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Scotland's Rural College

SAC Cereal Recommended List for 2011

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SAC Cereal Recommended List for 2011



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.

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, indicating its first (P1) or second (P2) year. Varieties that do not merit a UK recommendation but have a specific use are given S. New varieties may also be given a provisional specific use (PS). In the Tables on pages 23-25, 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 crop specialists 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. 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.

Grain whisky production also uses high enzyme malted barley: sourced from Scotland. Decanter has been the benchmark variety for some time, but its use has significantly declined. Belgravia and Forensic have full IBD Approval for this market.

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.

HGCA promotes two export brands to assist foreign millers and bakers in recognising the characteristics of UK varieties. **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 (*Triticum aestivum*).

Some varieties of wheat are susceptible to poor seed set or ear sterility. Although the precise cause is unknown, evidence from SAC research implicates frosty conditions during ear development, or at flowering. The risk to vulnerable varieties increases in seasons when forward crops are exposed to late frosts. Early sowing, a fast speed of development and warm weather in early spring will contribute to forward growth.

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 Approval lists for brewing and distilling (see Tables).

In 2010, the Scotch Whisky Association stated that it will only support potential candidate varieties that are non-producers of GN such as the varieties Concerto, Belgravia, Forensic and Oxbridge. This stance is an important aspect of long-term product protection. Established low-producers of GN such as Optic will continue to be used by distillers, but potential candidates of this type will not be supported in future.

In the Table on page 23, new malting recommendations are indicated as under test for IBD Approval (*T*). Stage 1 Provisional IBD Approval (*P*₁) is based on satisfactory micro-malting or lab results. A variety is moved to Stage 2 Provisional IBD Approval (*P*₂) if the initial commercial scale tests are satisfactory. Full IBD Approval (*F*) is based on a minimum number of satisfactory commercial scale tests.

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 is not generally 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 on the SAC RL.

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).

The presence of different *Rhynchosporium* populations in Scotland impacts on the susceptibility of winter barley varieties in different regions. In these circumstances, varieties with good or moderate resistance can sometimes develop high levels of disease. Varieties of winter barley susceptible to mildew, yellow rust, brown rust, *Rhynchosporium*, net blotch or *Ramularia* leaf spot 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. Pathogen resistance to strobilurin (QoI) fungicides and erosions in efficacy of some azole (DMI) fungicides mean that varietal resistance is becoming more important to manage this disease: Stigg (rated 8), Alchemy, Gravitas and Tuxedo (rated 7) are the most resistant of the fully 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. The risk of spread of yellow rust is low where DG1 varieties such as Alchemy, Beluga, Cassius, Istabraq, Stigg or Tuxedo, are grown together or with any one other recommended variety. The risk is high if Cordiale and Grafton (both DG3) are grown together, but there is a low risk of spread where either of these varieties is grown next to Oakley, Viscount, Robigus, Einstein, Gallant or Solstice. There is an especially high risk of spread where DG2b varieties are grown together, these are Oakley, Robigus, Solstice and Viscount.

Barley mildew:

Varieties in DG0 (Cassata, KWS Cassia, Element, Escadre, Florentine, Pearl, 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 are effective at limiting the potential of an epidemic.

Varieties in Diversification Group 1 (Belgravia, Moonshine, NFC Tipple, Propino, Publican, Shuffle, 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 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.

CEPHALOSPORIUM LEAF STRIPE

Cephalosporium leaf stripe can affect wheat, barley and oats, but it is most common in winter wheat. Recent HGCA research has shown varietal differences to this disease, which is most damaging to yield in continuous cereal cropping where straw is incorporated into the soil. Grafton, Gallant and Viscount demonstrate good resistance against this emerging disease threat, whilst Alchemy and Einstein are more susceptible to developing symptoms. Although no longer on the list, Consort also shows good resistance to this disease.

TAN SPOT

In 2010, Tan spot was identified in wheat crops in East Lothian. This disease is uncommon but the cold winter and mild spring in 2010 were conducive to the development of tan spot. Einstein showed most symptoms of the disease, whilst Oakley, Viscount, Robigus, Gallant and Cordiale showed few symptoms.

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* leaf spot 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 Scotland 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.

RAMULARIA LEAF SPOT

Ramularia leaf spot has been common on several varieties in the last decade causing yield loss and high screenings. Symptoms appear 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, succinate dehydrogenase inhibitors (SDHIs), chlorothalonil) are applied at the boot stage before ear emergence. 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, *Ramularia* leaf spot has also 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. Varieties have been categorised for their resistance to leaf spots (see thumbnail sketches)

BARLEY MILD MOSAIC VIRUS

The 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 Volume, Element, Retriever, Escadre, KWS Cassia, Florentine, Sequel and Cassata.

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. Bere barley will also be at risk. Triticale poses the highest risk, as do infertile secondary tillers. Grass-margins, grass weeds, set-aside and contaminated seed are potential sources of ergot.

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, Viscount, Gravitass and Denman 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

SHUFFLE (Syngenta Seeds Ltd.)

A new provisional recommendation under test for malt distilling and brewing. It is a non-producer of GN. Its yield is a clear improvement on both Optic and Concerto. Although rather tall its straw is provisionally rated as very stiff. Maturity is a little later than Optic, but brackling resistance is excellent. Mildew resistance is good, whilst Rhynchosporium resistance is moderate. Preliminary results indicates that it performs equally well across a wide range of sowing dates and soil textures.

CONCERTO (Limagrains Europe)

A full recommendation with IBD Approval for malt distilling and brewing. It is high yielding, though some trials results in 2009 were disappointing. As a GN non-producer it meets the requirements of distillers. It has produced high malt extract and spirit yield in tests and commercial bulks. Its market share will increase significantly for harvest 2011. In some trials its grain nitrogen has been lower than Optic. Screening levels are low. It is a relatively tall variety and matures later than average. Straw stiffness is a little below Oxbridge and Optic and

brackling resistance is average. Resistance to mildew is good but it is vulnerable to Rhynchosporium giving it a below average rating for green leaf area retention. Concerto is more suited to early sowing and medium or heavier textured soils.

MOONSHINE (RAGT Seeds Ltd.)

A new provisional recommendation under test for malt distilling and brewing. It is a non-producer of GN. Micro-malting tests have also indicated a potential use for grain distilling because of its high enzyme levels. It is not as high yielding as Shuffle, but has the advantage of early maturity. Straw strength is provisionally rated as weaker than average. Resistance to brackling is average. Mildew resistance is good, but it is vulnerable to Rhynchosporium. Initial results indicate relatively good performance on lighter textured soils.

OPTIC (Syngenta Seeds Ltd.)

Fully recommended with 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 2010 was above 40%, indicating distilling industry support for a variety that has shown reliability in grain quality over several challenging seasons. Its tendency to low nitrogen is attractive to distillers. Mildew resistance is poor especially at the seedling stage and 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 has been towards later maturity. Brackling or necking can be a problem in a delayed harvest and this contributes to a low 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.

IBD support for distilling only

FORENSIC (Syngenta Seeds Ltd.)

A fully recommended variety on the HGCA RL, but remains provisionally approved on the SAC list. It has full IBD Approval for grain distilling and is a GN non-producer. It may have some use in malt distilling and results from micro-malting tests have been comparable with varieties that have been used for brewing. Compared to other grain distilling varieties, it tends to be a low accumulator of nitrogen. This means growers will need to manage fertiliser inputs if a high nitrogen specification is required. It has short straw with good resistance to brackling. Forensic is very weak for mildew and 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 East Scotland and less well in the West.

PUBLICAN (Syngenta Seeds Ltd.)

A full recommendation with IBD Approval for malt distilling. It also has characteristics to suit brewing, though its overall market share has been low. The variety is becoming outclassed, and malting intake for 2011 is expected to decline. Like Optic, it is classed by distillers as a low GN producer. Its yield is just below Concerto and Forensic. It has good resistance to mildew but low ratings

for yellow and brown rust. Although its rating for *Rhynchosporium* is good, limited evidence indicates the disease can appear late season if disease pressure is high. Screening losses are low. It is later than Optic. Straw length and strength are average. It yields relatively better on lower fertility sites.

BELGRAVIA (Limagrain Europe)

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* leaf spot, and has very good green leaf area retention and only a small yield penalty if untreated. Straw is tall with average strength. Trials indicate it is favoured by early sowing.

OXBRIDGE (Limagrain Europe)

Fully recommended with IBD Approval for malt distilling. Although this variety has excellent distilling potential its intake quality and processing have been let down by weather related problems; including rejections for skinning and pre-germination, especially during a wet harvest. Its low grain nitrogen will increase if yields are disappointing. It has fared better in the north and north-east compared to the south. Its market share peaked in 2007 and 2008. This variety has become outclassed and it is important to check with your buyer to ensure you have a market. It is unlikely to be used for brewing or grain distilling. Low screenings have attracted some support for pearling. 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 has been better suited to early sowing.

IBD support for brewing only

PROPINO (Syngenta Seeds Ltd.)

A provisional recommendation with IBD Provisional Approval for brewing. As a low GN producer it does not meet the requirements for new varieties destined for distilling use. It may be acceptable for pearling. It is very high yielding, with a good untreated yield. Screening levels are low. Apart from the rusts, disease resistance is good. It has stiff straw and good resistance to brackling. There is provisional evidence that it is better adapted to early sowing and medium rather than lighter textured soils.

QUENCH (Syngenta Seeds Ltd.)

A full recommendation with IBD Approval for brewing. It does not qualify for distilling support as it fails to meet the requirement for limiting GN. To date, it has had a modest share of the English brewing market, which is dominated by NFC Tipple. Although of limited malting appeal in Scotland, it retains its place as a high yielding variety with good agronomic features. 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.)

A full recommendation on the HGCA RL with IBD Approval for brewing. It has dominated the brewing intake in England, but the Scottish market for brewing only varieties is small and other varieties such as Propino are much higher yielding. This means the variety is becoming outclassed in Scotland and growers should consult with their buyer to ensure a market. 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. It suits a wide range of growing conditions, but especially higher yielding sites.

Feed varieties

WAGGON (Syngenta Seeds Ltd.)

A fully recommended very high yielding feed variety. In some years samples are also acceptable for pearling. It is very susceptible to Rhynchosporium 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 and 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 maintains its yield over a range of situations with evidence for good performance where sowing is delayed.

WESTMINSTER (Limagrain Europe)

A fully recommended variety with IBD Approval for brewing. Its English brewing purchases have been a few percent since its peak of 8% in 2007 and 2008. Its main use in Scotland is as a tall feed variety. It has good disease resistance to both mildew and Rhynchosporium, with a relatively small response to fungicide and good green leaf area retention. These resistances may contribute to its late maturity. It has showed ergot symptoms in inoculated tests. It has potential for whole-crop and may be bought for pearling. It maintains its yield over a range of conditions with relatively good performance at lower potential sites.

WINTER BARLEY

IBD support for brewing

CASSATA (Limagrain Europe)

A full recommendation as a specialist brewing variety, with IBD Approval. It is used as one of only two malting winter barleys sourced in Scotland. 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 leaf spot: it is very vulnerable to yellow rust. RL data suggests it is relatively stable across soil types, but performs relatively better on higher yielding sites. It benefits from being sown earlier than Pearl.

PEARL (Limagrain Europe)

A full recommendation with IBD Approval for brewing. It has been the UK's dominant malting winter barley for ten years, though the 2010 English intake was split three ways with Cassata and Flagon. Pearl has dominated the malting interest in South-East Scotland. In some seasons dormancy can limit its use. Although it is very tall for a two-row variety it has shown less lodging than expected. It is relatively late to mature and is susceptible to winter-kill. 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 leaf spot. It is susceptible to Rhynchosporium and net blotch. 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 and suits heavier soil types.

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, though screenings are relatively high. It is tall with a modest rating for lodging resistance. A robust growth regulator programme is advisable to protect its high yield potential. It has no significant disease weaknesses and green leaf area retention is good. Resistance to Ramularia leaf spot is about average. It has resistance to BaMMV. Like other hybrids, it is less well adapted to the heavier textured soils and suits a wide range of sowing dates.

ELEMENT (Syngenta Seeds Ltd.)

A provisional recommendation. This hybrid six-row has a very high yield and a specific weight similar to Volume, but much lower screenings. It is a little taller than Volume and carries the same caution about protecting a weak straw when yield potential is high. It is very earlier and resistant to BaMMV. It is weak for brown rust and relatively good against yellow rust, but otherwise moderate for disease resistance. Preliminary results indicate it suits a range of sowing dates and higher yielding sites.

ESCADRE (KWS UK Ltd.)

A provisional recommendation. This non-hybrid variety has a clear yield improvement over Sequel. It has a very good specific weight and low screenings. It is not as tall as the other six-rows, though straw strength is similar to other varieties. It is relatively weak against mildew, brown rust and Ramularia leaf spot, but otherwise has good disease resistance. Preliminary results indicate it is less well suited to heavier textured soils.

SEQUEL (Syngenta Seeds Ltd.)

This fully recommended six-row variety retains its place because of its high specific weight, though screening losses are rather high. Bold samples may be accepted for pearling. It has tall rather weak straw, but is early maturing and resistant to BaMMV. Resistance to brown rust and Ramularia leaf spot is only moderate. It yields relatively better in North-East Scotland. Its yield on heavy soils

can be disappointing, but otherwise it is fairly stable across sowing dates, rotation and site yield potential.

Two-row feed varieties

RETRIEVER (Sejet, Denmark/Limagrain UK)

This full recommendation has produced outstanding yields that challenge the six-row varieties, but its market share has not grown to match its yield. In some trials it 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. A high yield loss if untreated reflects vulnerability to mildew, net blotch, Ramularia leaf spot and lodging. It has poor 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 good when sown on lighter textured soils.

KWS CASSIA (KWS UK Ltd.)

A provisional recommendation with many of Saffron's features, plus 5% higher yield. 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 and Ramularia leaf spot resistance and is resistant to BaMMV. It yields relatively better on high fertility sites and in North-East Scotland.

FLORENTINE (Senova)

A new provisional recommendation. Its North region yield is equal to KWS Cassia. It has a good specific weight, very stiff straw and is earlier than Saffron or KWS Cassia. It has no significant disease weaknesses, but can show moderate levels of Ramularia leaf spot. It is resistant to BaMMV. Preliminary results indicate that yields are relatively good on high yielding sites, but not on heavy textured soils.

SAFFRON (KWS UK Ltd.)

This fully recommended two-row feed variety is becoming outclassed for yield 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 does however show good resistance against Ramularia leaf spot. It is rather late. It is more suited to high potential soils especially after a break crop.

WHEAT

Soft textured varieties preferred by the distilling industry

VISCOUNT (KWS UK Ltd.)

This full 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 dough 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 is now vulnerable to yellow rust 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; note that 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.

BELUGA (Senova Ltd.)

This provisional recommendation is rated good for distilling. As a nabim Group 4 variety it is unlikely to be used for biscuit-making. It is provisionally listed for export as a **uks** variety but will be limited by its very low Hagberg falling number, which adds to concern about its sprouting risk in a wet harvest. Its yield loss when untreated with fungicide is mainly due to mildew, Septoria tritici and very low resistance to brown rust. It is resistant to yellow rust making it a very useful partner alongside more susceptible varieties. Eyespot resistance is above average. Its straw is short and very stiff. There are indications that it has done relatively better on heavier soils probably helped by its very stiff straw.

GRAVITAS (Limagrain Europe)

A new provisional recommendation in nabim Group 4 with a medium rating for distilling. It is provisionally listed for export as a **uks** variety. Its specific weight is intermediate and Hagberg relatively good for this Group. Its yield is at the Viscount level. Straw strength is weak, but response to PGR is very good. Its disease resistance profile is better than average including good resistance to Septoria tritici. Its yellow rust resistance tends to be good, but as yet it is unclassified for a DG. It has resistance to orange blossom midge. Maturity is later than average, but similar to Alchemy. Its yield is relatively better as a first cereal and on heavier soils.

DENMAN (Syngenta Seeds Ltd.)

A new provisional recommendation in nabim Group 4 with a good rating for distilling. It is provisionally listed for export as a **uks** variety suitable for blending. Its specific weight is fairly low, but Hagberg is above average for this Group. Its yield is at the Viscount level. Like Gravitas, its straw strength is weak, but response to PGR is very good. This variety is relatively early maturing. Its disease resistances tend to be intermediate, though brown rust resistance is poor. It has resistance to orange blossom midge. Its yield is relatively better on heavier soils.

ISTABRAQ (Limagrain Europe)

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. It has a high specific weight. It is no longer in yielded trials and has become outclassed by newer varieties. Its 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 making it a very useful partner to all other varieties. Maturity is relatively late. It does not suit early sowing because of its fast speed of development and relatively low vernalisation requirement. It has tended to perform better in the South-East than North-East of Scotland, and is less well suited to high yielding sites. Of the recommended distilling varieties, it yields relatively well when grown as a second cereal.

ALCHEMY (Limagrain Europe)

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 yield loss when untreated is still relatively low, which reflects good resistance to the normal foliar disease threats in Scotland, though brown rust is a weakness. It retained its excellent resistance to yellow rust making it a useful partner to all other varieties. Straw strength is average and maturity is a little later than average. Late sowing should be avoided, because its speed of development is slow. It performs relatively better if sown after a break crop and at sites of high yield potential.

Soft textured varieties for distilling and with biscuit making quality

ROBIGUS (KWS UK Ltd.)

A full recommendation in nabim Group 3. 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 remains 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 vulnerable to 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. It does not suit early sowing because of a fast speed of development and a relatively low vernalisation requirement.

TUXEDO (RAGT Seeds Ltd.)

A new provisional recommendation in nabim Group 3. It has potential for biscuit making and a medium rating for distilling. It has provisional support as a **uks**

blending variety for export but its specific weight is rather low. Its Hagberg is well above the average for this Group. Yield and maturity are similar to Robigus and straw stiffness is above average, with a good response to PGR. Its disease resistances are an improvement on Robigus, with good resistance to *Septoria tritici* and yellow rust.

INVICTA (Limagrain Europe)

A provisional recommendation 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 is relatively weak against mildew and eyespot. Its yellow rust rating is good. Straw strength is similar to Robigus but it has a better response to PGR. Its maturity is later than other recommendations in Group 3. It underperforms as a second cereal. Intermediate sowing dates are preferable and avoid very late conditions.

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. 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 also carries low ratings for mildew, eyespot and Fusarium resistance. It has resistance to wheat orange blossom midge. It is a relatively slow developer but average straw strength and susceptibility to eyespot limit its suitability for early sowing. It has yielded relatively well on high potential sites where it benefits from robust disease and lodging protection.

GRAFTON (KWS UK Ltd.)

A full recommendation. As a hard endosperm in nabim Group 4 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 also early maturing and exceptionally stiff with very good eyespot resistance. Fusarium and brown rust resistances are rated poor. There are indications that it yields well in North-East Scotland and on heavy sites where its stiff straw is an advantage. It is well suited to early sowing because of its slow speed of development, very stiff straw good eyespot resistance. It shows good resistance to *Cephalosporium* leaf stripe and it competes very well against most other varieties when grown as a second cereal. It could be a robust low-input variety for whole-crop especially as its yield is relatively higher in the wetter West.

EINSTEIN (Limagrain Europe)

This fully recommended hard endosperm variety is a standard nabim Group 2 for bread-making. Although at the lower end of Group 2 quality, it is widely accepted by millers. It has export use as a **ukp** variety. Specific weight and Hagberg are moderately high but not as high as Cordiale. Resistance to sprouting is relatively

good. Lodging, especially early root lodging, in recent seasons has downgraded its rating to a disappointing six. It does respond to PGR, but this needs to be applied early. It has moderate all round disease resistance with Septoria tritici and tan spot resistance tending to the weak. It is only moderate for yellow rust. 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.

STIGG (Limagrain Europe)

A new provisional recommendation. This hard endosperm feed variety has excellent disease resistance ratings, including an 8 rating for Septoria tritici. These benefits tend to compromise its yield, so consider this as a specialist variety, with potential for reducing inputs. It may be suitable in less accessible fields, since fungicide inputs will be lower, compared to other varieties. Its average straw strength responds well to PGRs. Maturity is the same as Oakley.

GALLANT (Syngenta Seeds Ltd.)

Classified as special variety in Scotland because of its vulnerability to ear sterility. This fully recommended bread-making variety is in nabim Group 1 and along with Solstice is a preferred millers choice. It is listed as a **ukp** variety with a very good Hagberg falling number, moderately high specific weight and good Chopin figures. Its North region yield is slightly down on its UK average, but good protein levels suggest it has good nitrogen scavenging ability. It has rather low ratings for foliar disease and it is vulnerable to yellow rust with a rating of 5. Straw strength is average and it is early maturing. A fast speed of development and vulnerability to ear sterility mean that early sowing should be avoided, as should sites prone to late frosts. It shows good resistance to Cephalosporium leaf stripe and yields well when following a cereal and suits heavier soils.

CORDIALE (KWS UK Ltd.)

Classified as special variety in Scotland because of its vulnerability to ear sterility. This fully recommended bread-making variety is the preferred nabim Group 2 variety by millers. 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 shows good resistance against Cephalosporium leaf stripe and provides a useful choice as a second cereal and suits heavier soils. Is it a relatively fast developer and should not be sown too early.

SOLSTICE (Limagrain Europe)

This fully recommended variety in nabim Group 1 is a preferred millers choice for bread-making. It is **ukp** listed and can 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. It performs relatively well as a second cereal and its stiff straw is suited to 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 wheat

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 / Limagrain UK)

A fully recommended nabim Group 2 variety. As a very high yielding variety protein levels can become diluted, typically 1.3% below Paragon. Additional nitrogen may be required to meet protein specifications. Specific weight is low. Failure to meet protein and specific weight specifications is a common cause of rejection for milling. It has a low rating for straw strength, principally based on weakness when autumn sown. Resistance to sprouting tends to be good.

ASHBY (KWS UK Ltd.)

A fully recommended nabim Group 2 variety. Its spring-sown yield is much lower than Tybalt's, though its protein, specific weight and Hagberg falling number are much better. It has no significant agronomic weaknesses. It has a relatively stiff straw and is later maturing than Paragon.

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 5% lower yielding than Solstice, but with better protein. When spring-sown, its yield is 11% below Tybalt. It has no significant agronomic weaknesses.

SPRING OATS

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

A new provisional recommendation. Its preliminary yield average is very good, but with considerable seasonal variation. It has moderate kernel content and specific weight. Although very tall, its provision rating for lodging resistance is good. It also has the best variety rating for mildew resistance. As with all new varieties it can take time for a market position to develop.

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

A fully recommended variety. Its yield has been erratic, though on average just above Firth. It is above Firth in specific weight but below for kernel content. Growers should check with their buyer to ensure a market. Provisionally its big bold grains and mill yield are positive features but de-hulling may present challenges. Early maturity and stiff straw with good mildew resistance look promising, but in some areas vulnerability to crown rust will be important.

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

A full recommendation. Kernel content and specific weight are low, though the variety mills well with a good hull to kernel ratio and good de-hulling. It is very weak for mildew and has moderate straw strength, but is early maturing.

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

A fully recommended variety well known for its reliability in agronomic characters and quality. 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. It has maintained a dominant position in seed area. It had disappointing yields in trials 2009, but performed very well in 2010. Its resistance to mildew tends to be good. In some seasons it can show a tendency to free-shell; reducing the drum speed should alleviate this problem.

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 on page 25 are UK yields.

BALADO (IBERS, Aberystwyth/Senova Ltd.)

This provisional recommendation is a semi-dwarf, with a yield 9% above Gerald. It has attracted milling interest despite a low kernel content. 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.

DALGUISE (Senova Ltd.)

This variety remains in the outclassed category with a sharply declining seed area, though it retains some strong milling support with good colour, size and specific weight. Scottish yields have been erratic. It is very tall and has weak straw. On some sites lodging has reached high levels, indicating a high risk if PGR is omitted. It is early ripening and together with its long straw is valued by growers not aiming for the PGR-free market. Crown rust and mildew resistance are very weak.

GERALD (IBERS, Aberystwyth/Senova Ltd.)

A fully recommended variety. Popular with growers and acceptable to millers despite a low kernel content. It maintains its yield rather better in Scotland than Dalguise, especially in the absence of PGR, though its straw strength is only a little better than Dalguise. Resistances to mildew and crown rust are weak.

MASCANI (IBERS, Aberystwyth/Senova Ltd.)

A full recommendation for its very high milling potential, based on excellent kernel content, high specific weight and low screenings. It is also relatively free of discoloration. Although its yield average is similar to Gerald, its performance has been disappointing in Scottish trials. It has moderate resistance to mildew. A very good resistance rating for crown rust, may be offset by a new race, though so far infection levels have been low.

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 South-West 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 is rather late.

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

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 has under-performed in the West.

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

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

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 recommended list.

For further information consult your local SAC Farm Business Services Office or the Crop & Soil Systems Research Group/Crop Clinic, West Mains Road, Edinburgh EH9 3JG.

SAC RECOMMENDED LIST FOR CEREALS 2011

SPRING BARLEY (100 = 7.2 t/ha)

| Year First Listed | Grain yield % treated Control | Yield loss if untreated % | Use B=brewing, D=distilling, GD=grain distilling | IBD Malting Approval† | Screenings <2.5 mm % | Specific weight kg/hl | Resistance to ear loss 1 to 9 | Maturity days +/- Optic | Straw strength weak-strong 1 to 9 | Straw length cm | Brackling risk 1 to 9 high-low | Disease resistance 1 susceptible to 9 resistant | | Green leaf area retention 1 to 9 | Diversification group‡ |
|-------------------|-------------------------------|---------------------------|--|-----------------------|----------------------|-----------------------|-------------------------------|-------------------------|-----------------------------------|-----------------|--------------------------------|---|----------------|----------------------------------|------------------------|
| | | | | | | | | | | | | Mildew | Rhynchosporium | | |
| 2010 | P2 | 107 | B | P ₁ | 3.3 | 66.9 | 7 | 0 | 8 | 76 | 8 | 8 | 7 | 6 | 1 |
| 2005 | R | 107 | Feed | No | - | 67.4 | 7 | -1 | 8 | 73 | 8 | 9 | 3 | 7 | 1 |
| 2011 | P1 | 106 | B & D | T | [3.6] | 66.9 | [7] | +1 | [9] | 77 | 9 | 8 | 6 | [5] | 1 |
| 2007 | R | 105 | B | F | 4.9 | 67.7 | 8 | 0 | 8 | 70 | 8 | 9 | 8 | 6 | 1 |
| 2009 | R | 103 | B & D | F | 3.4 | 68.0 | 7 | +1 | 6 | 77 | 7 | 8 | 4 | 5 | 1 |
| 2009 | P3 | 103 | GD | F | 4.1 | 66.9 | 7 | 0 | 6 | 71 | 8 | 4 | 5 | 4 | 0 |
| 2005 | O | 103 | B | F | 4.1 | 68.2 | 8 | 0 | 7 | 68 | 8 | 8 | 4 | 7 | 1 |
| 2011 | P1 | 102 | B & D | T | [3.5] | 67.1 | [7] | -1 | [6] | 71 | 7 | 8 | 4 | [8] | 1 |
| 2007 | O | 102 | D | F | 3.3 | 68.5 | 6 | +1 | 7 | 74 | 7 | 9 | 8 | 5 | 1 |
| 2008 | R | 101 | D & GD | F | 4.3 | 68.3 | 7 | +1 | 7 | 76 | 7 | 9 | 7 | 8 | 1 |
| 2005 | R | 99 | Feed | F | 3.6 | 69.8 | 7 | +1 | 6 | 82 | 6 | 9 | 8 | 8 | 1 |
| 1995 | R | 97 | B & D | F | 5.3 | 69.7 | 6 | 0 | 7 | 75 | 5 | 5 | 4 | 6 | 0 |
| 2005 | O | 96 | D | F | 3.2 | 69.4 | 7 | 0 | 8 | 73 | 8 | 7 | 7 | 6 | 14 |

WINTER BARLEY (100 = 9.0 t/ha)

| Year First Listed | Grain yield % treated Control | Yield loss if untreated % | Suitability to lighter soils | IBD Malting Approval† | Screenings <2.5 mm % | Specific weight kg/hl | Resistance to ear loss 1 to 9 | Maturity days +/- Pearl | Straw strength weak-strong 1 to 9 | Straw length cm | BaMMV R-resistant | Disease resistance 1 susceptible to 9 resistant | | Net Blotch | Diversification group‡ |
|-------------------|-------------------------------|---------------------------|------------------------------|-----------------------|----------------------|-----------------------|-------------------------------|-------------------------|-----------------------------------|-----------------|-------------------|---|----------------|------------|------------------------|
| | | | | | | | | | | | | Mildew | Rhynchosporium | | |
| 2009 | P2 | 112 | Good | No | 13.6 | 68.7 | 8 | -2 | 6 | 101 | R | 7 | 8 | 7 | 0 |
| 2011 | P1 | 112 | Good | No | 5.8 | 68.2 | [6] | -3 | 6 | 103 | R | 6 | 7 | 7 | 0 |
| 2007 | R | 108 | Good | No | 14.7 | 66.5 | 8 | -1 | 6 | 83 | R | 6 | 7 | 5 | 0 |
| 2011 | P1 | 106 | Good | No | 7.9 | 69.7 | [7] | -2 | 6 | 98 | R | 5 | 8 | 8 | 0 |
| 2010 | P2 | 103 | Moderate | No | 4.8 | 70.6 | 7 | 0 | 8 | 88 | R | 5 | 4 | 8 | 0 |
| 2011 | P1 | 103 | Moderate | No | 6.5 | 68.4 | [7] | -1 | 9 | 87 | R | 6 | 8 | 7 | 0 |
| 2003 | R | 102 | Moderate | No | 13.0 | 69.3 | 7 | -2 | 6 | 102 | R | 6 | 8 | 7 | 10 |
| 2005 | R | 97 | Moderate | No | 5.6 | 70.2 | 8 | 0 | 8 | 88 | | 3 | 4 | 8 | 10 |
| 1999 | R | 94 | Moderate | F | 4.1 | 70.3 | 7 | 0 | 7 | 97 | | 6 | 6 | 5 | 0 |
| 2009 | S | 95 | Moderate | F | 4.6 | 68.5 | 7 | 0 | 8 | 87 | R | 4 | 8 | 5 | 0 |

Good
 Tends to be good
 Tends to be poor
 Poor

| | | |
|--|---------------------------------------|--|
| R = Recommended for general use | S = Specific use variety | F = IBD Full Approval |
| P ₁ , P ₂ or P ₃ = Provisional year of recommendation | † Institute of Brewing and Distilling | P ₁ , or P ₂ = IBD Provisional Approval Stage 1 or 2 |
| O = Becoming outclassed | T = Under test as a malting variety | - Insufficient information |

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

SAC RECOMMENDED LIST FOR CEREALS 2011

WINTER WHEAT (100 = 10.6 t/ha)

| Year First Listed | Grain yield % treated control | Yield loss if untreated % | Suitability as a 2nd cereal | Quality Markets | | | Specific weight kg/hl | Hagberg falling number | Maturity days +/- Solstice | Straw strength 1 to 9 | Straw length cm | Resistance to sprouting 1 to 9 | Mildew | Yellow rust | Septoria nodorum | Septoria tritici | Diversification Group† |
|-------------------|-------------------------------|---------------------------|-----------------------------|-----------------|---------------|-------------|-----------------------|------------------------|----------------------------|-----------------------|-----------------|--------------------------------|--------|-------------|------------------|------------------|------------------------|
| | | | | Distilling | Biscuit uks + | Bread ukp + | | | | | | | | | | | |
| 2007 | R | Oakley | 106 | 23 | Poor | Poor | Poor | 75.7 | 155 | +1 | 7 | 87 | 6 | 6 | 7 | 5 | 2b |
| 2009 | R | Viscount | 104 | 15 | Good | Poor + | Poor | 75.9 | 173 | +1 | 7 | 84 | 4 | 7 | [9] | 5 | 2b |
| 2010 | P2 | Beluga | 104 | 20 | Good | Poor + | Poor | 75.4 | 152 | 0 | 9 | 82 | [4] | 5 | 5 | 5 | 1 |
| 2011 | P1 | Gravitas | [103] | 14 | Medium | Poor + | Poor | 76.5 | 211 | +2 | 5 | 92 | - | 6 | [7] | 7 | - |
| 2011 | P1 | Denman | [103] | 14 | Good | Poor + | Poor | 75.4 | 203 | 0 | 5 | 86 | - | 6 | [7] | 6 | - |
| 2004 | O | Istabraq | 102 | 18 | Good | Poor + | Poor | 78.2 | 204 | +3 | 6 | 96 | 5 | 5 | 7 | 5 | 1 |
| 2009 | R | Grafton | 102 | 13 | Very good | Poor | Poor | 78.5 | 278 | -2 | 9 | 79 | 5 | 7 | 6 | 6 | 3 |
| 2003 | R | Robigus | 101 | 27 | Very poor | Good + | Poor | 76.7 | 200 | +2 | 7 | 90 | 5 | 6 | 7 | 6 | 2b |
| 2011 | P1 | Tuxedo | [101] | 14 | Moderate | Good + | Poor | 74.7 | 267 | +2 | 7 | 86 | - | 6 | [9] | 7 | 1 |
| 2010 | P2 | Invicta | 100 | 16 | Poor | Good + | Poor | 75.3 | 235 | +3 | 7 | 93 | [6] | 6 | 7 | 6 | - |
| 2006 | R | Alchemy | 99 | 13 | Poor | Poor + | Poor | 77.2 | 236 | +2 | 7 | 95 | 6 | 7 | 7 | 7 | 1 |
| 2003 | R | Einstein | 99 | 15 | Good | Poor | Medium + | 77.5 | 263 | 0 | 6 | 88 | 6 | 6 | 6 | 5 | 2a |
| 2011 | P1 | Stigg | [97] | 5 | Moderate | Poor | Poor | 73.9 | 298 | +1 | 7 | 84 | - | 7 | [7] | 8 | 1 |
| 2009 | S | Gallant | 96 | 19 | Moderate | Poor | Good + | 77.6 | 295 | -2 | 7 | 86 | 6 | 5 | 5 | 5 | 2b |
| 2004 | S | Cordiale | 96 | 17 | Good | Poor | Medium + | 79.3 | 301 | -3 | 8 | 82 | 6 | 6 | 5 | 5 | 3 |
| 2002 | S | Solstice | 95 | 18 | Good | Poor | Good + | 77.9 | 256 | 0 | 8 | 96 | 7 | 4 | 5 | 5 | 2b |

Colour code Good Tends to be good Intermediate Tends to be poor Poor

| | | |
|---|----------------------------|--|
| R = Recommended for general use | S = Specific use variety | ‡ Disease risk can be reduced - see notes on pages 5 and 6 |
| P1, P2 or P3 = Provisional year of recommendation | [] = Limited data | O = Becoming outclassed |
| + See thumbnail sketch for export potential | - Insufficient information | |

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SAC RECOMMENDED LIST FOR CEREALS 2011

SPRING OATS (100=7.4 t/ha)

| Year first listed | | UK Grain yield % treated controls | Yield loss if untreated % | % Kernel content | Screenings %<2.0mm | Specific weight kg/hl | Maturity days +/- Firth | Straw strength 1 to 9 weak-strong | Straw length cm | Crown Rust 1 to 9 | Mildew 1 to 9 |
|-------------------|-----------|---|---------------------------------|---------------------|-----------------------|--------------------------|----------------------------|---|--------------------|-------------------------|------------------|
| 2011 | P1 Canyon | [106] | [11] | 75.1 | [0.5] | 53.4 | -2 | [8] | 117 | - | 8 |
| 2008 | R Husky | 99 | 13 | 76.5 | 0.2 | 54.0 | -3 | 7 | 109 | 4 | 7 |
| 2007 | R Atego | 99 | 20 | 74.4 | 0.2 | 52.0 | -3 | 6 | 102 | 6 | 3 |
| 2000 | R Firth | 98 | 11 | 77.0 | 0.2 | 52.6 | 0 | 7 | 104 | 5 | 7 |

WINTER OATS (100=8.3 t/ha)

| Year first listed | | UK Grain yield % treated controls | Yield loss if untreated % | % Kernel content | Screenings %<2.0mm | Specific weight kg/hl | Maturity days +/- Gerald | Straw strength 1 to 9 weak-strong | Straw length cm | Crown Rust 1 to 9 | Mildew 1 to 9 |
|-------------------|------------|---|---------------------------------|---------------------|-----------------------|--------------------------|-----------------------------|---|--------------------|-------------------------|------------------|
| 2010 | P2 Balado | 109 | [8] | 73.3 | 0.5 | 49.9 | 0 | 9 | 91 | 3 | 4 |
| 2003 | O Dalguise | 101 | [11] | 75.8 | 0.2 | 53.9 | -2 | 4 | 122 | 3 | 3 |
| 1993 | R Gerald | 100 | [5] | 72.8 | 0.3 | 52.6 | 0 | 5 | 119 | 4 | 3 |
| 2004 | R Mascani | 99 | [1] | 78.3 | 0.1 | 53.8 | -1 | 6 | 117 | 8~ | 6 |

SPRING WHEAT (100=7.1 t/ha)

| Year first listed | | UK Grain yield % treated controls | Yield loss if untreated % | nabim Group | Hegberg falling number | Specific weight kg/hl | Maturity days +/- Paragon | Straw strength 1 to 9 weak-strong | Straw length cm | Septoria tritici | Mildew 1 to 9 |
|-------------------|-----------|---|---------------------------------|-------------|---------------------------|--------------------------|------------------------------|---|--------------------|------------------|------------------|
| 2003 | R Tybalt | 106 | | 2 | 277 | 74.5 | [+1] | [3] | 81 | 6 | 8 |
| 2001 | R Ashby | 99 | | 2 | 289 | 76.8 | [+2] | 7 | 84 | 5 | 6 |
| 1999 | R Paragon | 95 | | 1 | 271 | 76.0 | 0 | 6 | 91 | 6 | 8 |

Colour code

Good

Tends to be good

Intermediate

Tends to be poor

Poor

| | |
|---|---|
| R = Recommended for general use | [] = Limited information |
| P1 or P2 = Provisional year of recommendation | - Insufficient information |
| O = Becoming outclassed | ~ A race of crown rust may affect Mascani |

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