Yield Prophet® performance in 2017

Sarah Noack, Hart Field-Site Group

Key findings

- Yield prophet under predicted the final grain yield of Mace (3.9 t/ha) at Hart in 2017.
- Lack of rainfall during the season meant the difference between 20% and 80% of years was only 0.5 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 2017	**Fertiliser**	40 kg N/ha 1st May
			20 kg N/ha 20th July
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.

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, 1st June 2017 Yield Prophet® predicted that Mace wheat sown on the 1st May would yield 4.8 t/ha in 50% of years (Figure 1). After well below average rainfall in June and July, it is not surprising that this yield prediction reduced to 4.3 t/ha from mid-June until late August.

The Yield Prophet® simulation on the 10th of October for grain yield, decreased by a further 1.0 t/ha. This was driven by below average rainfall for September and October (45 mm below the long-term average). The 20% of year's prediction was slightly higher at 3.5 t/ha. The actual grain yield for Mace sown in early May was 3.9 t/ha in the Hart wheat variety trial. The Yield Prophet® predicted wheat grain yield at Hart was down in comparison to previous seasons.
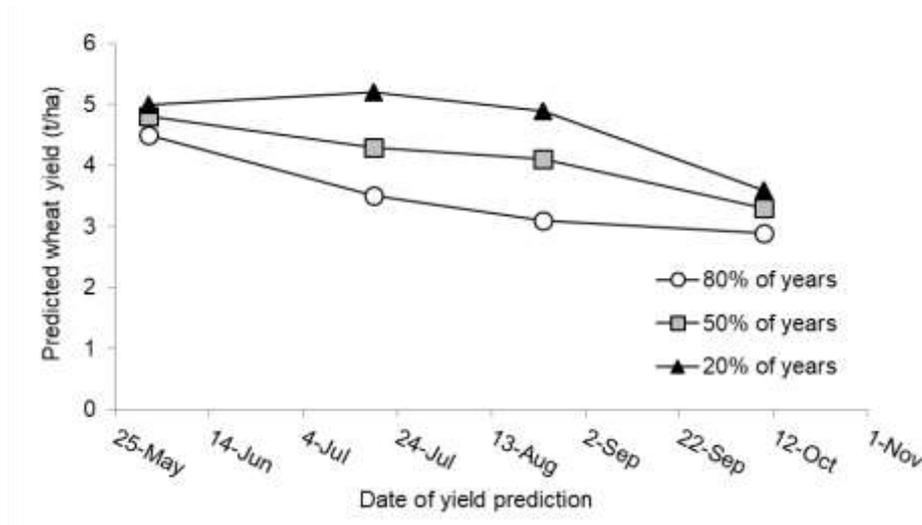
Figure 1. Yield Prophet® predictions from 1st June to the 10th October for Mace wheat sown on the 1st May, 2017. 80%, 50% and 20% represent the chance of reaching the corresponding yield at the date of the simulation.

Plant available water (PAW) (0-90 cm) when the first simulation was run at the beginning of June was 169 mm (Figure 2). This was significantly more stored moisture compared to the same time in 2015 (19 mm) and 2016 (33 mm). Plant available water decreased rapidly during June and July due to below average rainfall. Rainfall in August kept the PAW level consistent. From early September the bucket water level decreased to almost empty at the start of October. The soil moisture probe at Hart also indicated that the soil bucket was almost empty, with wheat roots extracting to depths of 80 cm at the beginning of October. The next major rainfall fell in early December. This event 'topped the bucket up' and there was approximately 40% stored soil moisture at the end of January 2018.
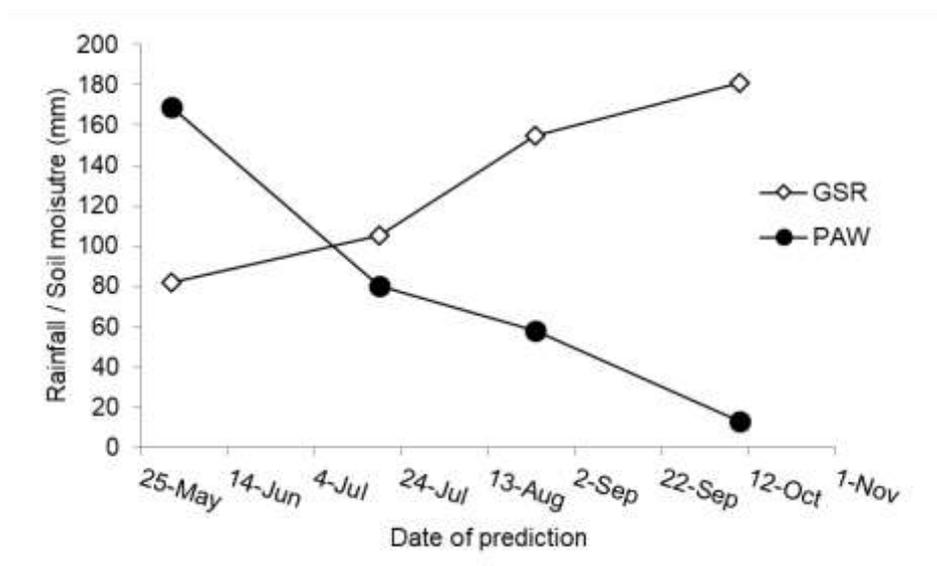

Figure 2. Predicted plant available water (PAW) and recorded cumilative growing season rainfall from 1st of June to 10th of October at Hart in 2017.