Yield Prophet® performance in 2016

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Key findings

- Yield prophet closely predicted wheat grain yields in the Hart district.
- Heavy rainfall in September meant the difference between 20% and 80% of years was only 0.2 t/ha towards the end of the season.

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	1st May 2016	**Fertiliser**	40 kg N/ha 1st May
			30 kg N/ha 4th July
Variety	Mace 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.

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, 6th June 2016 Yield Prophet® predicted that Mace wheat sown on the 1st May would yield 4.5 t/ha in 50% of years (Figure 1). After average rainfall in June and July it is not surprising that this yield prediction remained almost unchanged at 4.7 t/ha in late July. This yield prediction was closely maintained up until the end of August.

The Yield Prophet® simulation on the 5th of October for grain yield, increased by a further 0.4 t/ha. This was driven by the receival of 119 mm for September, 75 mm than the long-term average. The 80% of years prediction was also 5.1 t/ha and a further 0.2 t/ha in the top 20% of years. The actual grain yield for Mace wheat sown in early May was variable at Hart in 2016, ranging from 3.7 t/ha to 5.4 t/ha in the wheat variety and time of sowing trials. In cases where the yield prediction was poorer, can be attributed to both weather damaged (grain loss observed later in the season from wind/hail) and where crops were nitrogen limited. In general however, Yield Prophet® closely predicted wheat grain yields in the Hart district as it has in previous seasons.
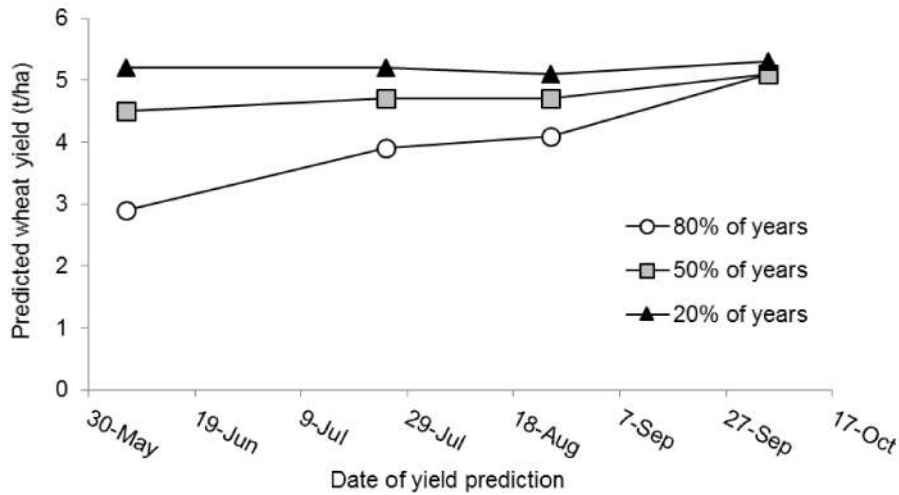
Figure 1. Yield Prophet® predictions from 6th June to the 5th October for Mace wheat sown on the 1st May, 2016. 80%, 50% and 20% represent the chance of reaching the corresponding yield at the date of the simulation.

Plant available water (PAW) (0-90 cm) when the first simulation was run at the beginning of June was 33 mm (Figure 2). This was 19 mm less stored moisture compared to the same time in 2015. Plant available water increased during July and remained steady across August. From early September the soil moisture level increased to 112 mm. At the end of October PAW started to decline however, even in early November there was still 75 mm PAW remaining (data point not shown). This soil moisture combined with 14 mm and 53 mm in November and December respectively meant there was soil moisture left in the profile after harvest.
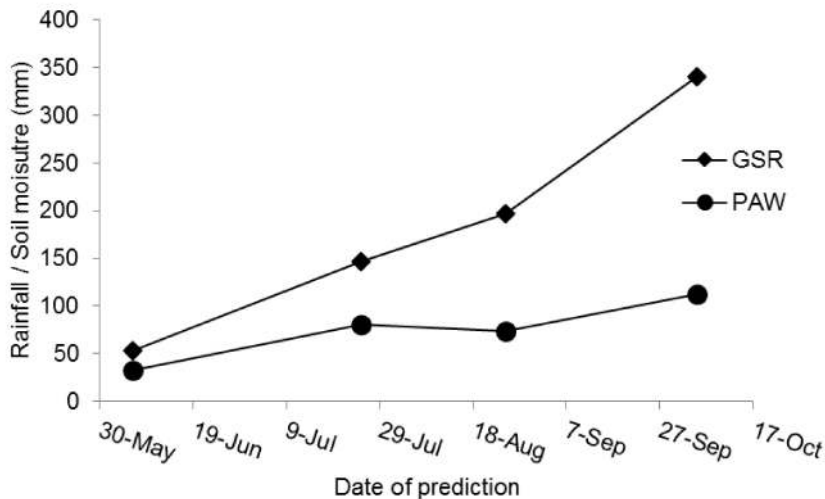

Figure 2. Predicted plant available water (PAW) and recorded cumulative growing season rainfall from 6th of June to 5th of October at Hart in 2016.