

Yield Prophet® performance in 2019

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Key findings

- Yield Prophet® closely predicted wheat grain yield for Scepter towards the end of the season.
- Lack of rainfall during the season meant the difference between 20% and 80% of years was 0.8 t/ha in mid-September and only 0.1 t/ha in early October.

Why do the trial?

Wheat growth models such as APSIM are highly valuable in their ability to predict wheat yield.

Yield Prophet® is an internet-based service using the APSIM wheat prediction model. The model relies on accurate soil character information such as plant available water and soil nitrogen levels, as well as historical climate data and up to date local weather information to predict plant growth rates and final hay or grain yields.

This early prediction of grain yield potential means it can be used to directly influence crop input decisions. No other tool is currently available to growers, which can provide information of this accuracy at such a useful time of the season.

How was it done?

Seeding date	May 1, 2019	Fertiliser	30 kg N/ha May 1 20 kg N/ha July 18
Variety	Scepter wheat @ 180 plants per square metre		

Yield Prophet® simulations were run throughout the season to track the progress of wheat growth stages and changes in grain yield predictions.

The 20%, 50% and 80% levels of probability refer to the percentage of years where the corresponding yield estimate would have been met, according to the previous 100 years of rainfall data.

Results

At the first simulation, June 20 Yield Prophet® predicted that Scepter wheat sown on May 1 would yield 3.9 t/ha in 50% of years (Figure 1). June was the only month where Hart received above average rainfall in 2019. The Yield Prophet® prediction remained high at 3.6 t/ha going into July. After well below average rainfall in July and August (Table 1), it is not surprising this yield prediction reduced to 2.5 t/ha by late August.

The Yield Prophet® simulation in mid-September decreased further by 1.0 t/ha. This was driven by below average rainfall for September (Table 1). By mid-October, the 20%, 50% and 80% of year's prediction were closely aligned between 1.3 – 1.4 t/ha. The actual grain yield for Scepter sown in mid-May was 1.6 t/ha in the Hart wheat variety trial (trial average 1.5 t/ha). Yield Prophet® closely predicted wheat grain yields towards the end of the season as it has in previous years. Localised frost damage was observed in the district and would have contributed to lower grain yields. The effects of heat and frost stress were not modelled in the predictions presented here. Yield predictions from the last eight seasons (Figure 2) have demonstrated Yield Prophet® can accurately predict yields with an average finish.



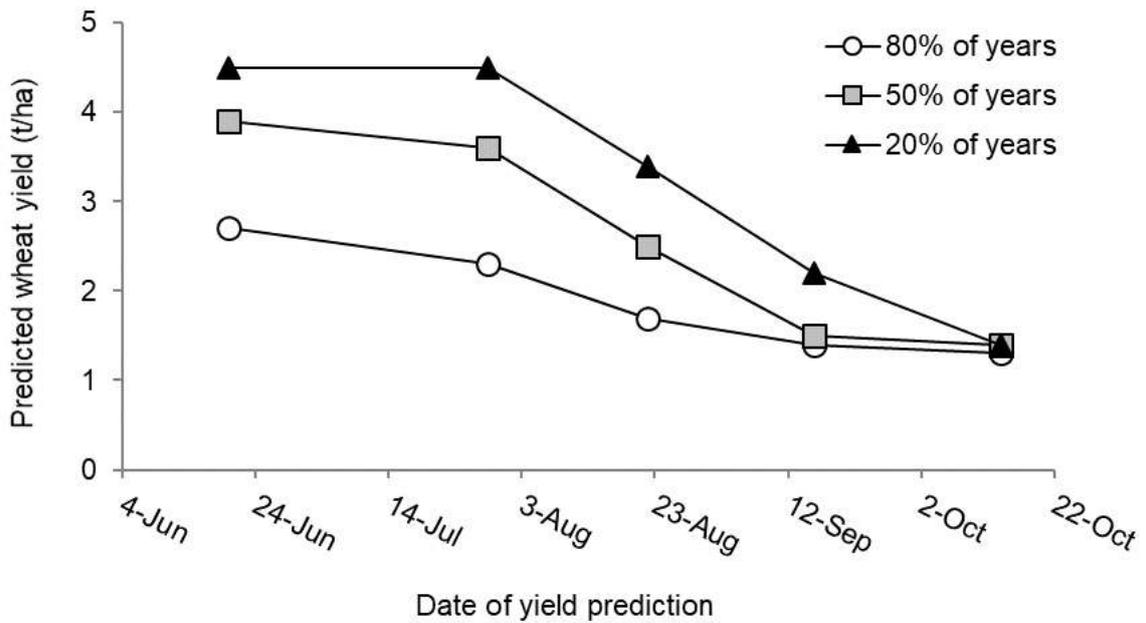


Figure 1. Yield Prophet® predictions from June 20 to October 14 for Scepter wheat sown on the May 1, 2019. The 80%, 50% and 20% represent the chance of reaching the corresponding yield at the date of the simulation.

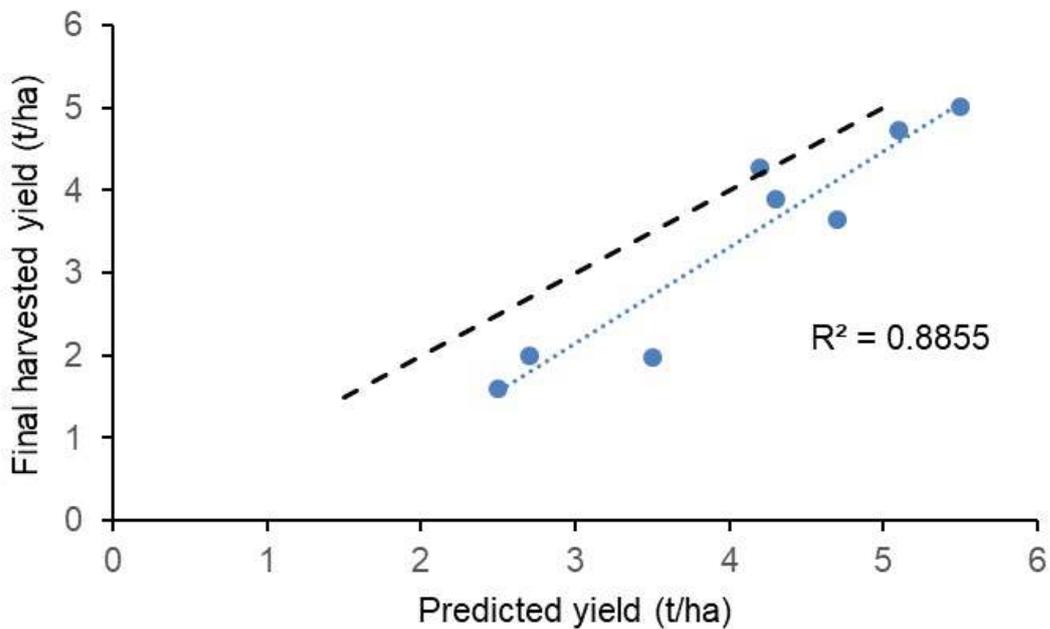


Figure 2. The relationship between predicted yield in mid-August, given an average finish to the season, against final harvested grain yield (blue line). This is a summary of Hart wheat yields from 2012 to 2019. The dashed black trendlines is the 1:1 line, through point 0.

Table 1. Long-term (100-year average) and 2019 monthly rainfall (mm) for Hart.

	Long-term average (mm)	2019 (mm)	Difference (mm)
Jan	19	2	-17
Feb	21	5	-16
Mar	18	3	-15
Apr	27	8	-19
May	44	41	-3
Jun	50	56	6
Jul	49	21	-28
Aug	48	18	-30
Sep	44	14	-30
Oct	37	4	-33
Nov	27	14	-13
Dec	24	2	-22
Total	408	189	

Plant available water (PAW) (0-90 cm) in mid-June was low, at 48 mm (Figure 3). This was the same as the stored moisture content this time in 2018. Across the entire growing season PAW never exceeded 50 mm (or 25% of the 'bucket' estimated to hold 200 mm PAW). Plant available water continued to decrease from June through to October. From early September the bucket water level decreased to almost empty at the start of October, reflecting the dry finish and signalling another early harvest.

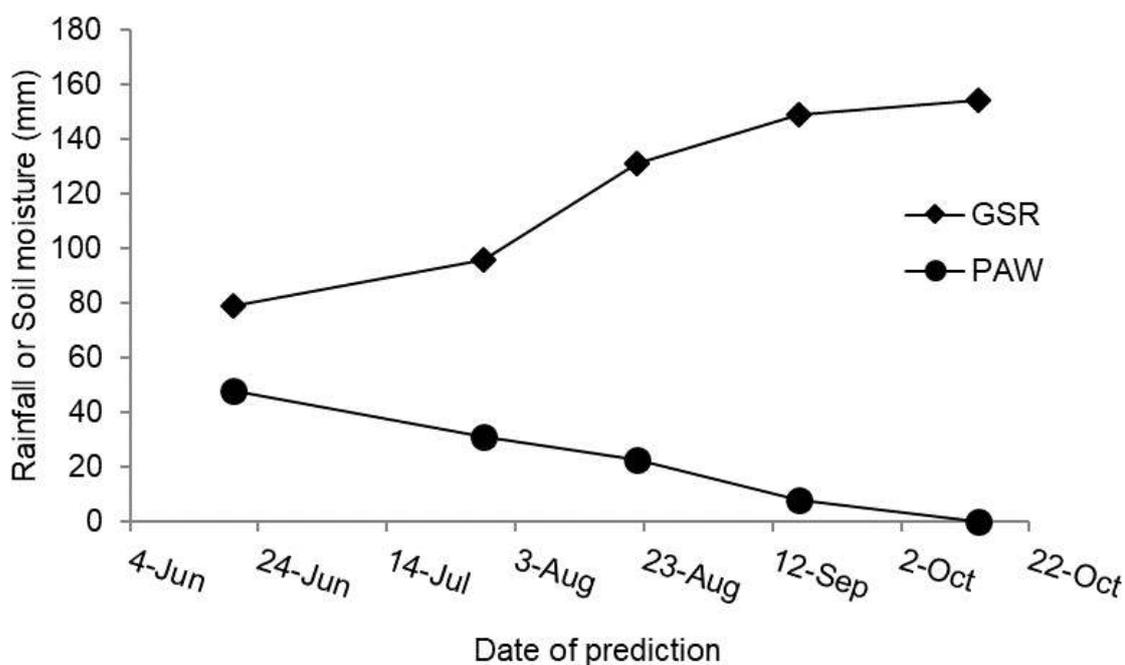


Figure 3. Predicted plant available water (PAW) and recorded cumulative growing season rainfall from June 20 to October 14 at Hart in 2019.

HART BEAT - yield predictions through the growing season for 8 Mid-North sites



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It is aimed at providing farmers and agronomists with regular updates of current and predicted crop and soil conditions as a season progresses.

We believe it will assist in making informed choices on the need for additional nitrogen and fungicide applications.

The Yield Prophet® simulations featured are not a crystal ball but provide a realistic prediction of the available soil water and nitrogen status of your crop.

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