Yield Prophet® performance in 2012

Key findings

- Yield prophet accurately predicted a final grain yield near 2.2t/ha

- Predictions made in mid-August using an average finish to the season have been 80% accurate

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.

The *Yield Prophet®* (YP) wheat growth model has been very accurate throughout Australia over the past 7 years in a range of soil types and seasons. At 4 sites in the Mid-North over the past 5 seasons YP has demonstrated this accuracy by providing accurate yield predictions with an average finish, in mid-August (Figure 1).
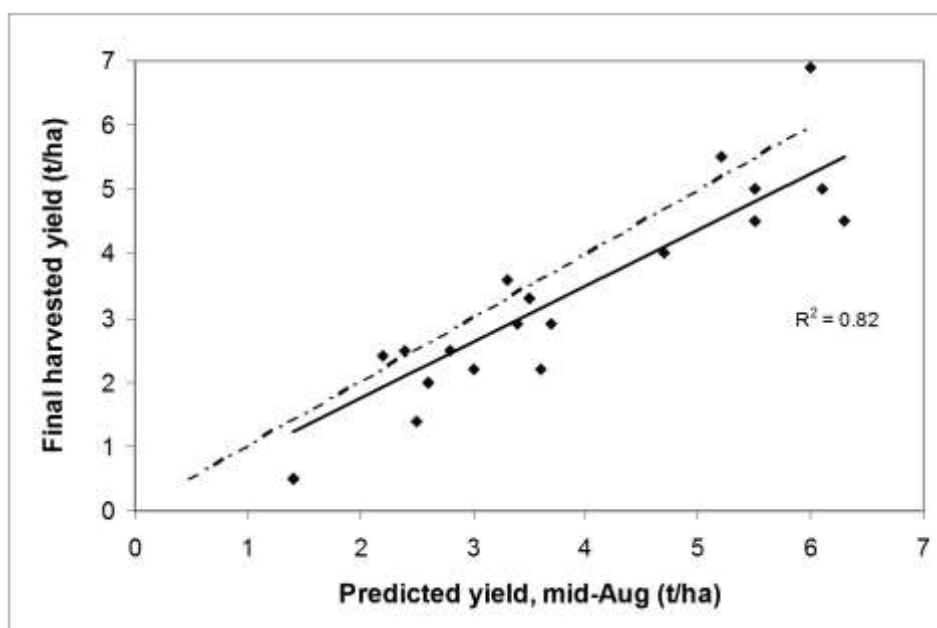

Figure 1: The relationship between predicted yield in mid-August, given an average finish to the season, against harvested grain yield. The sites and seasons include Spalding, Condowie, Tarlee (for 2009 to 2012), and Hart (2005 to 2012). The dashed trendline in the 1:1 line, through point 0.

This early prediction of grain or hay 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.

While Yield Prophet does provide a very good guide for potential yield, Figure 1 shows that it tends to over estimate predicted grain yield in mid-August, compared to the 1:1 comparison line on the chart.

How was it done?

Seeding date	1st June 2012	**Fertiliser**	DAP @ 50kg/ha	
			UAN @ 70L/ha 29th July	
Variety	Gladius wheat @ 80kg/ha			

Soil samples were taken for soil nitrogen and moisture on the 18th May 2012.

Table 1. Soil conditions at Hart (0-90cm), 18th May 2012.

Available soil moisture	44 mm
Initial soil N	65 kg/ha

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

The grain yield for Gladius wheat sown on the 1st May at Hart in 2012 was 2.2t/ha. This final grain yield matched the Yield Prophet® prediction (Figure 2).

At the first simulation, 23rd June 2012, the Yield Prophet® simulation predicted that Gladius wheat sown on the 1st June would yield 3.5t/ha in 50% of years. The predicted grain yield was maintained up until mid-August, where it then decreased steadily due to below average spring rainfall and mild temperatures. The Yield Prophet® on the 8th October for grain yield, given an average (50%) finish to the season, was 2.0t/ha.
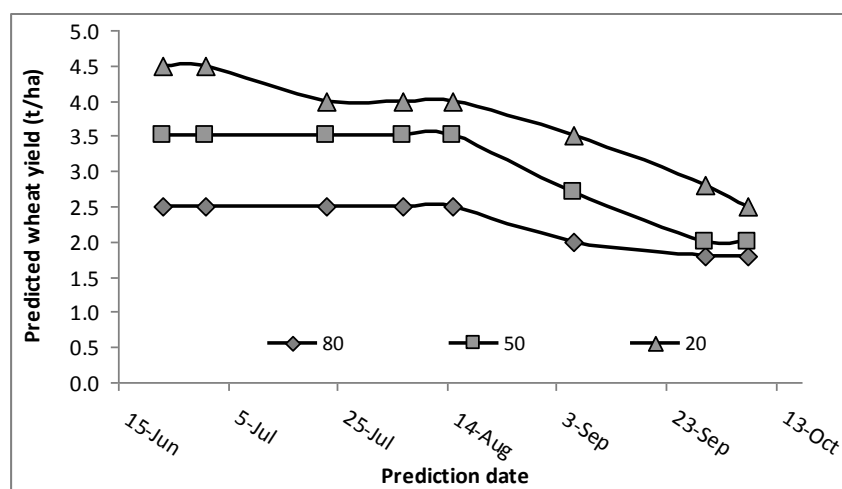

Figure 2: Yield Prophet® predictions from 15th June to the 13th October for Gladius wheat sown on the 1st June with 50kg/ha DAP. 80%, 50% and 20% represent the chance of reaching the corresponding yield at the date of the simulation.

At time of sowing, plant available water (PAW) measured 44mm (0-90cm) due to reasonable levels of stored moisture from spring (2011) and summer (2012) rains. PAW increased significantly up until the end of July and then dropped due to a lack of rain. With greater crop use and higher temperatures, it dropped to below 10mm PAW by the end of October. Fortunately temperatures did not exceed 30°C and enabled crops to fill good quality grain.
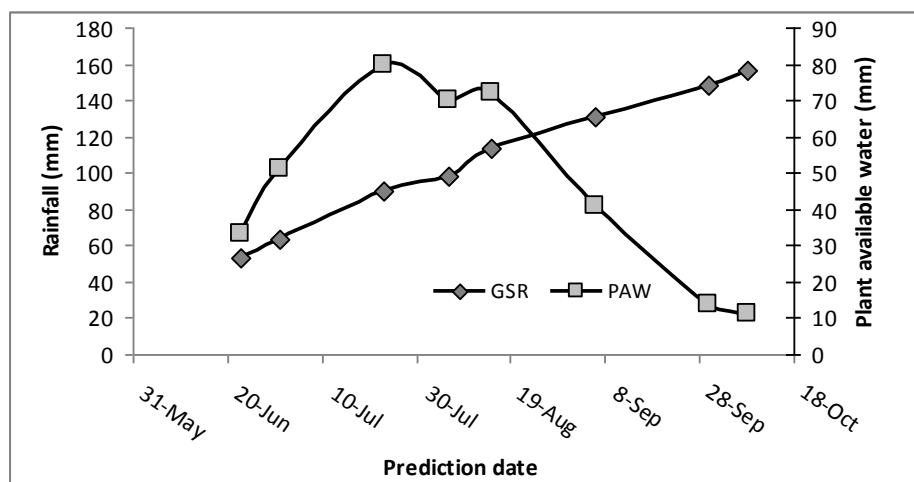

Figure 3: Predicted plant available water and recorded cumulative growing season rainfall from 20th June to the 15th October at Hart in 2012.

Michael Jaeschke, Allan Mayfield, Kevin Jaeschke and Matt Dare at the 30th Annual Hart Field Day, 2012