# HART BEAT

25<sup>th</sup> July 2018

### **ISSUE 46**

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- <u>Eudunda</u>
- <u>Tarlee</u>

## HART BEAT

### Yield Prophet<sup>®</sup> simulations for 8 sites across the mid-north of SA

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



## HART EVENTS

Hart Field Day – September 18, 2018 Spring Twilight Walk – October 16, 2018

## Definitions

### Hart Beat definitions

Each site has been characterised for plant available water capacity (PAWC) and bulk density to determine how much of the measured water and nitrogen is available to the crop during the season.

**Drained upper limit (DUL)** – is the amount of water that a saturated soil holds after it has drained.

**Crop lower limit (CLL)** – is the amount of water remaining in the soil after crop senescence.

**Plant available water capacity (PAWC)** – is the difference between the drained upper limit of the soil and the lower extraction limit of a crop over the depth of rooting. It is the maximum water available to a crop from a particular soil type.

**Plant available water (PAW)** – is the amount of water contained in the soil at a given time minus the crop lower limit.

**Bulk density (BD)** – is a measure of the weight of dry soil per unit volume of soil.

**Growing season rainfall (GSR)** – is rainfall for the period between and including April to October.

**Decile** – is a measure of seasonal rainfall on a scale of 1 to 9. In a decile 7 year, 70% of previous years were dryer, in a decile 3 year 30% of previous years were dryer.

**Yield probability curves** - display two different nitrogen scenarios for each site. The **green dashed line** displays the actual grain yield with the current soil available nitrogen. The **blue dashed line** represents the grain yield potential with unlimited nitrogen (yield potential). A small difference between these two lines indicates the current soil N level is adequate for the crop to reach its yield potential. Conversely, a large difference between these two lines indicates additional N fertiliser is required for the crop to reach its yield potential. Both these lines also now take into account frost and heat effects on grain yield potential.

The **French & Schultz** formula estimates the rainfall limited grain yield based on the growing season rainfall (GSR). It assumes evaporation of 110mm, includes stored water at sowing (30% of Jan to Mar rainfall) and a maximum grain yield potential of 20 kg/mm/ha.

Yield Potential = GSR (Apr-Oct) – Evaporation (110mm) \* 20 kg/mm/ha.

**Yield Prophet**<sup>®</sup> has been very accurate throughout Australia, over the past 5 seasons. At the Hart field site the <u>Yield Prophet</u><sup>®</sup> prediction on the 15<sup>th</sup> September, using an average finish, has been only 16% above the final grain yield, averaged over the past 4 years, making wheat growth models such as APSIM highly valuable.

*Yield Prophet*<sup>®</sup> is an internet based service which uses the APSIM wheat prediction model.

The model relies on accurate soil, crop, historical climate data and up to date local weather information to predict plant growth rates and final hay or grain yields. These are critical measurements specific to the site being analysed and may not fit closely to individual situations. Instead the predictions will give a realistic guide to seasonal prospects based on a site with similar rainfall and / or soil type.

Using climate data for the current season, *Yield Prophet*<sup>®</sup> simulates the soil water and nitrogen processes in the paddock, and crop growth. *Yield Prophet*<sup>®</sup> calculates the amount of water and nitrogen available to the crop and the water and nitrogen demand of the crop.

**Disclaimer:** *Yield Prophet*<sup>®</sup> information is used entirely at your own risk. You will accept all risks and responsibility for losses, damages, costs and other consequences of using *Yield Prophet*<sup>®</sup> information and reports. To the maximum extent permitted by law, APSRU and BCG excludes all responsibility and liability to any person arising directly or indirectly from using the information generated by *Yield Prophet*<sup>®</sup>.

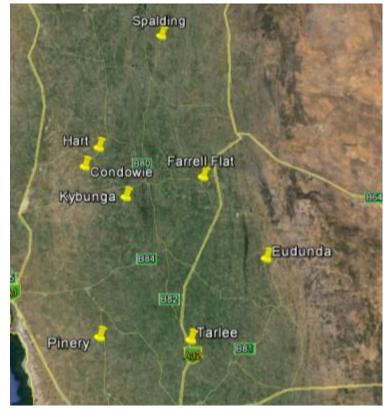
**Important Notice:** *Yield Prophet*<sup>®</sup> does not generate recommendations or advice, it is only a guide and must be combined with local paddock and district knowledge. APSIM does not take into account weed competition, pest/disease pressure, pesticide / herbicide damage, farmer error, or extreme events (such as extreme weather, flood and fire). For more information about APSIM or *Yield Prophet*<sup>®</sup> please visit or www.yieldprophet.com.au.

## Site information

### Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	Plant Available Water Capacity (mm)	Soil Profile Depth (cm)	Plant Available Water at 16 April (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	17	77
Spalding	430	Red brown earth	143	150	16	68
Condowie	350	Sandy loam	115	150	0	80
Kybunga	428	Clay loam	262	120	22	72
Farrell Flat	474	Light clay loam	172	120	11	68
Pinery	374	Silty clay loam	79	150	0	59
Eudunda	445	Gravelly loam	96	100	19	67
Tarlee	474	Sandy loam	113	150	26	76

### 2018 site locations





### SANDY CLAY LOAM

### Crop growth

Variety: Mace wheat

Sowing date: Emergence date:

e: 1st May date: 12<sup>th</sup> May Nitrogen fertiliser:

**GSR decile:** 

PAWC:

30 kg N/ha at seeding + 20 kg N/ha 18<sup>th</sup> July

#### The season so far

Annual rain to date: GSR to date: Current predicted PAW: 120 mm 96 mm (*17 mm since last report*) 31 mm (*15 % full*)

#### Grain yield predictions (Yield Prophet)

Yield prophet estimate:(Date of report 25/07/2018)These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.0	-0.7	2.6	-0.8

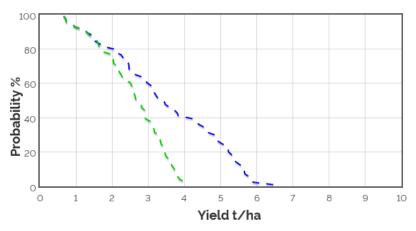
#### French & Schultz grain yield estimate:

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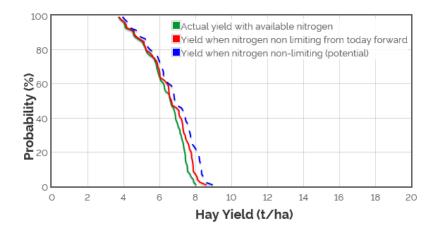
206 mm

100% WUE:	2.5 t/ha
80% WUE:	2.0 t/ha
This model assumes that the	rais 7 mm stored maisture

Inis model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (131 mm) for the rest of the season.



The graphs above and below show the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.



## **SPALDING**

### **RED BROWN EARTH**

#### **Crop growth**

Variety:	Mace wheat

Sowing date: **Emergence date:** 

1st May 11<sup>th</sup> May

Nitrogen fertiliser:

**GSR decile:** 

PAWC:

100

80

8 60

Probability 40 4

143 mm

Grain yield outcome graph

30 kg N/ha at seeding + 20 kg N/ha 18<sup>th</sup> July

The season so far Annual rain to date: 161 mm GSR to date: 132 mm (33 mm since last report) **Current predicted PAW:** 54 mm (38 % full)

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2018)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.5	-0.1	2.9	-0.4

#### French & Schultz grain yield estimate:

100% WUE:	3.5 t/ha
80% WUE:	2.8 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (143 mm) for the rest of the season.

## **CONDOWIE**

**Crop growth** Mace wheat Sowing date: Nitrogen fertiliser: 30 kg N/ha at seeding + Variety: 1st May 12<sup>th</sup> May 20 kg N/ha 18<sup>th</sup> July **Emergence date:** The season so far Annual rain to date: 119 mm GSR to date: 99 mm (21 mm since last report) **GSR decile:** 3 **Current predicted PAW:** 11 mm (10 % full) PAWC: 115 mm Grain yield outcome graph Grain yield predictions (Yield Prophet) (Date of report 25/07/2018) Yield prophet estimate: These estimates are based on a 50% probability 80 Sown Change Change 1<sup>st</sup> May Yield Sown **%** 60 since last since last 20<sup>th</sup> May Probability t/ha (see report report graph) 40 Grain -0.3 1.5 1.0 -0.3 French & Schultz grain yield estimate: 100% WUE: 2.0 t/ha 2 4 6 8 9 5 80% WUE: 1.6 t/ha Yield t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (107 mm) for the rest of the season.



Yield t/ha

This graph shows the chance of reaching the corresponding yield given

weather, soil conditions and agronomic inputs to date, and historical

climate data (100yrs) to simulate remainder of the season.

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10

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## **KYBUNGA**

Mace wheat

**Crop growth** Variety:

GSR to date:

The season so far Annual rain to date:

### **CLAY LOAM**

#### **Current predicted PAW:** 46 mm (18 % full) 262 mm Grain yield predictions (Yield Prophet) Grain yield outcome graph Yield prophet estimate: (Date of report 25/07/2018) 100 These estimates are based on a 50% probability 80 Sown Change Change Yield 1<sup>st</sup> May Sown since last since last 8 60 t/ha 20th May (see report report graph) Grain 3.1 -0.8 2.6 -0.6

138 mm (31 mm since last report)

1st May

11<sup>th</sup> May

Sowing date:

159 mm

**Emergence date:** 

#### French & Schultz grain yield estimate:

100% WUE:	4.0 t/ha
80% WUE:	3.2 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (168 mm) for the rest of the season.

## **FARRELL FLAT**

						LIGE
Crop grov	vth					
Variety:	Mace wheat	Sowing da	ate:	1st May	Nitrogen fertiliser:	: 30 kg N/
		Emergend	e date:	12 <sup>th</sup> May		20 kg N/
The seaso	on so far					
Annual rair	n to date:	186 mm				
GSR to date	e:	156 mm	(33 mm sind	e last repo	rt) GSR decile:	4
Current pre	edicted PAW:	60 mm (3	35% full)		<b>PAWC:</b> 1	.72 mm
Grain yiel	d prediction	s (Yield Proj	ohet)		Grain yield	outcome g
Yield proph	net estimate:	(Date oj	f report 25/0	07/2018)	100	•.
These estime	ates are based o	n a 50% probab	ility			No
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since la report	st Š	
Grain	4.5	-0.2	3.7	-0.5	<b>D D D D</b>	```
French	& Schultz graiı	n vield estima	te.			
enen	100% WUE:	i yicia estinia	4.4	t/ha	0 1	2 3
	80% WUE:		3.5	t/ha		

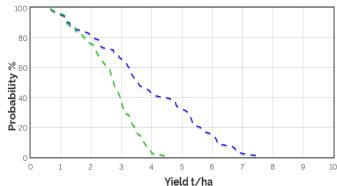
This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (166 mm) for the rest of the season.

4

Nitrogen fertiliser:

**GSR decile:** 

PAWC:



30 kg N/ha at seeding +

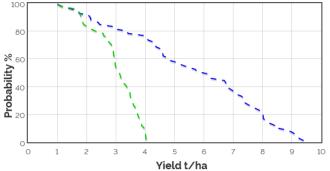
20 kg N/ha 18<sup>th</sup> July

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

### **LIGHT CLAY LOAM**

I/ha at seeding + l/ha 18<sup>th</sup> July

#### graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.



### SILTY CLAY LOAM

10

#### Crop growth

Variety:	Mace wheat

Sowing date: 1st May **Emergence date:** 13<sup>th</sup> May

Nitrogen fertiliser:

**GSR decile:** 

PAWC:

80 8 60

20 Probability 5

0

1

79 mm

Grain yield outcome graph

30 kg N/ha at seeding + 20 kg N/ha 18<sup>th</sup> July

Yield t/ha

This graph shows the chance of reaching the corresponding yield given

weather, soil conditions and agronomic inputs to date, and historical

climate data (100yrs) to simulate remainder of the season.

The season so far Annual rain to date: 117 mm GSR to date: **Current predicted PAW:** 

94 mm (19 mm since last report) 31 mm (39 % full)

#### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2018)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.1	-0.6	2.7	-0.6

#### French & Schultz grain yield estimate:

100% WUE:	2.5 t/ha
80% WUE:	2.0 t/ha

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (134 mm) for the rest of the season.

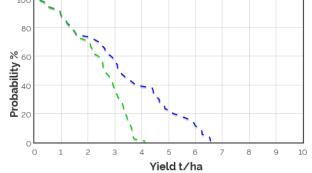
## **EUDUNDA**

						GRAVELLY	
Crop gro		. C		1 -+ 1 4			
Variety:	Mace whea	0	date: ince date:	1st May 14 <sup>th</sup> May	Nitrogen fertiliser:	30 kg N/ha at seeding + 20 kg N/ha 18 <sup>th</sup> July	
	son so far						
	ain to date:	141 mi					
GSR to da	ate:	102 mi	m (23 <i>mm sii</i>	nce last repo	rt) GSR decile:	1	
Current p	redicted PAW	<b>/:</b> 25 mm	(26 % full)		<b>PAWC:</b> 96	5 mm	
Grain yi	eld predictio	ons (Yield Pr	ophet)		Grain yield o	utcome graph	
Yield pro	phet estimate	: (Date	of report 25	5/07/2018)	100		
These estir	mates are based	l on a 50% prob	ability				
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report	Probability %		
Grain	2.9	-1.4	2.6	-1.3	probi		

#### French & Schultz grain yield estimate:

100% WUE:	3.2 t/ha
80% WUE:	2.5 t/ha

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (155 mm) for the rest of the season.



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## **TARLEE**

**Crop growth** 

### **SANDY LOAM**

Variety:	Mace wheat	Sowing date: Emergence date:		1st May 10 <sup>th</sup> May	Nitrogen fert	
The seas	on so far					
Annual ra	in to date:	115 mm				
GSR to da	o date: 94 mm (17 mm since last report)				GSR decil	
Current p	redicted PAW:	20 mm <i>(18</i> 9	PAWC:			
	ld prediction			07 (204 0)		
Yield prop	het estimate:	e: (Date of report 25/07/2018)				
These estimates are based on a 50% probability						
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change Since last Report	Sown 20 <sup>th</sup> May	Change Since La Report	ist % ₀₀	
Grain	3.2	-0.7	2.7	-0.8	oba	
			:	1	<b>č</b> 20	
French &	Schultz grain yi	eld estimate:				
1(	00% WUE:		3.1 t/ha	1		

80% WUE: 2.5 t/ha This model assumes that there is 6 mm stored moisture, 110 mm of

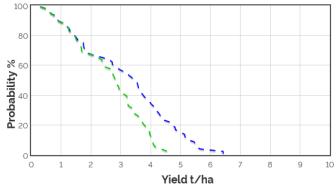
evaporation and Decile 5 rainfall (164 mm) for the rest of the season.

### Nitrogen fertiliser:

30 kg N/ha at seeding + 20 kg N/ha 18<sup>th</sup> July

ile: 1 113 mm

### yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## Winter Walk 2018

