

HART

BEAT

Yield Prophet® simulations for 8 sites across the Mid-North of SA

Hart | Spalding | Condowie
Kybunga | Farrell Flat | Pinery
Eudunda | Tarlee



ISSUE 55
June 28, 2021

HART BEAT definitions

All sites have 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.

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.

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 Prophet[®] 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*[®] simulates the soil water, nitrogen processes and crop growth in the paddock. *Yield Prophet*[®] calculates the amount of water and nitrogen available to the crop as well as the water and nitrogen demand of the crop.

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.

Disclaimer: *Yield Prophet*[®] 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*[®] 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*[®].

Important Notice: *Yield Prophet*[®] 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*[®] please visit www.yieldprophet.com.au.

Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	PAWC (mm)	Soil sampling date	Profile depth (cm)	Pre-sowing nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	April 7, 2021	150	61
Spalding	430	Red brown earth	143	April 9, 2021	150	64
Condowie	350	Sandy loam	115	April 7, 2021	150	65
Kybunga	428	Clay loam	262	April 7, 2021	120	69
Farrell Flat	474	Light clay loam	172	April 9, 2021	120	67
Pinery	374	Silty clay loam	79	April 9, 2021	150	60
Eudunda	445	Gravelly loam	96	April 9, 2021	100	63
Tarlee	474	Sandy loam	113	April 9, 2021	150	60

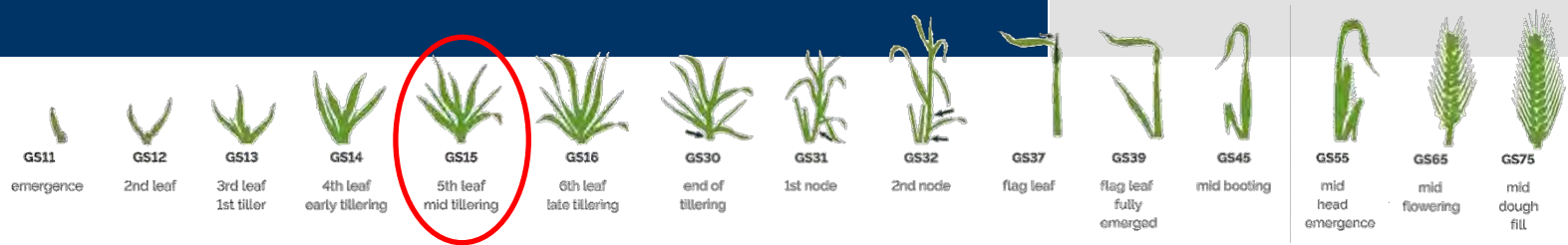
2021 site locations



Location:

HART

HART BEAT



HART

Soil type: Sandy clay loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2021
 Emergence: May 19, 2021
 Nitrogen fertiliser: 30 kg N/ha @ seeding

The season so far

Annual rainfall to date: 121 mm
 GSR to date: 84 mm
 Current GSR decile: 3
 Current predicted PAW: 51 mm (25% full)
 PAWC: 206 mm

Yield Prophet® predictions

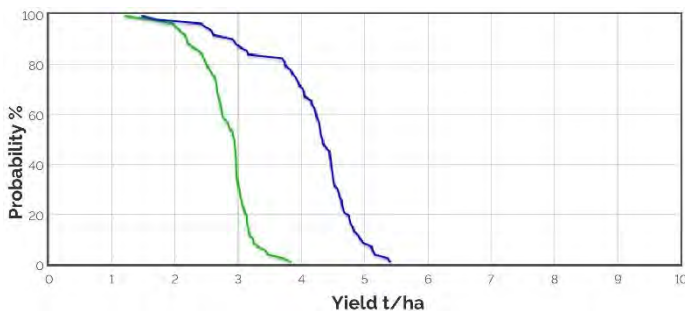
(based on a 50% probability)

Wheat sown May 1: **3.6 t/ha**

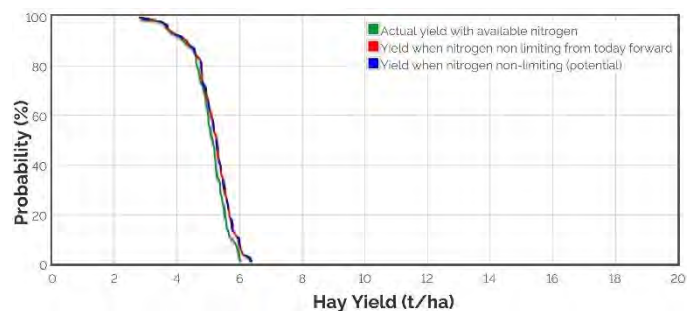
also see graphs below

Wheat sown May 20: **3.9 t/ha**

Grain yield outcome graph



Hay yield outcome graph



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

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 11 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (179 mm) for the remainder of the growing season.

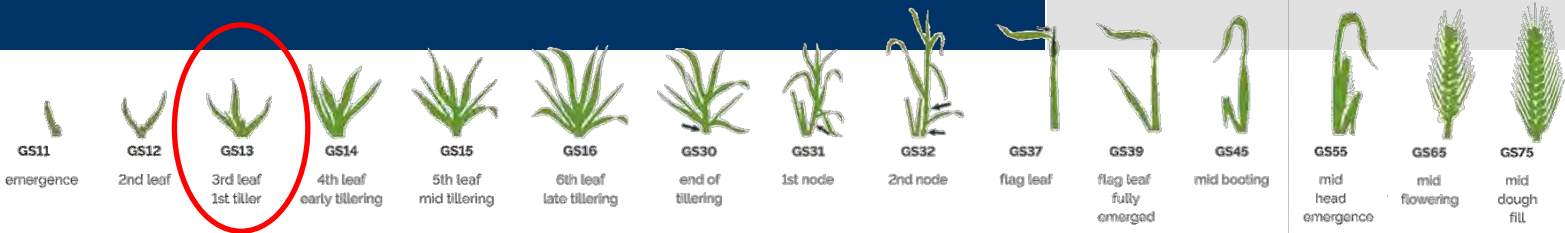
100% WUE **3.3 t/ha**

80% WUE **2.6 t/ha**

Location:

SPALDING

HART BEAT



SPALDING

Soil type: Red brown earth

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
Sowing date: May 1, 2021
Emergence: June 5, 2021
Nitrogen fertiliser: 40 kg N/ha @ seeding

The season so far

Annual rainfall to date: 142 mm
GSR to date: 112 mm
Current GSR decile: 6
Current predicted PAW: 73 mm (51% full)
PAWC: 143 mm

Yield Prophet® predictions

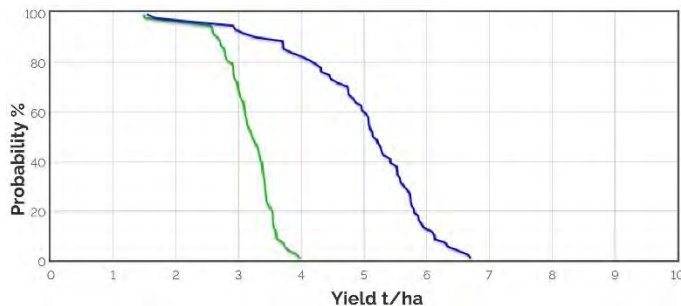
(based on a 50% probability)

Wheat sown May 1: **4.2 t/ha**

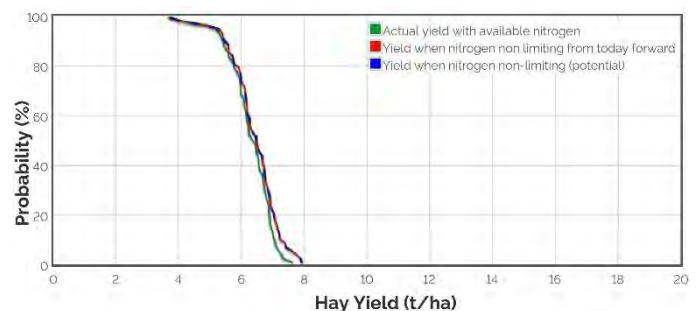
also see graphs below

Wheat sown May 20: **4.2 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (191 mm) for the remainder of the growing season.

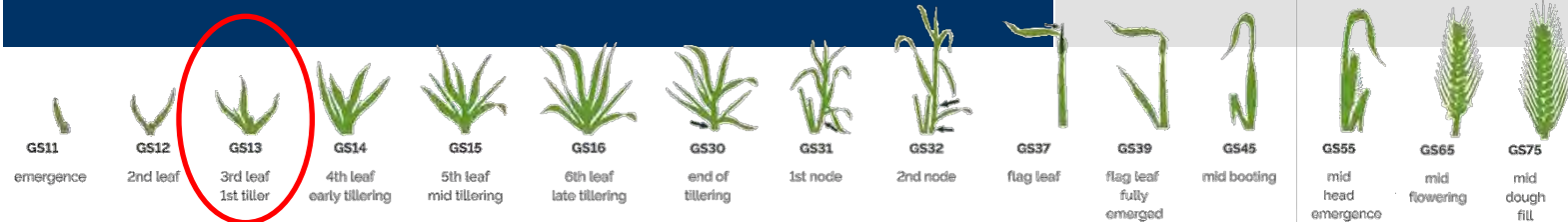
100% WUE **4.0 t/ha**

80% WUE **3.2 t/ha**

Location:

CONDOWIE

HART BEAT



CONDOWIE

Soil type: Sandy loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
Sowing date: May 1, 2021
Emergence: June 4, 2021
Nitrogen fertiliser: 30 kg N/ha @ seeding

The season so far

Annual rainfall to date: 101 mm
GSR to date: 76 mm
Current GSR decile: 2
Current predicted PAW: 24 mm (21% full)
PAWC: 115 mm

Yield Prophet® predictions

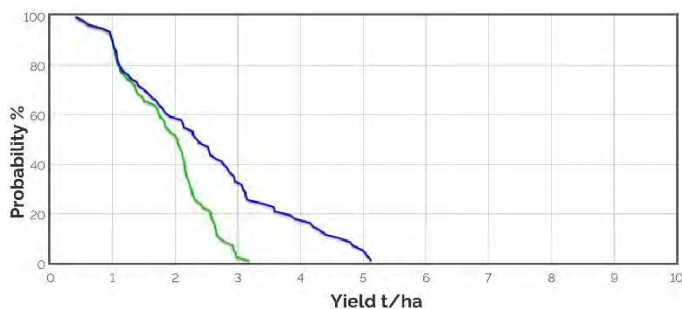
(based on a 50% probability)

Wheat sown May 1: **2.2 t/ha**

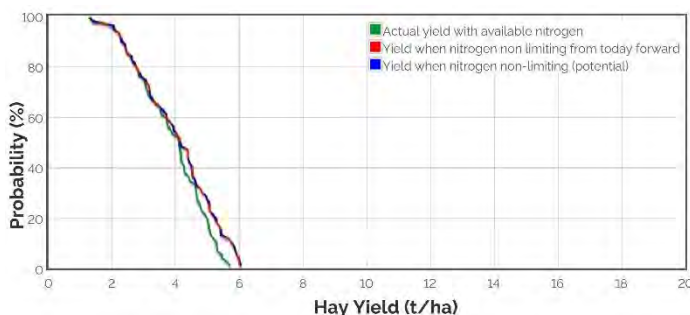
also see graphs below

Wheat sown May 20: **2.2 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 8 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (141 mm) for the remainder of the growing season.

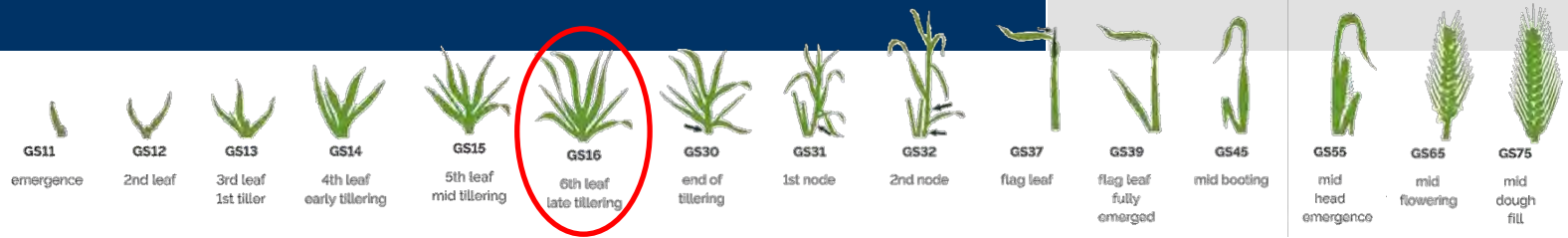
100% WUE **2.3 t/ha**

80% WUE **1.8 t/ha**

Location:

KYBUNGA

HART BEAT



KYBUNGA

Soil type: Clay loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2021
 Emergence: May 11, 2021
 Nitrogen fertiliser: 30 kg N/ha @ seeding

The season so far

Annual rainfall to date: 135 mm
 GSR to date: 101 mm
 Current GSR decile: 3
 Current predicted PAW: 44 mm (17% full)
 PAWC: 262 mm

Yield Prophet® predictions

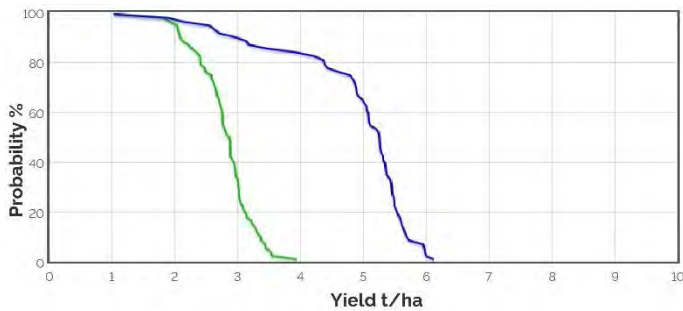
(based on a 50% probability)

Wheat sown May 1: **4.1 t/ha**

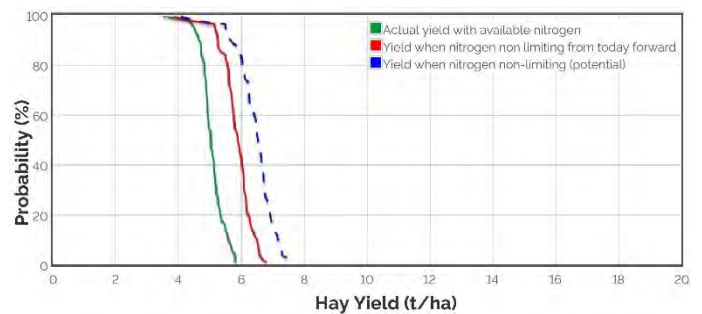
also see graphs below

Wheat sown May 20: **3.8 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

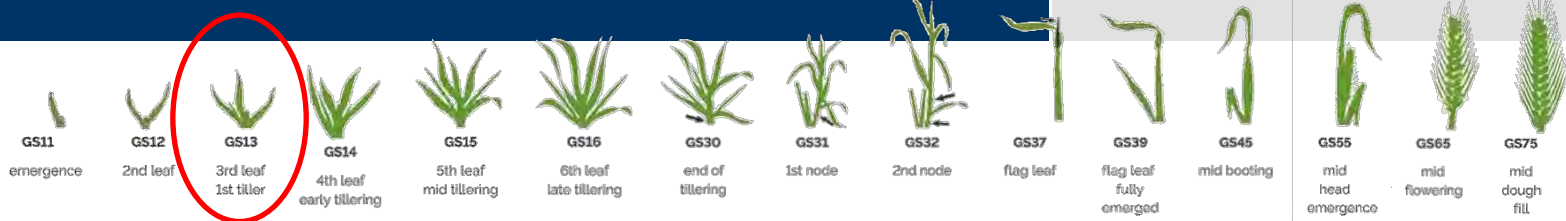
This model assumes that there is 10 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (222 mm) for the remainder of the growing season.

100% WUE **4.5 t/ha**

80% WUE **3.6 t/ha**

Location: FARRELL FLAT

HART BEAT



FARRELL FLAT

Soil type: Light clay loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
Sowing date: May 1, 2021
Emergence: June 6, 2021
Nitrogen fertiliser: 30 kg N/ha @ seeding

The season so far

Annual rainfall to date: 128 mm
GSR to date: 102 mm
Current GSR decile: 5
Current predicted PAW: 66 mm (38% full)
PAWC: 172 mm

Yield Prophet® predictions

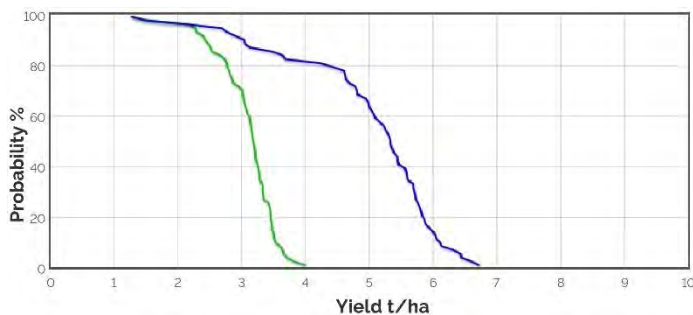
(based on a 50% probability)

Wheat sown May 1: **4.3 t/ha**

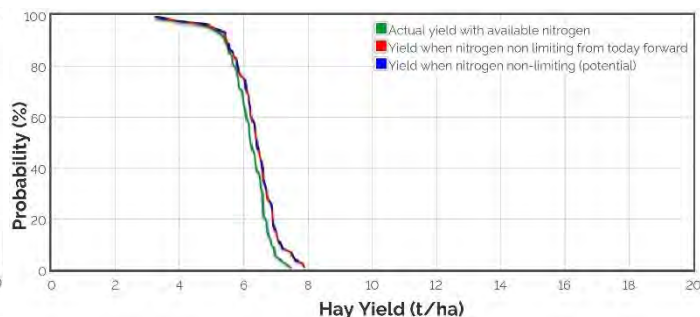
also see graphs below

Wheat sown May 20: **4.3 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 8 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (225 mm) for the remainder of the growing season.

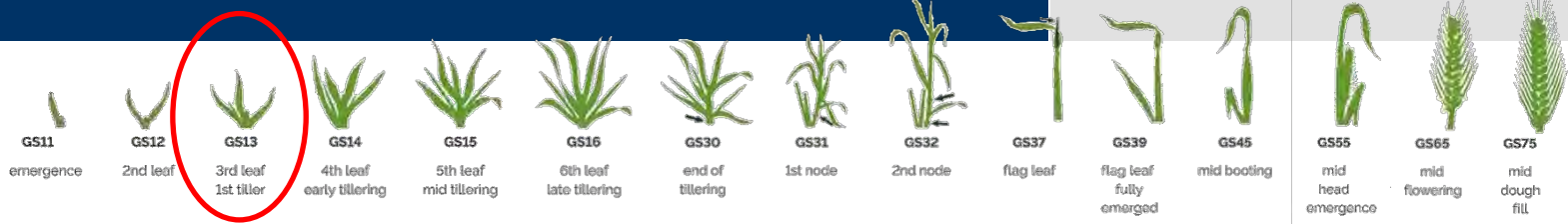
100% WUE **4.5 t/ha**

80% WUE **3.6 t/ha**

Location:

PINERY

HART BEAT



PINERY

Soil type: Silty clay loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2021
 Emergence: June 4, 2021
 Nitrogen fertiliser: 40 kg N/ha @ seeding

The season so far

Annual rainfall to date: 123 mm
 GSR to date: 88 mm
 Current GSR decile: 3
 Current predicted PAW: 59 mm (74% full)
 PAWC: 79 mm

Yield Prophet® predictions

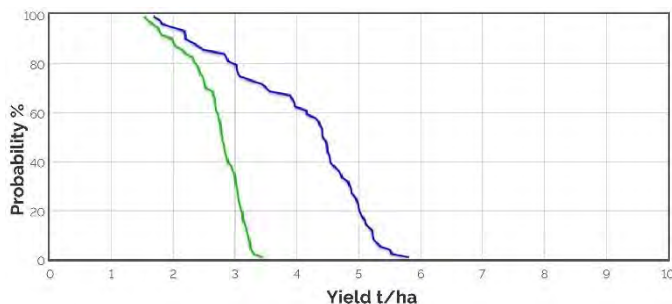
(based on a 50% probability)

Wheat sown May 1: **3.6 t/ha**

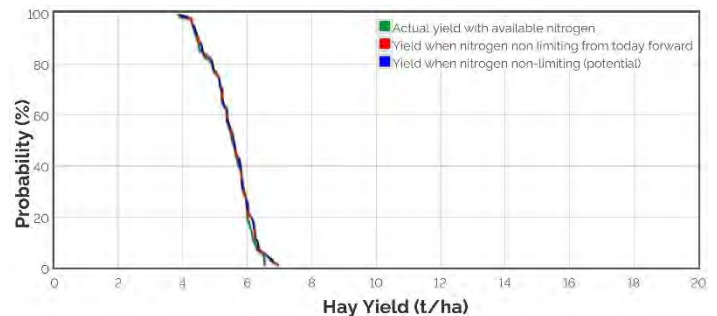
also see graphs below

Wheat sown May 20: **3.6 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 11 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (179 mm) for the remainder of the growing season.

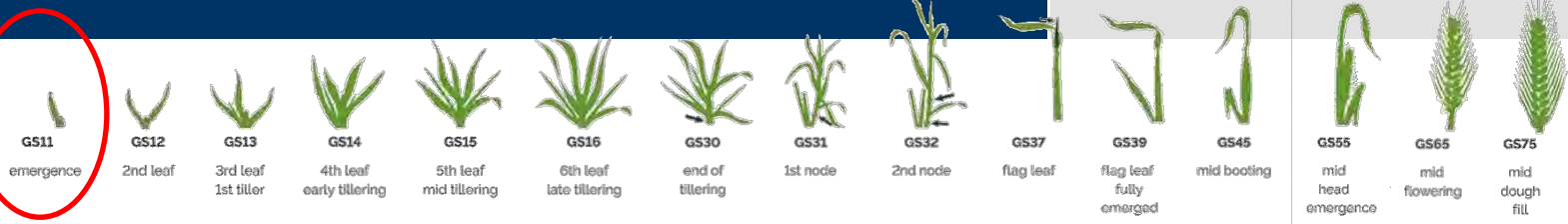
100% WUE **3.3 t/ha**

80% WUE **2.7 t/ha**

Location:

EUDUNDA

HART BEAT



EUDUNDA

Soil type: Gravelly loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2021
 Emergence: June 21, 2021
 Nitrogen fertiliser: 30 kg N/ha @ seeding

The season so far

Annual rainfall to date: 123 mm
 GSR to date: 83 mm
 Current GSR decile: 3
 Current predicted PAW: 22 mm (23% full)
 PAWC: 96 mm

Yield Prophet® predictions

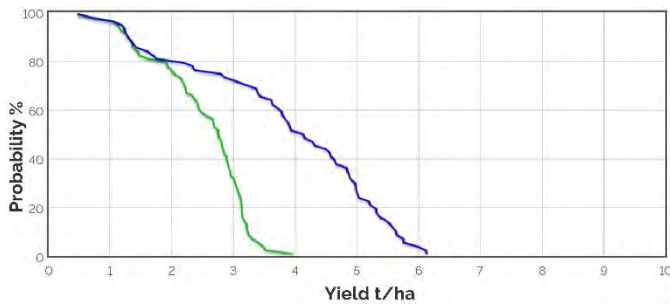
(based on a 50% probability)

Wheat sown May 1: **3.5 t/ha**

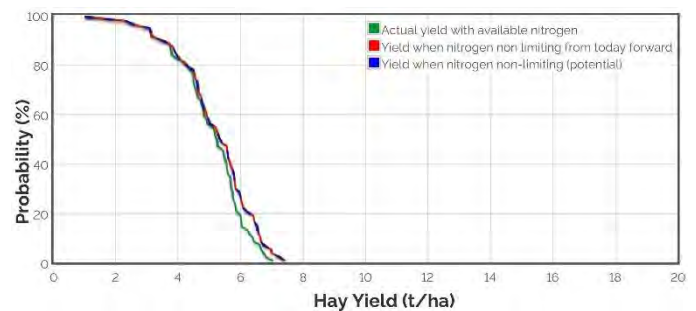
also see graphs below

Wheat sown May 20: **3.5 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (213 mm) for the remainder of the growing season.

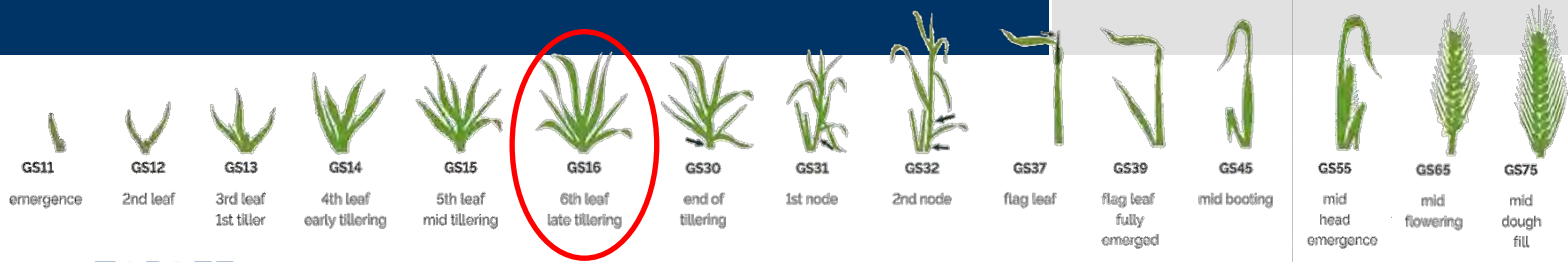
100% WUE **4.0 t/ha**

80% WUE **3.2 t/ha**

Location:

TARLEE

HART BEAT



TARLEE

Soil type: Sandy loam

Date of report: June 28, 2021

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2021
 Emergence: May 11, 2021
 Nitrogen fertiliser: 40 kg N/ha @ seeding

The season so far

Annual rainfall to date: 141 mm
 GSR to date: 95 mm
 Current GSR decile: 3
 Current predicted PAW: 84 mm (74% full)
 PAWC: 113 mm

Yield Prophet® predictions

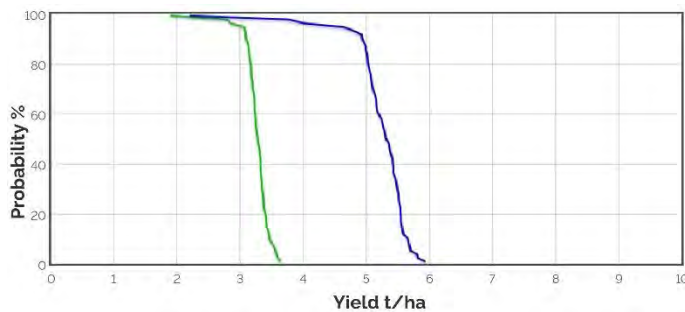
(based on a 50% probability)

Wheat sown May 1: **4.3 t/ha**

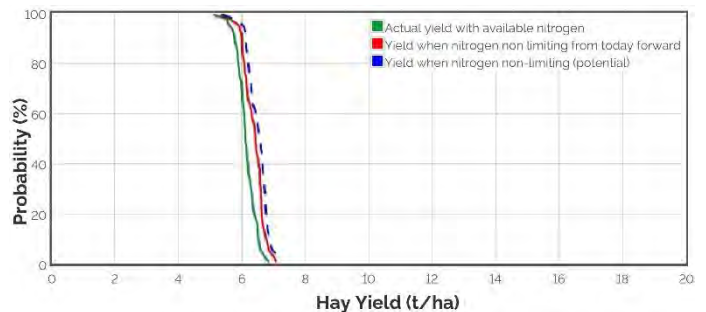
also see graphs below

Wheat sown May 20: **4.2 t/ha**

Grain yield outcome graph



Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

French & Schultz predictions

This model assumes that there is 14 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (218 mm) for the remainder of the growing season.

100% WUE **4.3 t/ha**

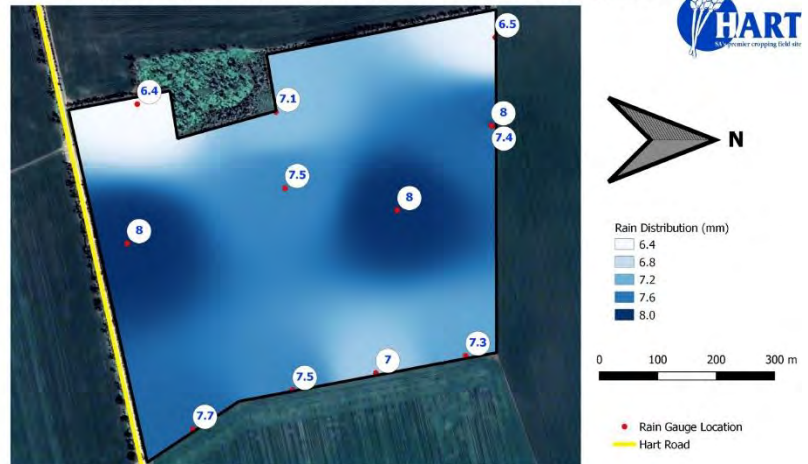
80% WUE **3.5 t/ha**

What's new on our website...

RAINFALL VARIABILITY TRIAL



Rainfall distribution at the Hart field site on June 23-28, 2021



The difference between the highest and lowest recording was 1.6 mm (20% of the highest recording)

'How much rain did you get?'

It's a common question, but the answer is sometimes perplexing. Your neighbour got 16 mm, yet you only got 10 mm... Why is that - were they were exaggerating? Is your rain gauge broken?

We regularly hear growers expressing uncertainty around the varying amount of rainfall recorded across short to medium distances and we've also noticed variation across our own site at Hart.

So we've set up a very simple trial to track how much variation occurs. The data is presented in some really easy to interpret, colour coded maps (thanks Declan!) and it's already making for very interesting viewing.

We've recorded and analysed 18 rainfall events so far this year; you can check them out here:

<https://www.hartfieldsite.org.au/pages/live-weather/rainfall-variability-trial.php>

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