

Replacing Schooner in New South Wales

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Abstract

Schooner was the predominant malting barley in NSW for many years. It has been largely displaced in the higher rainfall areas and in the north by Gairdner, which offers higher yields and better resistance to lodging and head loss. Schooner remains the dominant malting variety in the mid-lower rainfall areas of central and southern NSW, as growers appreciate its reliable grain size, and it remains popular with malsters and brewers for use in the domestic market. However, Schooner's place in the industry is under threat as farmers gain access to higher-yielding feed barley and wheat varieties, and its quality becomes less acceptable in the export market. Baudin, Buloke and Flagship are higher-yielding alternatives but even with good management will meet the malting specification for grain size less frequently.

Introduction

Barley is a major winter crop in NSW, ranked second behind wheat in area and production, and in 2005-06 an estimated 1.61 million tonnes was produced. On average, about 30% of this grain is received into malting grades, but this varies with season and location. Historically, malt barley from this region has been used for domestic malting and brewing or exported as whole grain. The other 70% of production had been used for domestic feed or exported as feed grain. This 70% includes grain of feed barley varieties as well as grain of malting varieties which fails to meet malt barley specifications. Farmer interest in barley is increasing with the release of higher-yielding varieties, concerns about leaf diseases in wheat, the requirement for weed competitive crops in managing herbicide resistance, and a desire to reduce risk by crop diversification.

Schooner has been a major variety in NSW for many years. Selected by D.H.B. Sparrow from a cross made in 1966, the variety was registered in 1983 (Sparrow 1983) and by this time had been tested widely in NSW. It showed a consistent yield advantage over Clipper (about 10%) and was rapidly adopted by farmers. Industry acceptance followed despite the need to alter malting regimes and to store grain for some months after harvest before malting (Derbyshire 1987).

The role of Schooner has diminished following major changes in the barley industry in eastern Australia over the last decade. There has been a rapid increase in the domestic demand for feed grain and this demand is predicted to further increase, prompting interest in feed varieties. A major driver has been the beef feedlot industry, with Australian feedlot capacity now more than 1.1 million head, 98% of which is located in NSW and Qld. There is also strong demand for barley from the dairy and pig industries and continued growth is expected in the overall demand for domestic feed grain. Secondly, many export markets which use non-liquid adjuncts now prefer varieties with higher enzyme levels than Schooner, so new varieties are required to maintain the competitiveness of Australian barley in these markets. Since 2002, 13 new potential malting varieties have been or are about to be released. These represent varying improvements in yield, disease resistance and malting quality over the standard varieties but present growers with difficult choices, particularly as there are limits on the number of varieties that can be segregated and successfully marketed.

To maximise their returns from barley, growers need to make the right decisions about markets, varieties and crop management. The first decision is whether to target the malt or feed market and this depends on their relative returns. As well as the price differential between feed and malt, input and transport costs need to be considered together with the relative yields of malt and feed types and the probability of meeting market specifications. The second choice is the variety, from within the large number of malt and feed varieties now available. Finally, management practices need to be appropriate as varieties differ in their optimum sowing time, seeding and fertiliser requirements, weed competitiveness and disease reactions. These issues have been addressed in an eastern Australian barley agronomy project, supported by GRDC. In this paper, project results from central and southern NSW are used to identify malting varieties and management practices for this region.

Methods

The performance of new malting varieties was compared to Schooner, based on the results from 33 field sites over four years, 2003 to 2006. Disease levels were generally low. Trials included treatments such as sowing time, seeding rate and nitrogen fertiliser rate, resulting in 130 comparisons for Gairdner, 112 for Baudin, 126 for Buloke and 82 for Flagship.

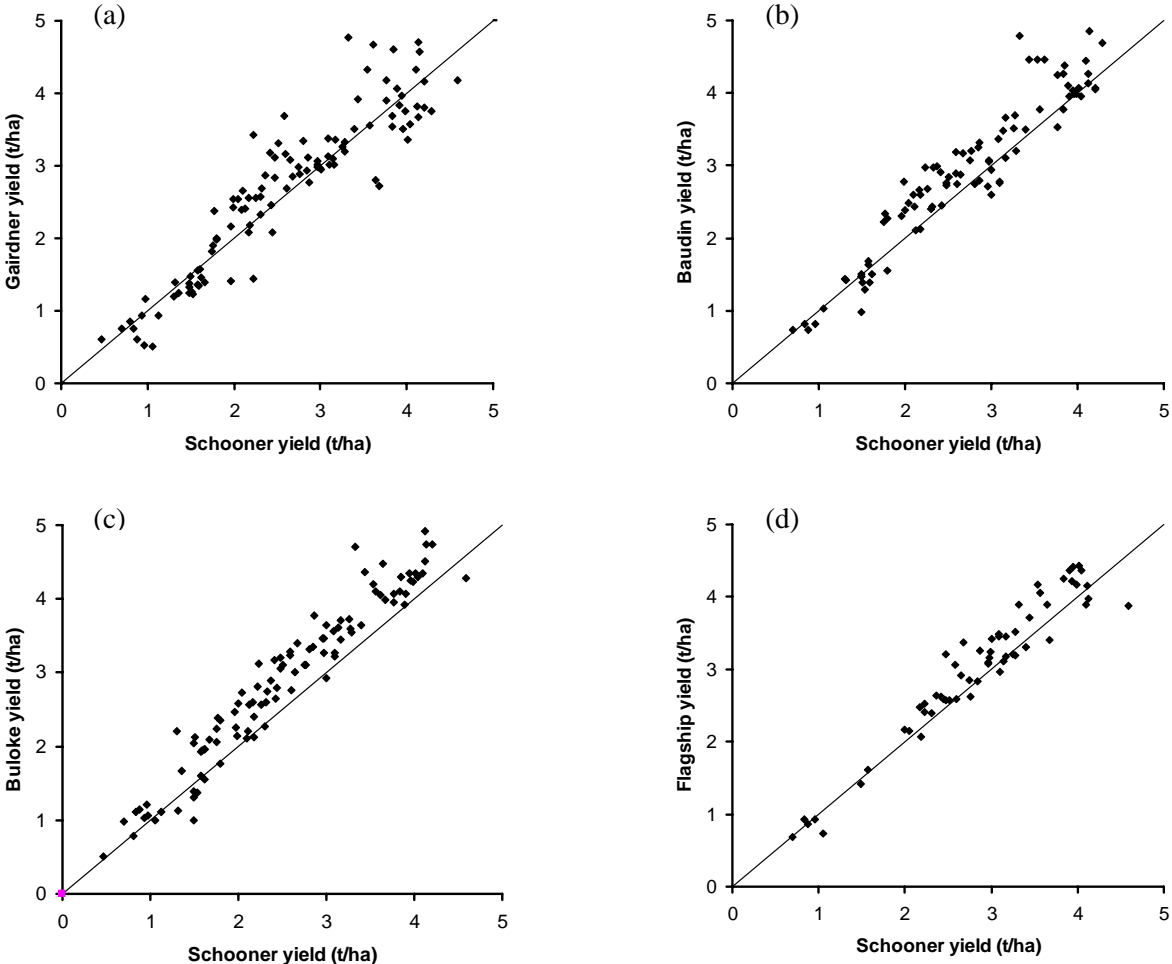


Figure 1. Grain yield of (a) Gairdner, (b) Baudin, (c) Buloke and (d) Flagship compared to Schooner in central and southern NSW, 2003-2006. Also shown is a 1:1 line.

Results and Discussion

Grain yields are presented in Figure 1. All four varieties out-yielded Schooner at yield levels above about 2 t ha⁻¹ although the results were more variable for Gairdner. Buloke achieved consistently higher yields than Schooner and performed well at lower yielding sites. These results are in agreement with variety trial yield performance in southern NSW (McRae *et al.* 2007) which show yields relative to Schooner to be 106% for Gairdner, 108% for Baudin, 110% for Buloke and 104% for Flagship. The yield performance and market acceptance of Gairdner has led to it becoming the major malting variety in higher rainfall areas and in the north where lodging and head loss are major issues.

Alongside yield, the probability of meeting market specifications is a major determinant of variety choice by farmers. In particular, for those aiming at the malting market the likelihood of producing grain sufficiently plump to meet the minimum 70% retention above a 2.5 mm screen is particularly important. Retention values in this study (Figure 2) covered a wide range, reflecting the seasonal conditions and the response to variables such as sowing time, seeding rate and nitrogen supply. Plump grain percentage in Gairdner never exceeded Schooner, and was frequently much lower. This was the

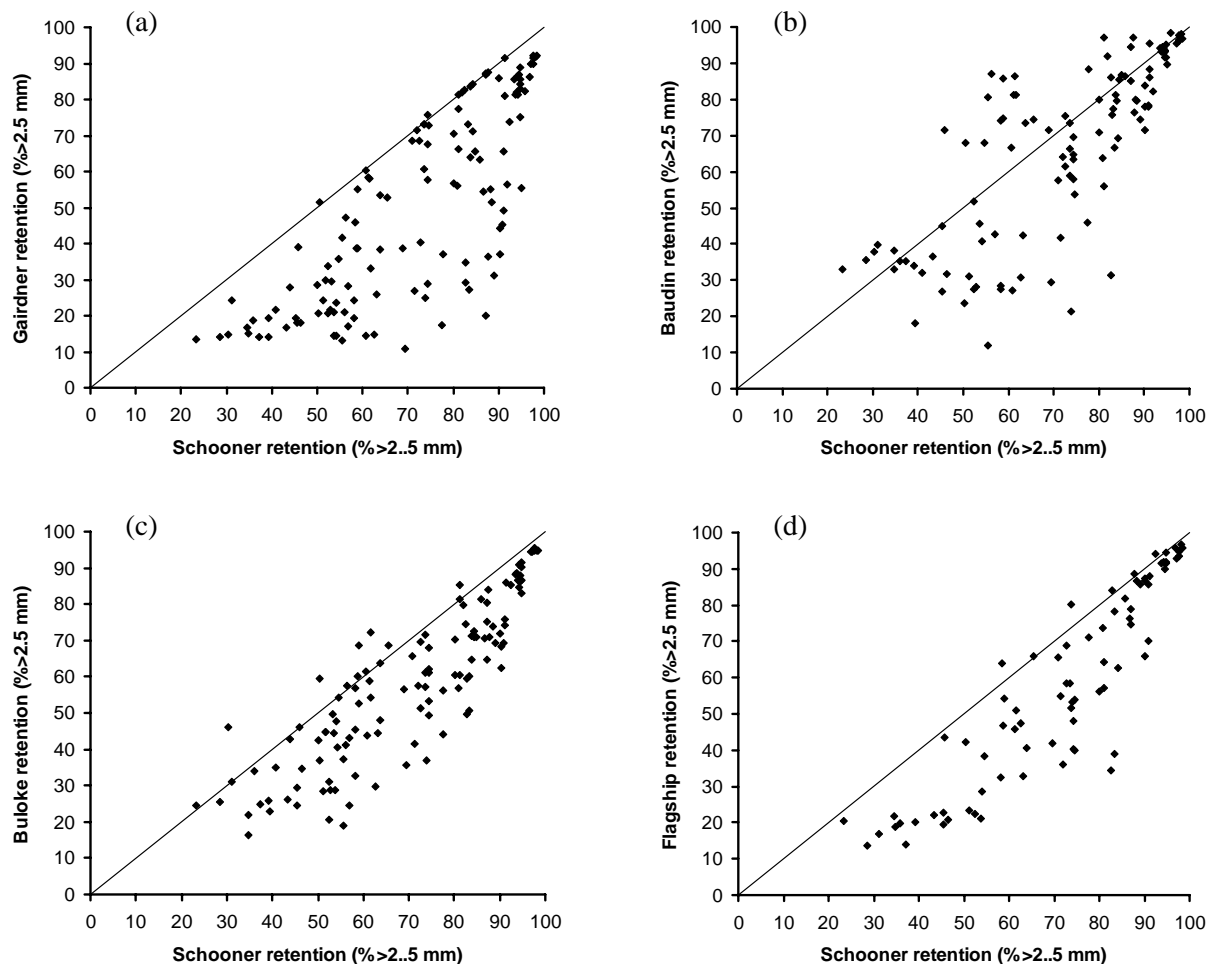


Figure 2. Retention values (% by weight retained above a 2.5 mm screen) for (a) Gairdner, (b) Baudin, (c) Buloke and (d) Flagship compared to Schooner in central and southern NSW, 2003-2006. Also shown is a 1:1 line.

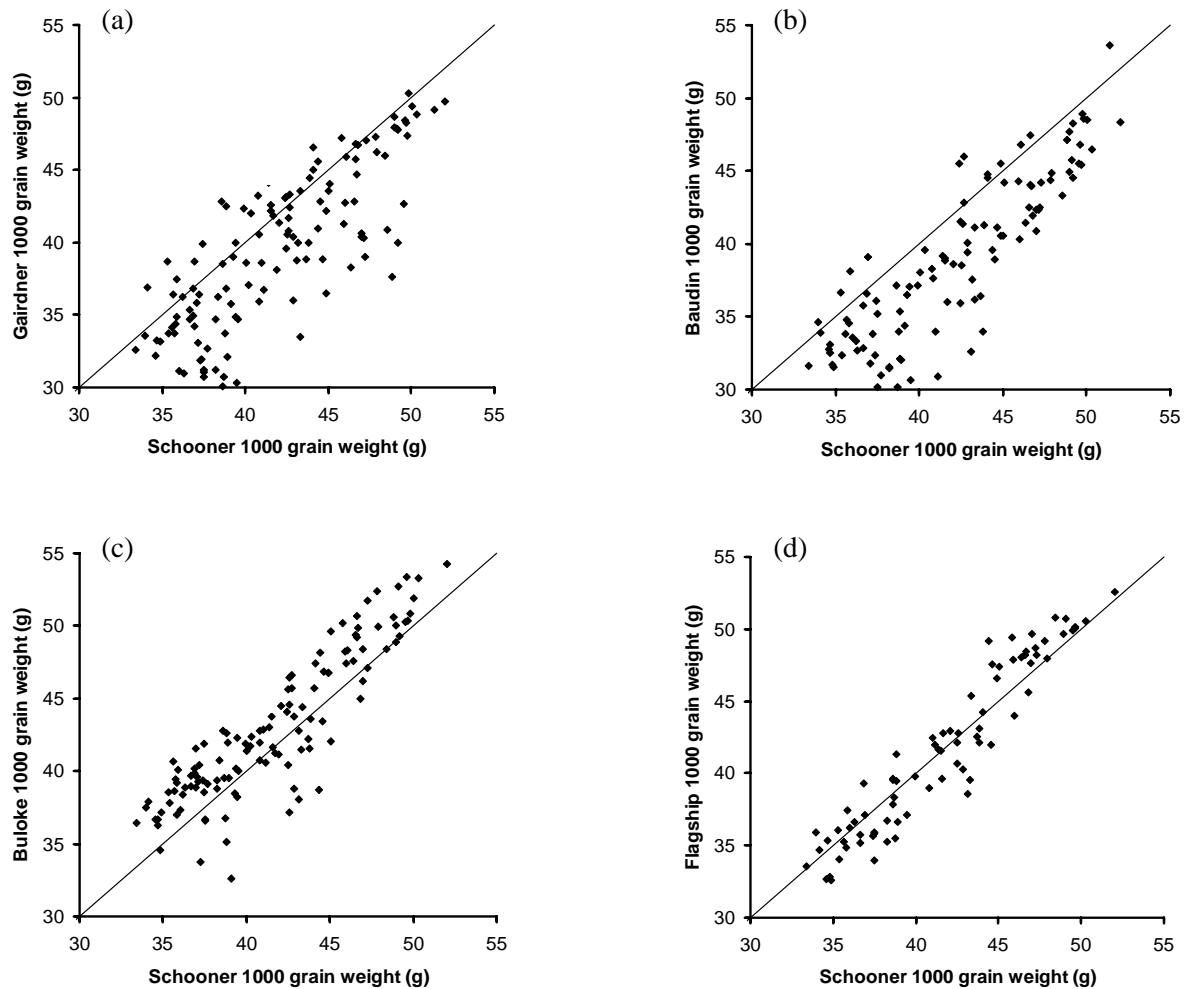


Figure 3. Thousand grain weights for (a) Gairdner, (b) Baudin, (c) Buloke and (d) Flagship compared to Schooner in central and southern NSW, 2003-2006. Also shown is a 1:1 line.

case even when average grain weight was higher (Figure 3), consistent with findings in Western Australia (Paynter *et al.* 1999) and a result of the longer and narrower grains in this variety. By comparison, Baudin had better retention values at some sites than Schooner despite generally lower average grain weights, a result of its rounder grain shape, again confirming Western Australian findings (Paynter *et al.* 2003) and emphasising the strong genetic control of this character. Both of these semi-dwarf varieties showed wide deviations from the 1:1 line with Schooner for both retention and average grain weight.

Buloke achieved excellent grain weights, with an average higher than Schooner and exceeding Schooner in 75% of comparisons. However, the narrower grain shape of Buloke resulted in lower retention values in many cases. Flagship had a similar grain weight to Schooner averaged across all sites, but deviated from the 1:1 line, performing better at the sites where grain weights were high. Retention values were also lower than Schooner in almost all comparisons.

The frequencies of achieving malting requirements for retention were remarkably similar for the four newer varieties but all were much lower than Schooner. At 64% of the sites where Schooner met specifications Gairdner and Buloke were also acceptable, whereas Baudin and Flagship were acceptable in 67% of comparisons.

The performance of new varieties can be maximised by appropriate crop management. Gairdner needs to be sown early to achieve high yields and increase the likelihood of producing large grain. Appropriate seeding rates are important and typical responses are shown in Figure 4, from a trial at Rankins Springs in 2005. Yield increased with seeding rate up to about 120 plants/m² in most varieties while kernel weight decreased with each increase in plant density for all varieties. Retention also decreased with increases in plant density in all but Buloke although the decline was only minor in Schooner. The effect of grain shape is evident. Buloke had the heaviest grains but was intermediate for retention whereas Baudin had high retention values and the lowest kernel weights. High seeding rates should be avoided in Gairdner.

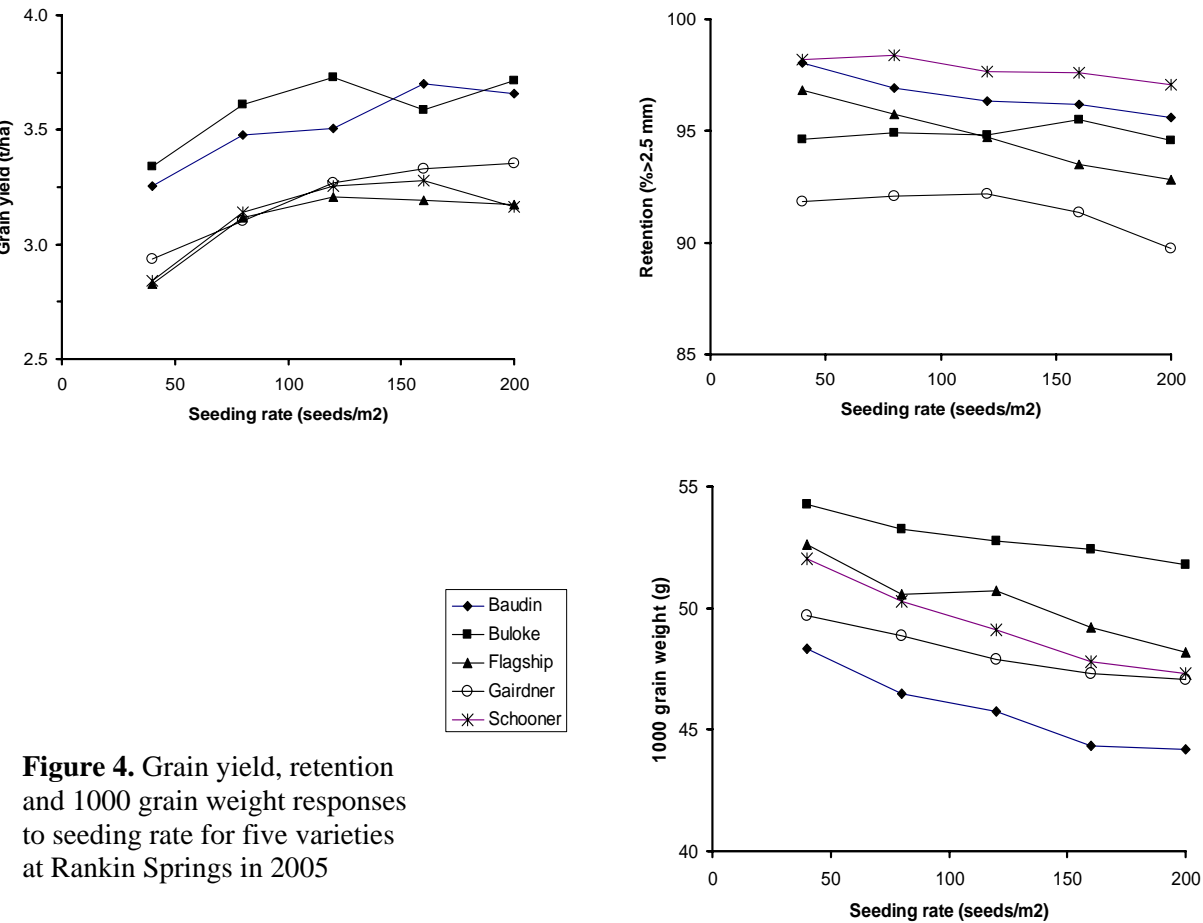


Figure 4. Grain yield, retention and 1000 grain weight responses to seeding rate for five varieties at Rankin Springs in 2005

Conclusions

There appears to be no immediate replacement for Schooner as a reliable malting variety in the lower rainfall areas of central and southern NSW. However, its continued production is dependent on a market prepared to pay a significant premium over the feed price and on its price relative to wheat. Buloke is likely to become a significant variety in the mid-lower rainfall region as its yield performance is similar to that of the best feed varieties. Flagship may have a role in the mid rainfall zone and perhaps for later sowing in higher rainfall zones, although it may not offer sufficient improvements in yield and grain size. Growers will watch the performance of Hindmarsh and WI3416-1572 with great interest.

Acknowledgements

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