

MALT BARLEY PERFORMANCE IN THE RIVERINE PLAINS: RESULTS FROM THE 2025 TRIAL AT RENNIE

KEY MESSAGES

- **Dry and variable conditions limited yield potential and elevated grain protein across most entries in a malt and malt-potential barley variety trial at Rennie during 2025.**
- **Two in-season fungicide applications reduced visible foliar disease symptoms, however, yield and grain quality responses were small, highlighting the importance of varietal resistance under moisture-limited conditions.**
- **High screenings observed across most varieties highlighted that there was insufficient moisture to fill grain.**
- **Nitrogen supply was high relative to yield potential (total ~130 kg N/ha from urea + (MAP), with excess nitrogen going to protein as a result of the unrealised yield potential.**

BACKGROUND

For barley, malt versus feed grade outcomes often remain uncertain until harvest. Price spreads between these grades can make variety choice difficult and result in “high-risk” in-season nitrogen timing and disease management decisions, particularly in seasons with short finishes.

A 2025 Riverine Plains trial, delivered with Malteurop and monitored by Eurofins Kalyx, compared 20 barley varieties under local conditions, to better understand how disease management and nutrition interact with varietal genetics to influence grain yield and malting-related quality traits.

AIM

To benchmark the yield and grain quality of 20 malt and malting-potential barley varieties and assess the impact of an in-season fungicide program under conditions experienced in the Riverine Plains.

Table 1 Trial management summary for Barley trial.

ITEM	DETAILS
Location	Riverine Plains’ trial site, Rennie, NSW
Sowing date	3 June 2025 (direct drilled at ~40 mm depth)
Harvest	25–26 November, 2025
Design	Randomised complete block design; 4 replicates x20 varieties
Disease management factor	Replicates 1–3 received two fungicide sprays; replicate 4 received nil in-season fungicide. Note: seed was treated with Systiva® prior to sowing to ensure consistent establishment protection.
Nutrition	MAP + Impact® 80 kg/ha at sowing; urea 80 kg/ha at GS25 (15 August) and 100 kg/ha at GS32 (1 September); total urea 260 kg/ha (~120 kg N/ha) plus MAP (~10 kg N/ha).
Weed management	Pre-sowing: glyphosate + Boxer Gold® + Sharpen® + Hasten®; in-crop: Mateno Complete® (31 July, GS23).
Growing season rainfall (GSR)	160 mm measured at the GoannaAg weather station, Coreen. Rainfall was sporadic with the largest event (~22mm) on 10 September.



RESULTS AND DISCUSSION

The main objective of this trial was to assess barley varieties in terms of their ability to achieve malt-grade specifications—with yield outcomes a secondary measure—under conditions typical of the Riverine Plains (Table 1).

During 2025, growing season rainfall (160 mm) was sporadic, meaning crops experienced periods of moisture deficit. At this site, rainfall amount and timing, combined with genetic differences in the barley varieties tested, were the main drivers of yield performance.

All commercially available varieties were sown within their optimal sowing window (first week of June), which provided favourable conditions for establishment to maximise yield potential.

ESTABLISHMENT

Plant establishment averaged 108 plants/m² across varieties (range 91–127 plants/m²). The site was sown at 80kg/ha, so this represents an establishment rate of 61 percent, which is regarded as low compared to the benchmark 80 percent. The reason behind the poor establishment is unclear, with potential variables including soil nutrition, timing, soil moisture and size possibly at play.

Plants emerged between 10–14 days after sowing and were consistent across all plots. Due to the dry start to the year, sowing took place on 3 June, making use of the 28 mm of mid May rainfall. Post sowing, the site received 34 mm of follow-up rain to the end June.

GRAIN YIELD

Yield and grain quality

The 2025 growing season was characterised by dry spring conditions and a relatively cool finish, which likely contributed to the observed variability in yields. Varieties representing a range of maturities—Neo mid, Planet (mid, with elastic maturity), Spinnaker (early mid), and Maximus (quick-mid)—varied in their yields, with no clear trend based on maturity.

Yields ranged from 3.58 to 4.58 t/ha across varieties, with an overall mean of 4.12 t/ha

(Figure 1). The least significant difference (LSD, $P=0.05$) for yield was 0.49 t/ha, with Neo CL yielding significantly more than RGT Planet, but not better than the other commercially available varieties RGT Asteroid, Spinnaker or Maximus CL. The numbered variety SCA25-Y007 yielded the most (4.59 t/ha) in this trial.

Paddock constraints identified through soil testing included an acidic layer at 5–15 cm depth and significant soil compaction below 60 mm. This, combined with low growing season rainfall, likely contributed to the yield variations seen in Figure 1.

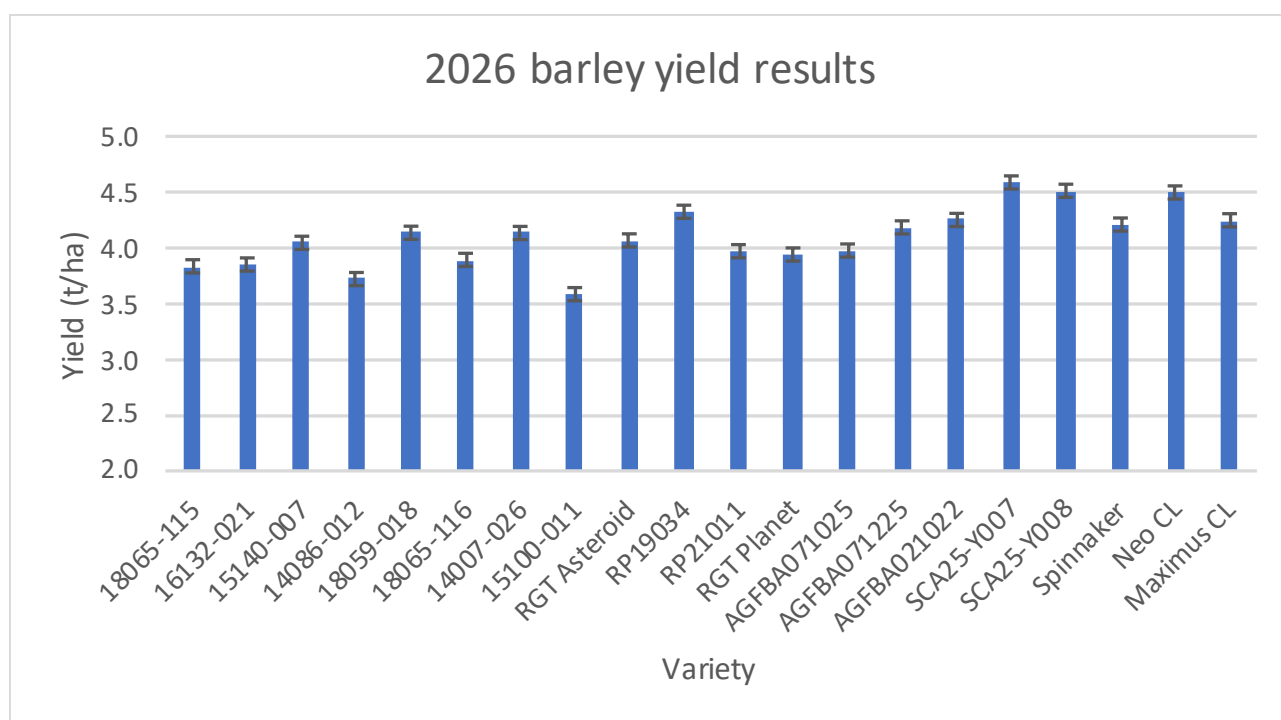


Figure 1 Grain yield (t/ha) of barley varieties at the Riverine Plains Rennie trial site in 2025. Mean of three replicates, LSD($P=0.05$) = 0.49 t/ha.

PROTEIN

Protein was generally high in 2025, consistent with a dry finish and a relatively high nitrogen program (Figure 2). Variety means ranged from 11.43–14.3 percent. LSD ($P=0.05$) for protein was 0.76 percent.

The elevated protein levels observed across the trial meant that all varieties exceeded minimum malt-grade specifications, which was attributed to consistent nitrogen applications.

Additionally, Colwell P concentrations (24–48 mg/kg in the 0–15 cm soil layer, and lower levels of 0–15 mg/kg at 15–30 cm depth), may have influenced protein accumulation. This is because sub-optimal phosphorus availability at depth can contribute to reduced yields, which can then increase grain protein concentration.

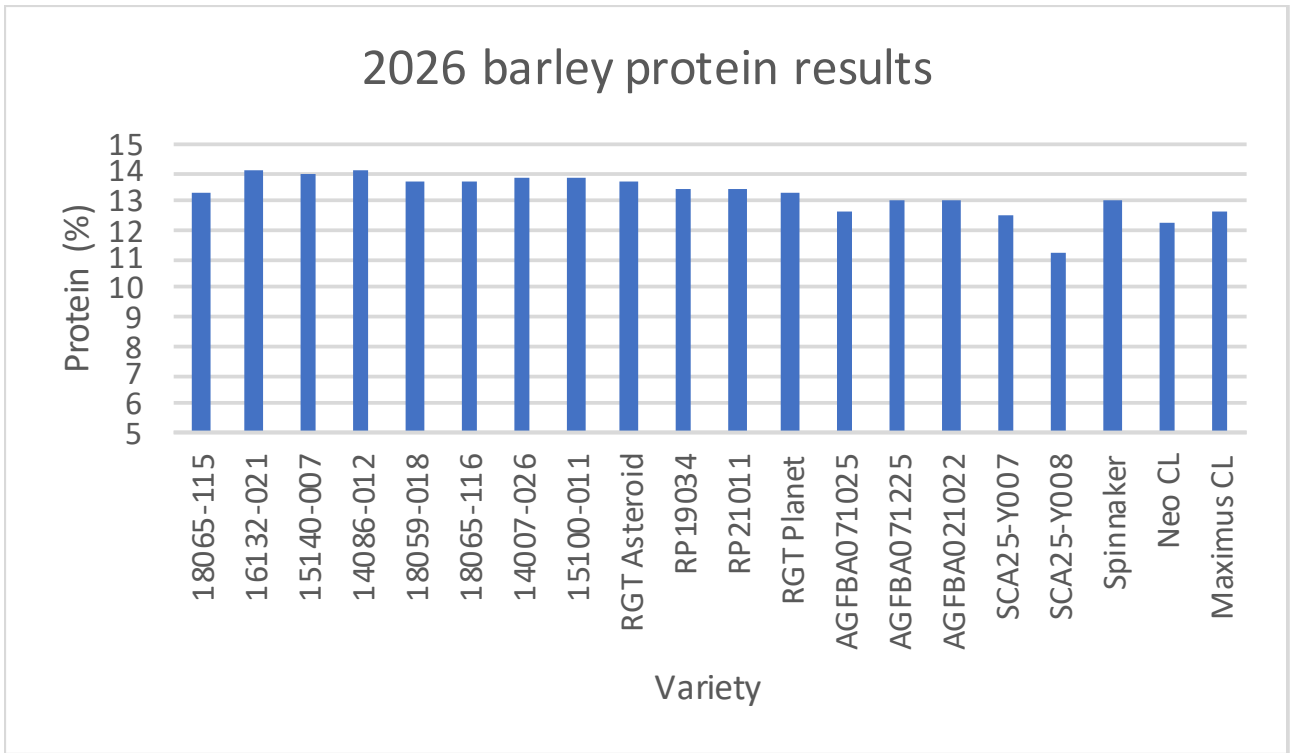


Figure 2 Grain protein (%) by barley varieties sown at the Riverine Plains trial site at Rennie, NSW, in 2025. Mean of three replicates, LSD (P=.05) = 0.86 percent

GRAIN SIZE (RETENTION AND SCREENINGS)

Screenings were variable across the trial, ranging from 5.9–32.8 percent (Figure 3), while retention (>2.5 mm) ranged from 30–87 percent (data not shown). The least significant difference (LSD; P = 0.05) was 8.0 percent for screenings and 16 percent for retention.

Elevated nitrogen application rates, combined with low in-season rainfall likely contributed to increased screenings across most varieties at harvest. Based on the Malt 1 classification threshold of ≤7% screenings, only the variety Maximus CL met this specification, highlighting the benefits of matching a quicker variety with an early June sowing.

These findings highlight the challenge of matching nitrogen to expected yields in a moisture-limited season.

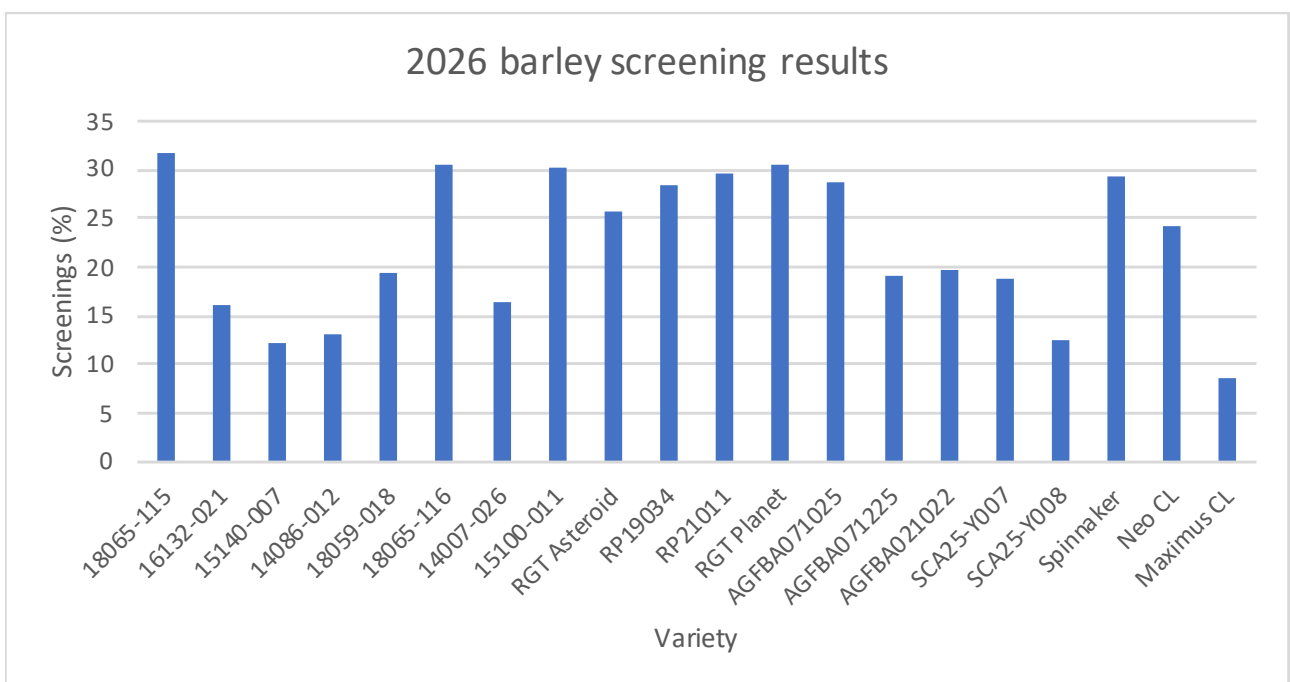


Figure 3 Screenings (%) by variety (means across three replicates). LSD (P=0.05) = 8.01%.

DISEASE

The net form and spot form of net blotch, as well as scald, were observed mid-season following rainfall events. Disease scoring during late winter/early spring indicated higher pressure in the unsprayed replicate, while sprayed replicates had reduced symptoms, with disease seen primarily in the upper canopy.

In 2025, this reduction in disease did not consistently translate to higher yield or improved grain size, likely because limited moisture was a key driver of crop performance.

NDVI AND SOIL CONSTRAINTS

Multispectral imagery was collected on 24 July (GS20–29) prior to the first in-crop urea application, with results presented in Figure 4.

Normalized Difference Vegetation Index (NDVI) is a satellite-derived measure of green biomass and canopy vigour that provides an indication of crop growth and ground cover.

Maximus CL is generally better suited to low–medium rainfall environments and is a quick–mid maturity variety, whereas Neo CL is adapted to medium–high rainfall environments and has a mid–slow maturity. Observed differences in NDVI between these varieties may, in part, be influenced by their contrasting growth habits.

Further, Maximus CL exhibits a more erect growth habit, while Neo CL tends to be semi-prostrate. These structural differences in canopy architecture may affect how biomass is detected by satellite imagery. A more erect canopy (Maximus) may present less ground cover at certain growth stages compared to a semi-prostrate type (Neo), potentially leading to lower NDVI values despite comparable biomass production.

Consequently, varietal growth habit and plant architecture should be considered when interpreting NDVI at field scale.

NDVI results

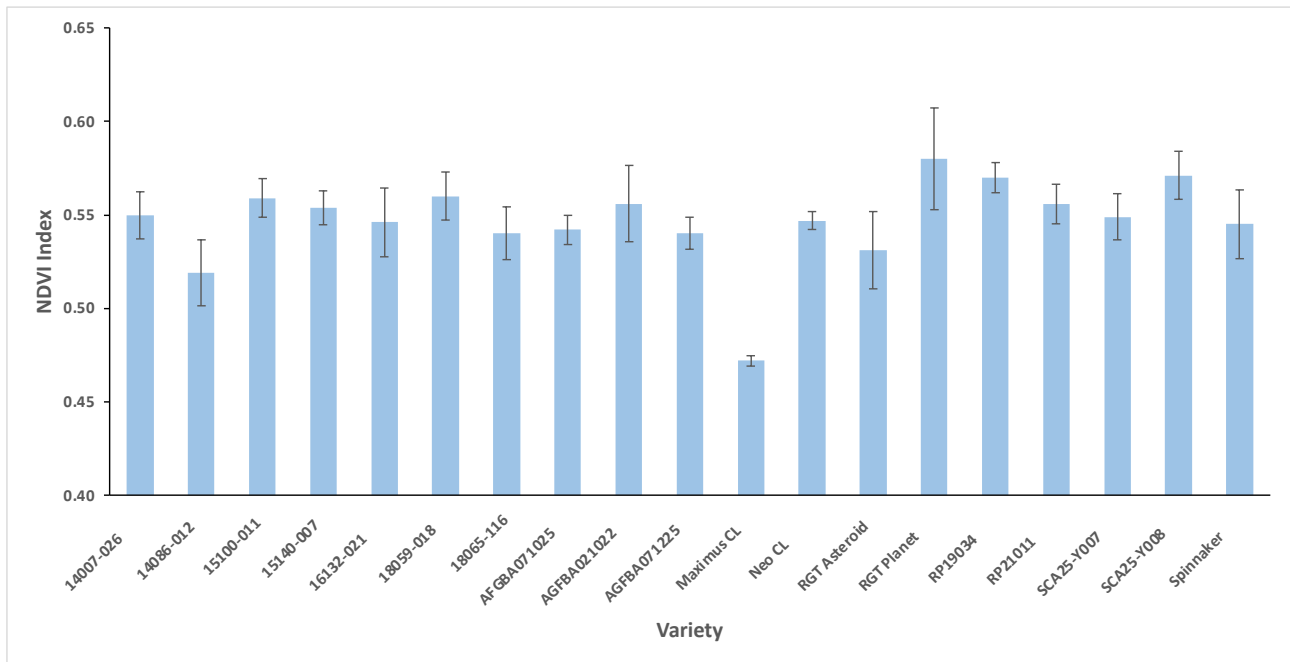


Figure 4 NDVI imagery values taken on 24 July (approximately GS20–29)

SOIL CONDITIONS

Pre-sowing soil testing identified sub-surface acidity in the 5–15 cm layer and visible shallow rooting/compaction constraints. While topsoil pH (CaCl₂) was generally within a suitable range, acidity at depth may have restricted rooting and access to stored moisture, contributing to within-site variability during a dry season.

CONCLUSIONS

To achieve malt 1 grade specifications, barley needs to achieve protein between 9–12 percent protein, screenings less than 7 percent and hectolitre weight greater than 70 kg/HL. Assessing against these requirements, none of the grain samples met the malt 1 standards.

Key messages from the trial were:

- 2025 conditions were moisture-limited, resulting in modest yields and generally elevated protein.
- Varieties differed significantly for yield, protein, test weight and grain size. These differences provide a useful shortlist for further local evaluation
- Fungicide reduced foliar disease, but yield and grain quality benefits were small in 2025. In seasons with higher yield potential, or earlier disease onset, responses may be larger.
- Future work will focus on refining nitrogen strategies (rate and timing) to better match seasonal yield potential and improve the probability of meeting malting specifications, alongside continued benchmarking of varietal disease resistance.

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