data suggest it is relatively stable across soil types: by comparison with Pearl, it should be sown earlier and it yields relatively better on higher yielding sites

PEARL (Nickerson)

Carries IBD Approval for brewing; Pearl is the dominant malting winter barley variety with over 40% of the UK market, significantly down on 2008. In South East Scotland there is malting interest in Pearl but growers should note that dormancy limits its use. It is the tallest recommended two-row variety but has shown less lodging than expected. It ripens late. It is susceptible to winter-kill and net blotch. Pearl no longer contributes to mildew diversification; it is susceptible at the seedling stage but has good adult plant resistance. Green leaf area retention is above average and it has shown below average levels of *Ramularia*. It is sometimes used in blends to improve the specific weight of some of the six-row varieties. It is more likely to outyield Cassata on the less fertile sites especially where a cereal was the previous crop.

Six-row feed varieties

VOLUME (Syngenta Seeds Ltd.)

A provisional recommendation, this hybrid six-row has a very high yield and an encouraging specific weight. It is tall with a low rating for resistance to lodging: with such yield potential, a robust growth regulator programme is advisable especially as its response to pgr is poor relative to other recommended weakish varieties such as Sequel and Retriever. Other than for *Rhynchosporium* and net blotch, foliar disease resistance is mediocre rather than good; green leaf area retention is good. Resistance to *Ramularia* is about average. It has resistance to BaMMV. Like other hybrids, it is better adapted to the lighter textured soils: its relative yield improves on the more fertile sites and it tends to suit earlier sowing.

PELICAN (Saaten Union, Germany/Saaten Union UK Ltd.)

This variety has been moved to becoming outclassed because of the difficulty marketing very low specific weight six-row bulks. It is high yielding and may still be appreciated by the home-feeders. The straw is tall with a strong response to pgr. It is vulnerable to net blotch and *Ramularia* but still supports a high untreated yield. It has resistance to BaMMV. Yield performance has been relatively better in SE Scotland and it improves on the more fertile sites in contrast to Retriever.

SEQUEL (Syngenta Seeds Ltd.)

This fully recommended six-row variety retains its place because of its high specific weight; screening losses are rather high. Bold samples may be accepted for pearling. It is early, with tall rather weak straw, and is resistant to BaMMV. Resistance to brown rust and *Ramularia* is only moderate. It yields relatively better in NE Scotland.

Heavy soils should be avoided: in other respects its yield is fairly stable across sowing date, rotation and yield potential.

Two-row feed varieties

RETRIEVER (Sejet, Denmark/Nickerson)

This full recommendation is a feed variety, it has produced outstanding yields that seriously challenge the six-row varieties but its market share has not grown to match its yield. In some trials Retriever has looked disappointing but still produced excellent yields. Specific weight is rather low and screening levels are high compared with other recommended two-row varieties. It may have some potential for pearling provided the colour isn't too yellow. Although it is short, it has weak straw and merits a robust pgr programme. Its high figure for yield loss if untreated reflects vulnerability to mildew, *Ramularia* and lodging and it has a poor record for green leaf area retention indicating a need for sound protection. It has BaMMV resistance and above average resistance to yellow rust. In Scotland its vulnerability to *Rhynchosporium* is more than would be expected by its UK resistance rating. Yield performance is relatively enhanced in late sown conditions and on lighter lower fertility soils.

KWS CASSIA (KWS UK Ltd.)

A new provisional recommendation with many of Saffron's features plus 5% higher yield: in 2009 it showed better resistance to *Ramularia* than Saffron. Like Saffron it is a short stiff two-row feed variety with a high specific weight. Like Saffron it is very vulnerable to *Rhynchosporium* but it has slightly better mildew resistance and is resistant to BaMMV. It yields relatively better on high fertility sites and in NE Scotland.

SAFFRON (KWS UK Ltd.)

This fully recommended two-row feed variety has not yielded quite as well in Scotland but it is useful as a short stiff variety with an excellent specific weight. It has good resistance to net blotch but is very weak for mildew and *Rhynchosporium* giving it a large response to fungicide. It is rather late. It is more suited to high potential heavier textured soils especially after a break crop; early sowing is discouraged probably due to disease susceptibility.

WHEAT

Soft textured varieties are preferred by the distilling industry

VISCOUNT (KWS UK Ltd.)

This provisional recommendation is rated good for distilling; as a nabim Group 4 variety, it is unlikely to be used for biscuit-making in Scotland as it lacks extensibility. It is provisionally listed for export as a **uks** variety but may struggle to meet the specification. Specific weight and Hagberg Falling Number are close to Robigus. Care may be needed in a wet harvest as there are indications that it is at risk from sprouting. Viscount succumbed to the 2009 change in yellow rust race: it is now in the vulnerable DG2b with a resistance rating of 4, this is likely to increase the response to fungicide. It is resistant to orange blossom midge. Straw stiffness is similar to Robigus, both varieties have a relatively disappointing response to pgr. There are indications that it has done relatively better in South East Scotland, when early sown, on heavier soil types, and on high yield potential sites. Other varieties do better as a second cereal.

BELUGA (Senova Ltd.)

This new provisional recommendation is rated good for distilling; as a nabim Group 4 variety it is unlikely to be used for biscuit-making. It hasn't yet been tested for UK export suitability but will be limited by its very low Hagberg Falling Number; this and anecdotal reports give rise to concerns about sprouting in a wet harvest. It has a large UK yield loss if untreated with fungicide mainly due to mildew, *Septoria* and very low resistance to brown rust: it is in DG1 for yellow rust with a 9 rating for resistance making it a very useful partner to all other varieties. Eyespot resistance is above average. The straw is short and very stiff. There are indications that it has done relatively better on heavier soil types probably helped by its very stiff straw.

CASSIUS (Nickerson)

This provisional recommendation has been rated medium for distilling; as a nabim Group 4 variety, it is unlikely to be used for biscuit-making in Scotland. It is listed for export as a **uks** variety but with concerns about its Hagberg Falling Number it will struggle to meet the specification. Specific weight and Hagberg Falling Number are low. With a good untreated yield, its resistance to disease is good apart from *Septoria tritici*: it retained its excellent resistance to yellow rust and its DG1 position in 2009 making it a very useful partner to all other varieties. Straw stiffness is moderate with a good response to pgr. There are indications that it has done relatively better on high potential sites: with a slow speed of early development it suits early sowing. Of the recommended distilling varieties, it responds relatively better than the others in second cereal situations.

ISTABRAQ (Nickerson)

Fully recommended with a good rating for distilling. As a nabim Group 4 variety, it is unlikely to be used for biscuit-making in Scotland, but is listed for export as a **uks** variety suitable for blending. Other than in Scotland there is little support for this variety and it is no longer in yielded trials. It has a high specific weight. The straw is tall and rather weak but it responds well to pgr. It has above average resistance to eyespot and *Fusarium* ear blight

but vulnerability to *Septoria tritici*, and especially mildew, give it an above average response to fungicide. It retained its excellent resistance to yellow rust and its DG1 position in 2009 making it a very useful partner to all other varieties. Maturity is later than average. It doesn't suit early sowing as the straw is weak and when early sown it demonstrates a fast speed of development. It has a relatively low vernalisation requirement. Relative to SE Scotland, it underperforms in the North East. It also underperforms on high yielding sites. Of the recommended distilling varieties, it yields relatively well when grown as a second cereal.

ALCHEMY (Nickerson)

A full recommendation, rated medium for distilling. Placed in nabim Group 4, it is unlikely to be used for biscuit-making in Scotland, but it has potential for export as a **uks** blending variety: it does not suit some export buyers as a pure variety. By soft wheat standards it is high for both specific weight and Hagberg and its sprouting resistance is above average, better than Robigus, Istabraq and Viscount. Its excellent untreated yield reflects good resistance to the normal foliar disease threats in Scotland: the brown rust infections in 2007 demonstrated a weakness that may appear again. It retained its excellent resistance to yellow rust and its DG1 position in 2009 making it a useful partner to all other varieties. Straw strength is average. Maturity is later than average. Speed of development is slow so late sowing conditions should be avoided. It performs relatively better if sown after a break crop and in high potential situations.

ROBIGUS (KWS UK Ltd.)

Fully recommended, this soft wheat is graded medium for distilling and is suitable for biscuit-making; it is also listed as a **uks** variety for export; it is the only variety fully recommended for these three markets in Scotland. It is rated rather weak for sprouting. Straw strength is average with a rather disappointing response to pgr. It can no longer be regarded as a low input variety as resistance to both mildew and *Septoria tritici* has deteriorated. It is in the vulnerable DG2b for yellow rust with a very low resistance rating of 2. It has resistance to orange blossom midge. It is a small grained variety so should be sown by seed number. Robigus is high yielding in first cereal situations especially on high potential sites but its yield can be severely affected where it follows a cereal in the rotation. Its speed of development doesn't suit early sowing. It has a relatively low vernalisation requirement.

INVICTA (Nickerson)

This new provisional recommendation has been placed in nabim Group 3, suitable for biscuit-making and it is graded medium for distilling. It has provisional support as a **uks** blending variety for export but note the specific weight is rather low. It has no significant disease weaknesses at present but further work is required before it can be allocated to a DG for yellow rust. Straw strength is similar to Robigus but it has a better response to pgr. Maturity is late. There is provisional evidence that it doesn't suit late sowing but further work is needed to establish its speed of development.

The other recommended varieties

OAKLEY (KWS UK Ltd.)

This full recommendation has produced some very high yields: it is a hard endosperm nabim Group 4 wheat so there is little prospect of use for distilling or milling. It has a low specific weight and Hagberg Falling Number. As a high yielding variety, it needs and responds well to pgr and fungicide. Oakley was a serious casualty of the 2009 change in yellow rust: it is now in the vulnerable DG2b with a resistance rating of 2, similar to Robigus. It carries low ratings for mildew, eyespot and *Fusarium* resistance. It has useful resistance to wheat orange blossom midge and continues to produce impressive yields. It is a relatively slow developer but weak straw and susceptibility to eyespot limit its suitability for early sowing. Yield performance is relatively disappointing when sown after a cereal, almost as bad as Robigus. It has yielded relatively well on high potential sites but on heavier soils it has underperformed maybe due to lodging.

GRAFTON (KWS UK Ltd.)

A provisional UK recommendation, it is a hard endosperm nabim Group 4 wheat so there is little prospect of use for distilling or milling but it has several strengths that make it worth considering. Compared with Oakley, it has a very high specific weight and Hagberg Falling Number: it is early and exceptionally stiff with very good eyespot resistance. It is now in the same DG3 as Cordiale for yellow rust but with a 7 rating for resistance making it a good partner to all other recommended varieties apart from Cordiale. *Fusarium* and brown rust resistances are rated poor. It could be a robust low-input variety for whole-crop especially as its yield is relatively higher in the wetter West. There are indications that it yields well in North East Scotland and on heavy sites where its stiff straw is an advantage. With a very slow speed of development together with very stiff straw and a good eyespot resistance rating it is well suited to early sowing and it is one of the most tolerant varieties when following a cereal in the rotation.

EINSTEIN (Nickerson)

This fully recommended hard endosperm variety is at the low end of nabim Group 2 for bread-making. It has export use as a **ukp** variety with Chopin figures that readily match the requirement for blended flour. Specific weight and Hagberg are moderately high but not as high as Cordiale. Resistance to sprouting is moderately high. Lodging, especially early root lodging in recent seasons has downgraded its rating to a disappointing six; early pgr is needed. It has moderate all round disease resistance with *Septoria tritici* resistance tending to the weak. The yellow rust rating has slipped to 5 and it is now in DG2a so it shouldn't be grown alongside any DG2b variety. Its fast speed of development makes it better suited to later sowing. It does well as a second cereal with a bias in favour of lighter soils and lower yield potential sites.

GALLANT (Syngenta Seeds Ltd.)

Classified as special in Scotland because growers need to consider the risk of significant grain infertility. This provisionally recommended bread-making variety is in nabim Group 1: it has provisional **ukp** support. For Hagberg Falling Number and specific weight it is in the Solstice/Einstein range. It has yielded much better in England where

despite its high yield it has managed to retain a highish protein indicating good nitrogen scavenging ability. It has rather low ratings for foliar disease and it is now placed in the vulnerable DG2b for yellow rust with a rating of 4. It is early. Straw strength is average. With both a fast speed of development and a vulnerability to grain infertility, early sowing should be avoided: also avoid sites prone to late frosts. It yields quite well when following a cereal.

CORDIALE (KWS UK Ltd.)

Reclassified as special because Scottish growers need to consider the risk of significant grain infertility. The risk is high where it is sown early or in conditions likely to produce forward crops especially as it is a relatively fast developer. This recommended bread-making variety is in nabim Group 2. It may even earn a premium over other Group 2 varieties and lays claim to being now the most popular nabim Group 2 variety. It is listed as a **ukp** variety for export with good Chopin figures. Both specific weight and Hagberg are very high. It justifies a robust fungicide programme with vulnerability to *Septoria* and potentially brown rust. It has been reallocated to DG3 with Grafton making it a good partner to all other recommended varieties apart from Grafton. It is early maturing with stiff straw. It provides a useful choice as a second cereal.

SOLSTICE (Nickerson)

Regraded to nabim Group 1 it is the main quality bread-making variety. This **ukp** variety can also be sold into export markets. Specific weight and Hagberg are moderately high but not as high as Cordiale. It has weak resistance to all the main foliar diseases and it succumbed to the 2009 change in yellow rust: it is now in the vulnerable DG2b with a resistance rating of 4. It has stiff straw and good resistance to sprouting. Although it is a slow developing variety, vulnerability to eyespot limits its use for early sowing. With stiff straw it suits heavier textured soils.

Winter varieties require vernalisation (some cold weather); this requirement limits their use for spring sowing. The latest safe sowing date in Scotland is likely to be at the end of February with varieties such as Istabraq and Robigus at the safer end of the spectrum. Spring varieties develop without needing vernalisation, they can be sown later in the spring but this leads to an even later harvest. The table lists UK data for available recommended quality spring varieties.

TYBALT (Wiersum, Netherlands/Nickerson)

A nabim Group 2 recommendation with a very impressive yield. Growers should note a possible low rating for straw strength, principally based on weakness when autumn sown. With such high yields and a protein 1.3% below Paragon, additional nitrogen is required to meet protein specifications. The specific weight also risks being below the marketing standard. Failure to meet protein and specific weight specifications is a common cause of rejection for milling.

ASHBY (KWS UK Ltd.)

A nabim Group 2 variety with no significant agronomic weaknesses but eclipsed by Tybalt's large spring-sown yield.

PARAGON (RAGT Seeds Ltd.)

The only fully recommended nabim Group 1 spring variety and the millers' preference. As a late autumn sown variety it is 7% lower yielding than Solstice; in spring it is 12% below Tybalt. It has no significant agronomic weaknesses.

SPRING OATS

HUSKY (Nordsaat, Germany/Saaten Union UK Ltd.)

A recommendation that needs more evidence before Scottish growers and millers are likely to support it commercially; encouraging Scottish yields in 2007 and 2009 were partly countered by disappointment in 2008. Early maturity and stiff straw with good mildew resistance look promising but in some areas vulnerability to crown rust will be important. It is above Firth in specific weight but below for kernel content. Millers require more samples in order to reach a considered verdict: provisionally its big bold grains and mill yield are positive features but de-hulling may present challenges.

ATEGO (Selgen, Czech Republic/Trevor Cope Seeds Ltd.)

A recommendation that needs very careful protection against mildew if its yield potential is to be achieved. Kernel content and specific weight are low. Increased availability in the South of England has provided millers with opportunities for evaluating commercial bulks. Overall the current impression is that Atego is a good milling oat and in 2009 it de-hulled well with a good hull to kernel ratio: high screenings were a negative feature. Its early maturity and short straw could be useful.

FIRTH (Lochow-Petkus, Germany/KWS UK Ltd.)

Recommended for its reliability, agronomic characters and quality. Firth has maintained a dominant position at 45% of the 2009 UK seed area (52% in Scotland): market share is down on 2008 and Scottish trial yields were disappointing in 2009. For millers it has a combination of good kernel content, low screenings and moderate specific weight; they also value its reliability and speed through the mill. In some seasons it can show a tendency to free-shell; reducing the drum speed should alleviate this problem.

LEVEN (Lochow-Petkus, Germany/KWS UK Ltd.)

This recommendation has a high kernel content that attracts milling interest but more experience is needed with commercial bulks: 2009 was a difficult season for de-hulling with Leven positive in this respect. It is stiff, early and has good mildew resistance but yield potential looks rather limited; it could have potential in organic and conservation grade systems where its yield will be more competitive. Its Scottish yields show a similar deficit against Firth.

WINTER OATS

Winter oats are widely grown. Earliness and yield relative to spring oats are major benefits. There is a substantial milling market for winter oats in Scotland: some of this must be pgr-free. Achieving pgr-free winter oats is likely to be more challenging than achieving pgr-free spring oats. As winter oats are less hardy than winter wheat and winter barley, they should be sown early to reduce the risk of winter-kill and plant heave. The yields given in the table are UK yields.

BALADO (IBRS, Aberystwyth/Senova Ltd.)

This new provisional recommendation is a semi-dwarf; it has yielded particularly well in pgr-free trials at 13% above Gerald however Scottish trialling is limited especially due to poor harvest weather in 2008. It is attracting milling interest despite the low kernel content: small scale lab tests have been very encouraging. As a semi-dwarf it has a top-rating for stiffness which will appeal to millers requiring pgr-free oats. However it is weak for both mildew and crown rust giving it a high response to fungicide. Maturity is later than average.

TARDIS (IBRS, Aberystwyth /Senova Ltd.)

Like other varieties this provisional recommendation has produced very variable yields in Scotland with an average similar to Gerald and Dalguise: in pgr-free trials it has yielded relatively better at 5% above Gerald. It is acceptable to millers but unlikely to become popular as its kernel content is only equivalent to Gerald, the specific weight is much lower and commercial bulks have shown high levels of small grains. It benefits from stiff straw, early maturity and excellent mildew resistance.

DALGUISE (Senova Ltd.)

Now in the outclassed category with a sharply declining seed area, it retains strong milling support in the Borders with good colour, size and specific weight. Yield in Scotland has been very variable with excellent yields in some years but disappointing in others. On some sites lodging has reached high levels, indicating high risk if pgr is omitted. It is early ripening and this together with its straw is valued by growers not aiming for the pgr-free market. Crown rust and mildew resistance are very weak.

MASCANI (IBRS, Aberystwyth/Senova Ltd.)

A recommendation for its very high milling potential, based on excellent kernel content, high specific weight and low screenings; recent observations also indicate it is relatively free of discoloration. Yields are disappointing especially in Scotland where Gerald out-yields it by more than 10%. It has moderately good resistance to mildew but could be affected by crown rust.

GERALD (IBRS, Aberystwyth/Senova Ltd.)

Popular with growers and acceptable to millers despite a low kernel content. It maintains its yield rather better in Scotland than Dalguise and Mascani especially in the absence of pgr and has been less variable than those two varieties. Mildew resistance is weak.

NAKED OATS

Naked oats yield below 80% of the conventional varieties but they have the potential to earn a premium and should be grown on contract. The terms of the contract have an important bearing on the profitability of the crop. Naked oats should be regarded with some caution as they must not be harvested before fully mature and particular care is needed in drying and handling this crop. Information on naked varieties may be obtained from the HGCA website. There is a market for naked oats in the poultry industry.

SPECIAL RECOMMENDATIONS FOR THE WEST

A few varieties perform rather better or worse in the wetter conditions of the west than in the drier east, these are highlighted in this section:

Spring barley:

Riviera continues to produce competitive yields in SW Scotland; Westminster also yields well and looks useful for whole-crop. Waggon is early and has produced excellent yields with stiff straw but there is a severe risk of *Rhynchosporium* infection if unprotected: Publican has better *Rhynchosporium* resistance than Waggon but with weaker straw and it is rather late.

Belgravia, Concerto, Forensic, NFC Tipple, Optic, Oxbridge and Quench have underperformed.

Winter barley:

The limited yield data doesn't show much differentiation for the West. In general stiffer varieties should be preferred.

Winter wheat:

For **distilling**, Istabraq and Alchemy have yielded well with newcomer Invicta showing promise: Robigus is penalised as it is a disappointing second cereal, Istabraq is better but watch its vulnerability to lodging and mildew.

For **bread-making**, Solstice yields well in the West with Gallant showing potential but not as stiff.

For **feed**, Oakley has the highest yield but with a low untreated yield, weak straw and poor grain characters. Grafton looks useful; it has a high untreated yield, very stiff straw, excellent eyespot resistance and is early: vulnerability to brown rust and *Fusarium* are less relevant in this region.

For **whole-crop**, Grafton looks very useful: Alchemy also looks suitable. On present evidence, Viscount and Cassius have under-performed in the West.

For further information consult your local SAC Advisory Office.

SAC is grateful to the HGCA and BSPB for funding cereal variety testing.

The HGCA Recommended Lists are independently managed by Crop Evaluation Limited.

SAC is grateful to the members of the Scottish Variety Consultative Committee (Cereals) for their advice and other input concerning use of varieties that make up this leaflet.

SAC RECOMMENDED CEREALS 2010

Year First Listed	Grain yield as a % of fungicide treated controls	Yield loss if untreated %	Use B=brewing D=distilling GD=grain distilling	Mating Approval	Screenings <2.5 mm %	Specific weight kg/hl	Resistance to ear loss 1-9 poor-good	Maturity days -earlier than average	Straw strength 1-9 weak-strong	Straw length cm	Brackling risk 1-9 high-low	Disease 1 = susceptible Mildew 9 = resistant Rhyncho-sporium	Green leaf area retention 1 = poor 9 = good	Diversification group
SPRING BARLEY (100=7.3 t/ha, 58 cwt/acre)														
2005	R	107	15	Feed	No	67.1	8	-1	8	75	8	9	3	7
2007	R	105	13	B	*	67.4	7	0	8	72	8	9	8	6
2007	R	103	10	D & (B)	*	68.4	6	+1	7	76	7	9	7	5
2005	O	103	12	B	*	68.0	8	0	7	70	7	8	4	7
2005	R	101	7	Feed	No	69.7	7	+1	6	84	6	9	8	1
2008	R	100	8	D & GD	*	68.2	7	0	7	78	7	9	8	1
2005	R	97	10	D	*	69.3	7	0	8	75	8	7	7	6
1995	R	97	17	B & D	*	69.5	6	0	7	77	5	5	4	6
1999	O	94	9	D & GD	*	69.0	8	-1	8	76	8	9	6	8
2010	P1	107	11	B	-	66.5	(7)	-1	7	78	8	8	7	6
2009	P2	103	13	B & D	(*1)	67.9	7	0	7	79	7	8	4	5
2009	P2	103	18	(B), D & GD	(*1)	66.8	7	0	7	73	8	4	5	4
WINTER BARLEY (100 = 8.7 t/ha, 68 cwt/acre)														
2007	R	111	24	7	No	66.6	7	0	6	84	R	6	8	6
2007	O	110	17	5	No	64.0	7	0	7	103	R	7	8	6
2003	R	104	20	8	No	69.5	7	-1	6	104	R	6	8	7
2005	R	101	20	5	No	70.3	8	+1	8	88	3	4	4	10
1999	R	97	17	5	*B	70.5	7	+1	7	97	6	6	6	0
2009	P1	116	20	8	No	68.9	8	0	6	102	R	5	8	8
2010	P1	106	20	7	No	70.8	7	0	8	89	R	5	4	8
2009	S2	97	17	6	*B	68.6	7	+1	8	88	R	4	8	5

Quality Markets																
	Suitability as 2nd cereal 1-9 poor-good	Distilling	Biscuit uks	Bread	Specific weight kg/hl	Hagberg falling number	Maturity days	Straw strength 1-9	Straw length cm	Resistance to sprouting 1-9	Mildew	Yellow rust	Septoria nodorum	Septoria tritici	Net Blotch	Diversification Group
2007	R	3	Poor	Poor	75.9	159	+1	7	88	5	5	2	7	6	6	2b
2004	R	6	Good	Poor +	78.3	206	+2	6	97	5	5	9	7	5	5	1
2006	R	4	Medium	Poor +	77.5	242	+2	7	95	6	7	9	7	7	7	1
2003	R	2	Medium	Good +	76.8	204	+1	7	91	5	6	2	7	6	6	2b
2003	R	6	Poor	Poor	77.6	265	0	6	89	6	6	5	6	5	5	2a
2004	S	6	Poor	Poor	79.4	305	-2	8	83	6	6	6	5	5	3	3
2002	S	6	Poor	Poor	78.0	266	0	8	97	7	4	4	5	5	5	2b
2009	P2	4	Good	Poor +	76.3	183	+1	7	85	(4)	6	4	8	6	6	2b
2010	P1	5	Good	Poor	75.9	158	0	9	82	-	5	9	5	5	5	1
2009	P2	7	Medium	Poor +	75.2	173	+1	7	88	(5)	6	9	8	5	5	1
2009	P2	8	Poor	Poor	78.6	282	-2	9	80	(5)	7	7	6	6	3	3
2010	P1	4	Medium	Good +	75.5	237	+3	7	93	-	6	8	7	6	-	-
2009	PS1	6	Poor	Poor	77.7	294	-2	7	86	(6)	6	4	5	5	5	2b

WINTER WHEAT (100 = 10.7 t/ha, 86 cwt/acre)																	
2007	R	106	26	3	Poor	Poor	75.9	159	+1	7	88	5	5	2	7	6	2b
2004	R	101	22	6	Good	Poor +	78.3	206	+2	6	97	5	5	9	7	5	1
2006	R	100	17	4	Medium	Poor +	77.5	242	+2	7	95	6	7	9	7	7	1
2003	R	100	26	2	Medium	Good +	76.8	204	+1	7	91	5	6	2	7	6	2b
2003	R	99	17	6	Poor	Poor	77.6	265	0	6	89	6	6	5	6	5	2a
2004	S	96	21	6	Poor	Poor	79.4	305	-2	8	83	6	6	5	5	3	3
2002	S	95	21	6	Poor	Poor	78.0	266	0	8	97	7	4	5	5	5	2b
2009	P2	104	17	4	Good	Poor +	76.3	183	+1	7	85	(4)	6	4	8	6	2b
2010	P1	103	25	5	Good	Poor	75.9	158	0	9	82	-	5	9	5	5	1
2009	P2	102	18	7	Medium	Poor +	75.2	173	+1	7	88	(5)	6	9	8	5	1
2009	P2	101	16	8	Poor	Poor	78.6	282	-2	9	80	(5)	7	7	6	3	3
2010	P1	100	18	4	Medium	Good +	75.5	237	+3	7	93	-	6	8	7	6	-
2009	PS1	96	22	6	Poor	Poor	77.7	294	-2	7	86	(6)	6	4	5	5	2b

Colour code														
Tends to be good														
Intermediate														
Tends to be poor														
Poor														
R = Recommended for general use														
S = Specific use variety														
P = Provisional														
O = No longer in trial, becoming outclassed														
‡ As assessed by the Mating Barley Committee														
* Approved as a matting variety														
(*1) Provisionally Approved as a matting variety														
uks + See thumbnail sketch for export potential														

The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)

SPRING OATS (100=7.5 t/ha, 60 cwt/acre)

		UK Grain yield as a % of fungicide treated controls	Yield loss if untreated %	% Kernel content	Screenings %<2.0mm	Specific weight kg/hi	Maturity days + later -earlier than average	Straw strength 1-9 weak-strong	Straw length cm	Crown Rust 1-9	Mildew 1-9
2008	R	Husky	100	76.1	0.2	54.5	-2	8	114	4	7
2007	R	Atego	100	74.5	0.2	52.8	-1	6	109	6	3
2000	R	Firth	97	77.2	0.2	53.6	+1	6	110	5	7
2007	R	Leven	94	78.5	0.1	53.8	-2	8	112	5	7

WINTER OATS (100=8.3 t/ha, 66 cwt/acre)

2003	O	Dalguise	100	75.6	0.2	54.6	-2	4	122	3	3
1993	R	Gerald	99	72.7	0.3	53.2	+1	6	120	4	3
2004	R	Mascani	99	78.3	0.2	54.5	0	6	118	8	6
2010	P1	Balado	108	73.6	0.8	51.3	+2	9	92	3	4
2007	P3	Tardis	103	72.8	0.3	49.8	-2	7	111	7	8

SPRING WHEAT (100 = 7.4 t/ha, 59 cwt/acre)

		Nabim Group	Hegberg falling number	Specific weight	Maturity days	Straw strength 1-9	Straw length cm	S. tritici	Mildew
2003	R	Tybalt	2	277	0	(3)	84	6	8
2001	R	Ashby	2	285	+1	7	87	5	7
1999	R	Paragon	1	290	0	6	93	6	7

Colour code

Good

Tends to be good

Intermediate

Tends to be poor

Poor

R = Recommended for general use
 S = Specific use variety
 P = Provisional
 O = Becoming outclassed

The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)