Changing Barley Varieties – A Case Study in Coping with Change

'There's plenty of barley … right?'

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Introduction

Consistency of malt is of paramount importance to all brewers. Variability can arise due to a number of factors including the barley variety used, growing regions, seasonal influences and different supplying malthouses.

Australian Barley Industry

Barley is the second largest cereal crop grown in Australia. Total barley production averages around 8 million tonnes per annum (see Figure 1). The total tonnage harvested, as well as the geographic split, varies from year to year depending on a range of factors. Taking the 2014-15 season as an example, Figure 2 shows that the cropping regions in the southern and western regions of Australia produce the majority of Australia's barley.

Figure 1 Australian Barley Harvest

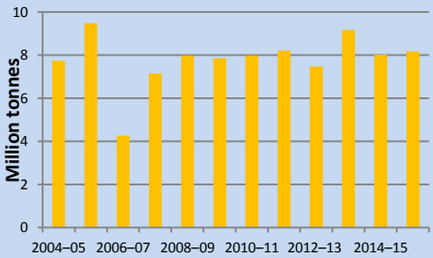
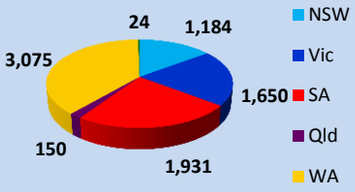


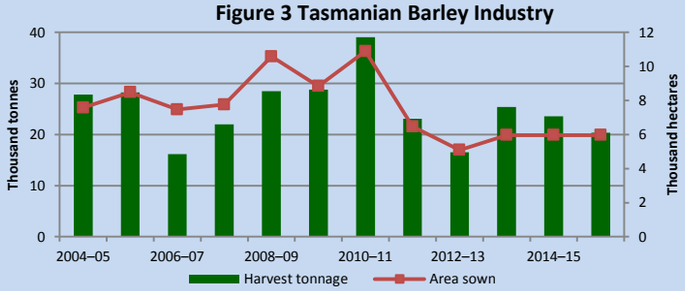
Figure 2
2014-15 Barley Harvest
(thousands of tonnes)



The Australian barley industry is comparatively export focused with about 60% of the crop exported each year. Malting selection rates vary depending on sowing patterns and seasonal conditions but are typically about 30% with the remainder utilized as feed for livestock. Domestic demand for malting barley is about 1 million tonnes with the bulk to the resulting malt exported to overseas markets.

Tasmania produces a relatively small volume of barley in the context of the national picture (see Figure 3). Hence the accumulation system cannot reasonably handle multiple variety segregations. Apart from niche opportunities, a single malting variety has generally been segregated and everything else aggregated as feed.

Figure 3 Tasmanian Barley Industry



Barley Breeding

Barley breeders try to meet a range of industry stakeholder priorities in new releases. These include agronomic performance (disease resistance, yield, etc) and quality traits. The latter may be general requirements (such as extract) or specific to end uses. Important quality traits for some uses may not be a consideration for another use (e.g. beta-glucan is critical for malting barley but not feed barley) or conversely incompatible (e.g. high diastase activity required in export brewing types but not for domestic types).

The Australian barley industry has moved from a 'one size fits all' approach that existed for several decades around the 1960s, to developing a range of varieties matched to the specific needs of regional growers as well as domestic and export markets. Since the privatization of barley breeding in Australia about ten years ago, the rate of release of new varieties has increased dramatically. There are currently some 18 malting varieties actively under cultivation.

Variety Case Studies

Schooner was released as a malting barley in 1983 and for many years was a benchmark in terms of the moderate fermentability desired by domestic brewers.

Gairdner was released as a malting variety in 1998 and widely grown across Australia for over a decade. In recent years, both varieties have fallen out of favour with growers due to disease susceptibility and inferior yields compared with newer releases.

Changes in the sowing and production of a given variety are not necessarily consistent across the country with local factors playing a part in determining these outcomes. Figures 4 and 5 illustrate varietal trends in Victoria and New South Wales since 2010 and forecasted out to 2018.

Whilst the availability of Schooner in Victoria had completely evaporated by 2013, it was still readily obtainable in New South Wales for several years after that. Gairdner appears to be on a similar trajectory but with a reversed horizon in the two geographies.

For many years, Gairdner was the malting variety grown in Tasmania. From Figure 3 it is clear that barley has lost ground with growers in recent years. Gairdner's disease profile and competition from new high yielding wheat varieties have contributed to this decline.

Variety Trends

Figure 4 Victoria

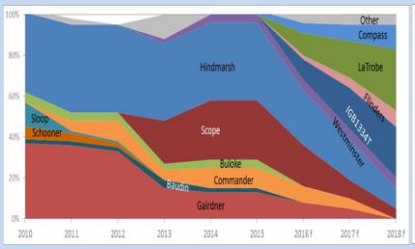
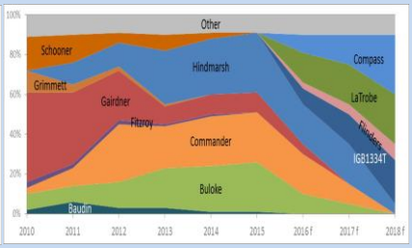


Figure 5 NSW



Westminster is a European malting barley suited to high rainfall areas with superior yields and extract levels. It was submitted for local evaluation as a dual purpose (export and domestic) type but evaluation at Pilot Brewing Australia found that it was more suited to liquid adjunct brewing. It was accredited as a malting type in Australia in 2013.

Sowing of Westminster has since maintained a steady level in Victoria (see Figure 4). Shortly after that the maltsters and major brewers operating in Tasmania agreed to support an industry move from Gairdner to Westminster but this has not yet arrested barley's decline in Tasmania.

Impact – Boag's Brewery

Expansion of the Boag's Brewery in Launceston meant that the Devonport malthouse could not keep pace with brewing demand particularly during peak season. Supplementary supply of Gairdner malt was thus provided from Victoria.

With the Tasmanian barley industry committed to a rapid changeover to Westminster, trials with Westminster malt had to be undertaken ahead of time to ensure that fermentability could be controlled. With no local Westminster segregated due to the aforementioned constraints, trials were undertaken with Victorian Westminster at the Boag's Brewery. These demonstrated that the higher diastase activity in Westminster could be managed for the brand portfolio and a changeover plan for both malthouses was assembled.

Impact – Little Creatures Brewery

Historically the Little Creatures Brewery in Fremantle used Schooner malt sourced out of Victoria. Its moderate fermentability was ideally suited to meet the desired flavour profile of the beers which typically have higher levels of residual extract.

Production has since expanded to a second brewery in Geelong and volume growth has been rapid. The increased demand on dwindling supplies of Schooner meant that requirements had to be supplemented with Gairdner. The Victorian provenance for brands produced at Geelong was under threat with the rapid decline of Schooner and Gairdner in Victoria.

Options for a domestic style variety grown in Victoria with a stable supply outlook were limited. Based on the experience at the Boag's Brewery, it was decided to trial Westminster for Little Creatures.

Little Creatures' recipes are essentially all malt so more fermentable varieties arguably present less of a challenge than recipes using cane sugar adjunct but the need for higher residual extract after fermentation remained. An additional constraint at the breweries was wet milling. This configuration limits the range of higher mashing temperatures that could be employed to deal with a more fermentable variety.

Additionally, limited capability to blend potentially over attenuated trial beer meant that a more cautious trial programme was adopted. A small scale trial was conducted in Lion's pilot plant in Sydney prior to a commercial scale brew in Fremantle. Again these trials showed that attenuation control was possible but the margin for error was less in this case. Little Creatures have now moved to a blend of Westminster and Gairdner as an interim measure.

Summary

- Ongoing development of new barley varieties, export focus and rapid pace of change will continue
- Small volume users with special varietal requirements may get caught out despite the overall large volume of malting barley produced in Australia each year
- To ensure specific needs are met, brewers are advised to:
  - Engage with the wider barley industry to monitor trends and needs of all players
  - Have a plan B – medium term planning needs to Include contingency trials

References

- Barley Australia (www.barleyaustralia.com.au)
- ABARES (www.agriculture.gov.au/abares)

Acknowledgements

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