Malting Barley Market Outlook

Jack Watts
Lead Analyst - Cereals & Oilseeds
AHDB Market Intelligence

Global Grains Production - predicted to break records this year

Source: USDA
As a result, prices move lower – particularly for maize.

Source: AHDB/HGCA

Global Maize S&D - a much needed surplus, but not out of the woods.

Source: USDA
Global Wheat S&D - persistent premiums to maize could undermine feed demand

Source: USDA

Global Barley S&D - uplift in production, but no major stock rebuild

Source: USDA
Year-on-year change in global barley availability from main suppliers

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (Mt)</th>
<th>Exports (Mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-28</td>
<td>+4.8</td>
<td>-0.3</td>
</tr>
<tr>
<td>Russia</td>
<td>+2.6</td>
<td>+0.3</td>
</tr>
<tr>
<td>Ukraine</td>
<td>+0.5</td>
<td>0</td>
</tr>
<tr>
<td>Canada</td>
<td>+1.4</td>
<td>+0.2</td>
</tr>
<tr>
<td>Argentina</td>
<td>-0.7</td>
<td>+0.7</td>
</tr>
<tr>
<td>Australia</td>
<td>+0.7</td>
<td>-0.4</td>
</tr>
</tbody>
</table>

Global production 2012/13: 129.5Mt; 2013/14 forecast: 142.8Mt
Total exports 2012/13: 19.5Mt; 2013/14 forecast: 19.1Mt

Source: IGC

EU Barley S&D – good export pace so far, but likely to slow down

Source: EU Commission
EU Malting Barley prices

Source: RM International

UK Situation
UK wheat production and demand - stocks, imports and alternative feed grains important

Source: AHDB/HGCA, Defra

UK barley production and demand - largest crop in 15 yrs = more feed demand / exports

Source: AHDB/HGCA, Defra
How are we dealing with the biggest barley crop in 15 years?

Barley usage (Jul-Nov)
- Brewing, distilling & malting
- GB feed compounders and IPU*
- Exports

Other key areas
- On farm feeding
- End season stocks
- Intervention

The geography of UK malting barley—strong distilling demand using more English barley

- Strong distilling demand
- Northern England moving toward spring distilling varieties
- E. Anglia typically in deficit, but looking at distilling demand
- South of England remains key for exports and regional ‘buffering’

Source: Defra, HMR&C

Source: AHDB/HGCA
Outlook

Five-year global outlook for barley - 1.8% average increase in production

Source: IGC
EU barley prospects for 2014 - forecast 8% drop in spring area could be useful

Source: Strategie Grains

Summary

- Grain prices are lower due to record global production this year
- However, recovery in global grain demand and strong EU exports have helped provide some support
- UK barley exports to non-EU countries are important to deal with the largest crop in 15 years - but face competition due to higher global production
- 2014 may provide better opportunities with lower EU/UK spring barley areas expected
Thank you

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Grain skinning: What can growers do to help hit malting specification?

Maree Brennan and Steve Hoad – SRUC Crop Science Team
Grain skinning & UK malting

Detachment of the barley husk (skinning) reduces malting efficiency
- wasted time coping with variability
- over-modification, loss of sugar to plant

The whole supply chain is affected:
Breeders →Growers→ Maltsters→ Brewers & Distillers

“Despair”
“Hassle”
“Extra work”
“Unbelievable”

What are we doing?

Helping industry to grow varieties with no physical defects

Variety Improvement – funded by BBSRC’s Crop Improvement Research Club
- Characterise varieties
- Grain structure and genetics
- Grain assessment and variety screening

Industry intelligence – funded by HGCA
- Industry samples and data
- Field screening tests
- Industry protocols
- Identify risk factors

From Dr Andy Bruce & Steve Hoad (SRUC)
Outputs so far...

- Development of variety screens for breeders
- Developing a new scoring protocol for industry
- Identifying risk factors to inform growers

Skinning weakness was evident in 2012

- Wide range of skinning (4% to 67%) recorded in field trial
- Many Recommended List varieties (*) performed poorly
- Dispelling industry myth that brewing varieties (▲) are resistant

from: Maree Brennan, Steve Hoad, Linda McCloskey and Kainsty Topp (SRUC)

from: Maree Brennan & Steve Hoad (SRUC) and Bill Thomas (JHI)
Screening for grain skinning

Controlled environment screens are being compared to help the industry identify resistant and susceptible varieties
- misting post-anthesis simulated a summer with wet and dry spells
- shading post-anthesis simulated low light and poor grain-filling (2012)

Tests for grain skinning

Grains must be subjected to mechanical force to distinguish varietal susceptibility to skinning (coded A to F)
In this test, hand-harvested ears were mechanically threshed for 5 or 20 seconds
Results from the misting screen

Varieties with larger grains are not more susceptible to skinning

Variatel differences must be caused by other factors

Identifying high- and low-risk varieties

Phenotypic expression among contrasting environments
- 2012 field trial at JHI, Dundee (poor grain filling)
- 2013 field trial at SRUC, Edinburgh (more typical season)
- Glasshouse post-anthesis misting screen (wetting and drying effect)

Test for significance of rank order among environments
- Kendall’s coefficient of concordance, $W$
High- and low-risk varieties

Skinning expressed relative to the population mean

The final order is based on the average rank across environments

\[ W = 0.525, \, P = 0.011 \]

Understanding the husk adhesion process

A lipid cementing layer is required for husk adhesion

The structure of this layer gives insight into varietal differences in husk-caryopsis adhesion
Have we found the glue?

Summary of findings so far ...

- Most current varieties had some weakness in 2012, a year of poor grain filling and a prolonged harvesting period
- Crops were much less susceptible in 2013, though weaker varieties skinned under SRUC under lab tests
- Skinning can be induced by repeated (prolonged) wet-dry spells
- Dispelled the myth that brewing varieties were less susceptible to skinning
- Variety and environmental influences on a glue-like material are being investigated

from: Maree Brennan & Steve Hoad (SRUC)
Industry engagement

- Industry requests to address grain skinning in malting barley
- HGCA-funded project ‘Supporting UK malting barley with improved market intelligence on grain skinning’, started October 2013
  - Identify varietal, regional, climatic and agronomic factors influences grain skinning
- Liaison with Scottish and English Micro-Malting Groups
- HGCA SRUC Agronomy Workshops 2014
- Field events e.g. Cereals in Practice
- SWRI activities e.g. Raw Materials KT Seminar, October 2013
- Ongoing discussions with BBSRC Crop Club barley breeders
- Engagement with AIC

What can growers do?

- It is too early to recommend a low risk variety, but some variety differentiation is emerging
- Follow the HGCA Project on ‘Supporting UK malting barley with improved market intelligence on grain skinning’
  - A variety guide to skinning will be an output from this project
- Ideally, grow more than one variety to reduce risk in a bad year
- Liaise with maltsters on revised thresholds in a difficult season
- Consider changes to combine settings to reduce abrasive/handling effects on weaker varieties
- Attention to plant health: Although too soon to confirm, avoidance of plant stress before flowering and during grain filling should help to offset any mismatch between husk and grain development
Thank you, Any Questions?

**Project Team**

- Maree Brennan: SRUC, Post-Doctoral Research Assistant
- Christine Hackett: JHI, Data Management
- Pete Hedley: JHI, Genome Facility
- Steve Hoad: SRUC, Principal Investigator
- Monika Lenty: SRUC, PhD Student
- Linda McCloskey: SRUC, Technical Support
- Brian Pool: SRUC, Glasshouse
- Tom Shepherd: JHI, Lipid Analysis
- Bill Thomas: JHI, Principal Investigator
- Kairsty Topp: SRUC, Data Management

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**Market requirements from a maltster’s perspective**

Eddie Douglas - Commercial Director
Bairds Malt Ltd
**Malting Barley Production and Purchases**

**Scottish Cereal Production**

1. **TOTAL CEREALS(1)**
2. **SPRING BARLEY**
3. **WHEAT**
4. **WINTER BARLEY**
5. **OATS**

(1) Includes triticale
Malt Market

UK malt supply by sector – Free market

Source: MAGB Industry data
UK Beer sales (,000hl)

- Forecast volumes declining by 2.5% per annum
  
  Source: Plato logic

Scotch Whisky sales
(million litres of pure alcohol)

- Sutherlands forecast of ~5% growth pa 2013 to 2016
  
  Source: Sutherlands
Usage of UK Produced Malt (2013 Est.)

- Distilling: 53%
- Brewing: 32%
- Export: 13%
- Food: 2%

Usage of Scottish Produced Malt (2013 Est.)

- Distilling: 94%
- Brewing: 3%
- Export: 3%
- Food: 0%
Malting Barley Specifications

Importance of Barley Specification

• High quality malt requires high quality malting barley

• Malting barley specification ensures that customer malt specification requirements can be achieved

• Ensuring that the malting barley delivered meets specification is key control activity
Quality Requirements

• Germination - 98% min
• Grain size - <10% thru 2.50mm
• Grain nitrogen – Wish list
• Admixture
• Food Safety

Importance of Germinative Capacity

• Germinative capacity measures the viability of the barley
• The changes that convert barley to malt wholly dependent on the grains ability to germinate
• Non-viable grains do not germinate and pass through the malting process unchanged
• These non-germinated grains will have a significant detrimental effect on malt quality
Importance of Moisture Content

• Risk that high moisture barley may have damaged germinative capacity

• Storage of high moisture barley for even short time period can result in fungal growth and possible mycotoxin formation – see HGCA Grain Storage Guide and Safe Storage Matrix

• Legal limits in place for ochratoxin A (OTA) which may be result from fungal growth

Importance of Grain Size

• Small grains will be lost during pre processing grading of the malting barley

• Small grains higher in nitrogen, low in extract

• Small grains hydrate rapidly so would give uneven moisture levels if steeped along with std malting barley grains

• Uneven steeped moisture levels would result in uneven modification levels in the germinated malt
Importance of Nitrogen Content

- Correct nitrogen content of resultant malt important for distilling/brewing performance
- Customer sets acceptable malt nitrogen range based on their product type and process

‘Wish List’ 2014 Scotland

- SPRING 1.56% to 1.65%: 48%
- SPRING 1.66% to 1.85%: 9%
- SPRING Above 1.85%: 9%
- WINTER Above 1.85%: 3%
- WINTER 1.66% to 1.85%: 4%
- WINTER Under 1.55%: 20%
Importance of Other Specification Items

• Admixture
  • Important to keep foreign material out of the malting and brewing process

• Varietal purity
  • Individual varieties will require specific processing conditions to optimise malt quality

• Pregerminted/split/skinned grains
  • Damage of this nature renders the grain problematic to handle and malt leading to poorer malt quality

Field mycotoxins

• Legal maximum levels apply to DON and ZEA when cereals are offered to the market – due diligence analysis programmes are run by malting companies

• Maltsters are also participating in UK data collection of levels of T-2 and HT-2 mycotoxins
Varieties

IBD Approved List Harvest 2014

<table>
<thead>
<tr>
<th></th>
<th>WINTER VARIETIES FOR BREWING USE</th>
<th>SPRING VARIETIES FOR BREWING USE</th>
<th>SPRING VARIETIES FOR MALT DISTILLING USE</th>
<th>SPRING VARIETIES FOR GRAIN DISTILLING USE</th>
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<tbody>
<tr>
<td>Full Approval</td>
<td>Pearl Flagon Cassata Venture</td>
<td>NFC Tipple Concerto Propino</td>
<td>Optic Belgravia Concerto Moonshine Odyssey</td>
<td>Belgravia</td>
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<td>Provisional Approval 2</td>
<td>Archer</td>
<td>Odyssey Overture</td>
<td>Overture</td>
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<td>Provisional Approval 1</td>
<td>Talisman</td>
<td>Sanette</td>
<td>Glassel</td>
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### HGCA Recommended List 2014

**Spring malting varieties**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Breeder</th>
<th>Parentage</th>
<th>HGCA Recommendation</th>
<th>IBD Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanette</td>
<td>Syngenta</td>
<td>Summit x Yard</td>
<td>Full UK</td>
<td>Prove 1 brewing</td>
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<tr>
<td>KWS Aurelia</td>
<td>KWS UK</td>
<td>(Conchita x Quench) x Quench</td>
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<td>Odyssey</td>
<td>Limagrain</td>
<td>Concerto x Quench</td>
<td>Full UK</td>
<td>Full brewing &amp; Prove 1 malt distilling</td>
</tr>
<tr>
<td>Propino</td>
<td>Syngenta</td>
<td>Quench x NFC Tipple</td>
<td>Full UK</td>
<td>Full Brewing</td>
</tr>
<tr>
<td>Hacker</td>
<td>Secotra</td>
<td>Quench x Belgravia</td>
<td>Full UK</td>
<td>Under evaluation</td>
</tr>
<tr>
<td>Overture</td>
<td>Limagrain</td>
<td>Concerto x Quench</td>
<td>Full UK</td>
<td>Prove 1 brewing &amp; malt distilling</td>
</tr>
<tr>
<td>Glassel</td>
<td>Syngenta</td>
<td>Summit x Belgravia</td>
<td>Full UK</td>
<td>Prove 1 malt distilling</td>
</tr>
<tr>
<td>Quench</td>
<td>Syngenta</td>
<td>Sebastian x Drum</td>
<td>Full UK</td>
<td>No longer approved</td>
</tr>
<tr>
<td>KWS Iris</td>
<td>KWS UK</td>
<td>Conchita x Quench</td>
<td>Full UK</td>
<td>Under evaluation</td>
</tr>
<tr>
<td>Concerto</td>
<td>Limagrain</td>
<td>Minstrel x Westminster</td>
<td>Full UK</td>
<td>Full brewing &amp; malt distilling</td>
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<tr>
<td>Shaloo</td>
<td>Syngenta</td>
<td>SY Tabern x Marionette</td>
<td>Full UK</td>
<td>Under evaluation</td>
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<tr>
<td>Moonshine</td>
<td>RAGT</td>
<td>Toucan x Class</td>
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<td>Full malt distilling</td>
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<tr>
<td>NFC Tipple</td>
<td>Syngenta</td>
<td>(NFC 497 x Cork) x Vortex</td>
<td>Full UK</td>
<td>Full brewing</td>
</tr>
<tr>
<td>Belgravia</td>
<td>Limagrain</td>
<td>Minstrel x Westminster</td>
<td>Full N East</td>
<td>Full malt &amp; grain distilling use</td>
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<tr>
<td>Optic</td>
<td>Syngenta</td>
<td>Chad x (Corniche x Force)</td>
<td>Full UK</td>
<td>Full malt distilling / No longer approved for brewing</td>
</tr>
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</table>

### HGCA Recommended List 2014/15

**Winter malting varieties**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Breeder</th>
<th>Parentage</th>
<th>HGCA Recommendation</th>
<th>IBD Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talisman</td>
<td>Senova</td>
<td>Flagon x Retriever</td>
<td>Full UK</td>
<td>Prove 1 Brewing</td>
</tr>
<tr>
<td>SY Venture</td>
<td>Syngenta</td>
<td>DH925 x Retriever</td>
<td>Full UK</td>
<td>Full Brewing</td>
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<tr>
<td>Archer</td>
<td>Limagrain</td>
<td>NSL01- 8026 x Jonathan</td>
<td>Full UK</td>
<td>Prove 2 Brewing</td>
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<tr>
<td>Winsome</td>
<td>Syngenta</td>
<td>Flagon x NFC 7169-01</td>
<td>Full UK</td>
<td>No longer approved</td>
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<tr>
<td>Cassata</td>
<td>Limagrain</td>
<td>Opal x NSL 96/7517</td>
<td>Specific (BVMY)</td>
<td>Full brewing</td>
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<tr>
<td>Flagon</td>
<td>Syngenta</td>
<td>(NFC296-7 x Rifle) x Pearl</td>
<td>Full UK</td>
<td>Full brewing</td>
</tr>
<tr>
<td>Pearl</td>
<td>Limagrain</td>
<td>Puffin x Angora</td>
<td>Full UK</td>
<td>Full brewing</td>
</tr>
</tbody>
</table>
Malting variety purchases

Scottish Spring Barley Purchased - 2009 to 2013 Crop
(Data Source: MAGB Malting Barley Purchasing Return)

Malting Barley Prospects 2014
Scottish Malting Barley Prospects
2014 crop

• Increased Spring barley demand due to distilling expansion.

• Variety and nitrogen will depend on target market
  • Distilling
    • Pot still malt - Spring barley, low nitrogen - below 1.65N2
    • Grain malt – Spring barley, high nitrogen - above 1.85N2
  • Brewing
    • Brewing can use both Winter & Spring with a range of nitrogen up to 1.85N2

• Distillers prefer zero GN varieties
  • – Concerto, Belgravia, Odyssey etc.

• Each maltings/intake point will have their own specific variety requirements – please check with your merchant

Thank you