HART BEAT

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

Definitions | Site information

Hart | Spalding | Condowie

Kybunga | Farrell Flat | Pinery

Eudunda | Tarlee

Plus...

How you can access more Hart research in 2020

HART
SA's premier cropping field site

ISSUE 54
October 21, 2020

DEFINITIONS

HART BEAT

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.

SITE INFORMATION

HART BEAT

Rainfall and soil water characteristics for all sites

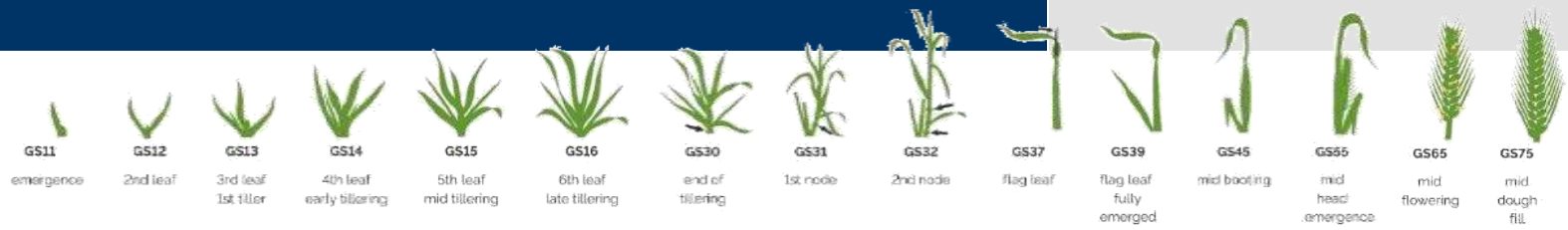
Site	Average annual rainfall (mm)	Soil type	PAWC (mm)	Soil sampling date	Profile depth (cm)	Pre-sowing nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	May 7, 2020	150	63
Spalding	430	Red brown earth	143	April 24, 2020	150	69
Condowie	350	Sandy loam	115	April 24, 2020	150	67
Kybunga	428	Clay loam	262	May 7, 2020	120	70
Farrell Flat	474	Light clay loam	172	April 24, 2020	120	64
Pinery	374	Silty clay loam	79	May 7, 2020	150	60
Eudunda	445	Gravelly loam	96	April 24, 2020	100	68
Tarlee	474	Sandy loam	113	May 8, 2020	150	61

2020 site locations

Location:

HART

HART BEAT



HART

Soil type: Sandy clay loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 11, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 20 kg N on July 10

The season so far

Annual rainfall to date:	389 mm
GSR to date:	292 mm *(107 mm since last report)*
GSR Decile:	6
Current predicted PAW:	78 mm (38%)
PAWC:	206 mm

Yield Prophet® predictions

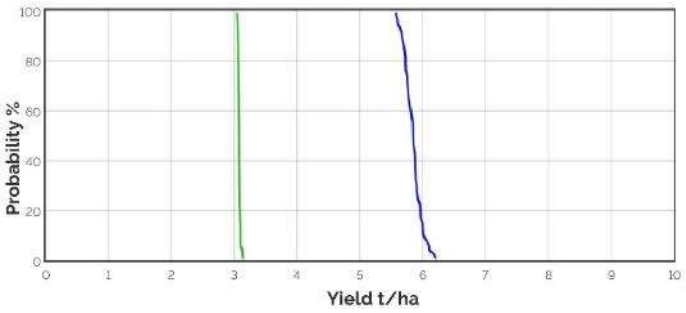
(*based on a 50% probability)*

Wheat sown May 1: **4.5 t/ha** (+ 0.9 t/ha since September report)

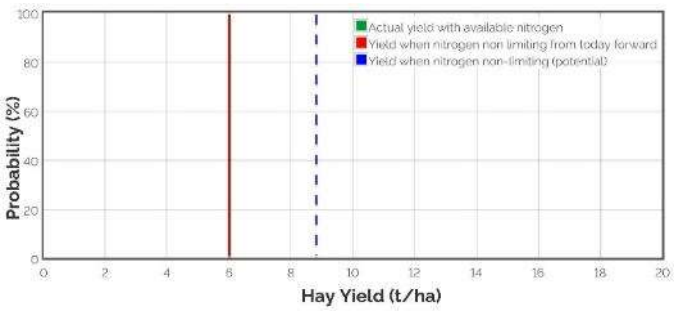
also see graphs below

Wheat sown May 20: **4.2 t/ha** (+ 1 t/ha since September report)

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 29 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (9 mm) for the remainder of the growing season.

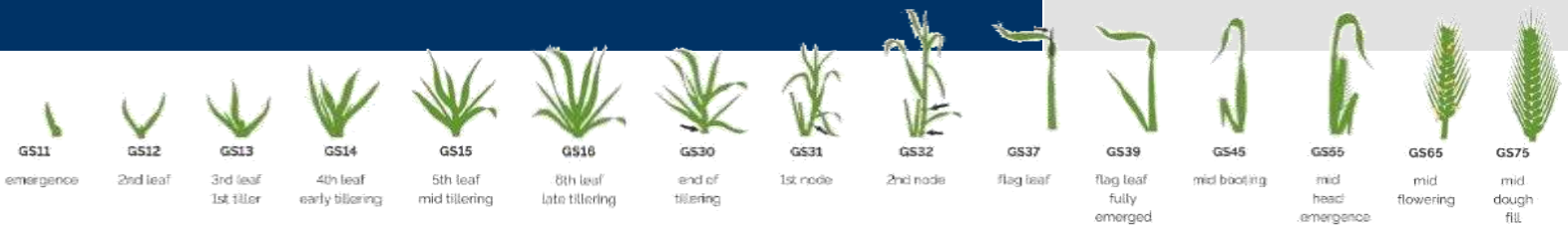
100% WUE **4.4 t/ha**

80% WUE **3.5 t/ha**

Location:

SPALDING

HART BEAT



SPALDING

Soil type: Red brown earth

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 12, 2020
Nitrogen fertiliser:	40 kg N/ha @ seeding + 40 kg N/ha on July 10

The season so far

Annual rainfall to date:	427 mm
GSR to date:	348 mm *(107 mm since last report)*
GSR Decile:	8
Current predicted PAW:	56 mm (39%)
PAWC:	143 mm

Yield Prophet® predictions

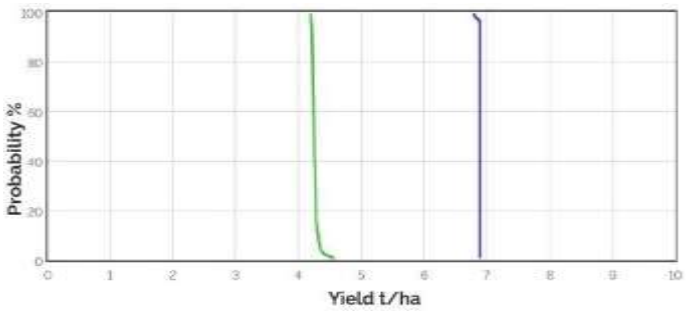
(*based on a 50% probability)*

Wheat sown May 1: **5.6 t/ha** (+ 1 t/ha since September report)

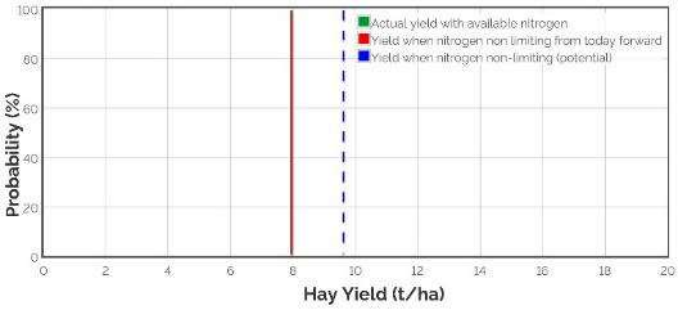
also see graphs below

Wheat sown May 20: **5.3 t/ha** (+ 1.5 t/ha since September report)

Grain yield outcome graph



Hay yield outcome graph



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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 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (9 mm) for the remainder of the growing season.

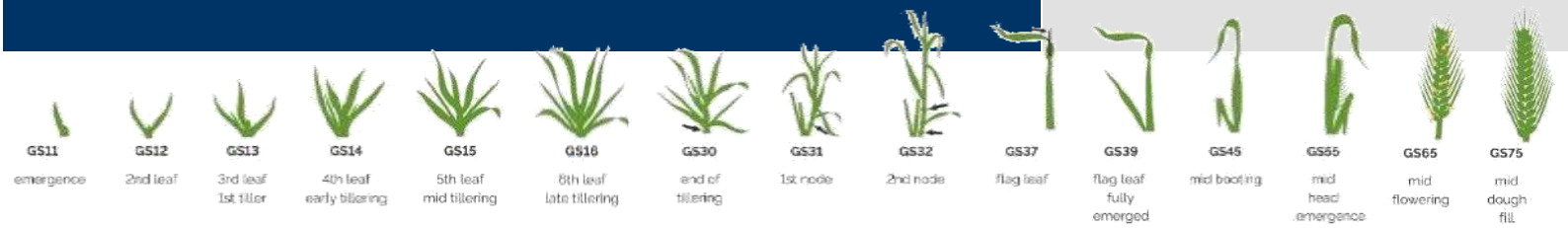
100% WUE **5.4 t/ha**

80% WUE **4.3 t/ha**

Location:

CONDOWIE

HART BEAT



CONDOWIE

Soil type: Sandy loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 11, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 20 kg N/ha on July 10

The season so far

Annual rainfall to date:	268 mm
GSR to date:	193 mm *(68 mm since last report)*
GSR Decile:	4
Current predicted PAW:	30 mm (26%)
PAWC:	115 mm

Yield Prophet® predictions

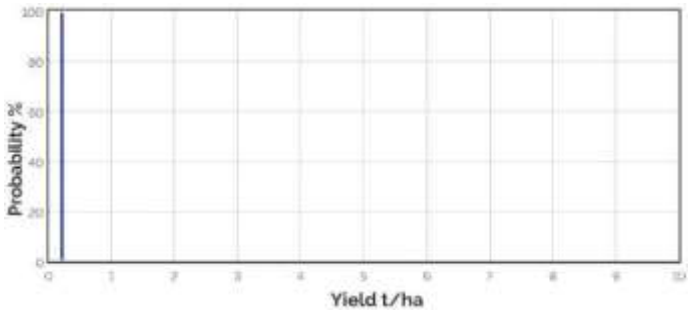
(*based on a 50% probability)*

Wheat sown May 1: **0.2 t/ha** (no change since September report)

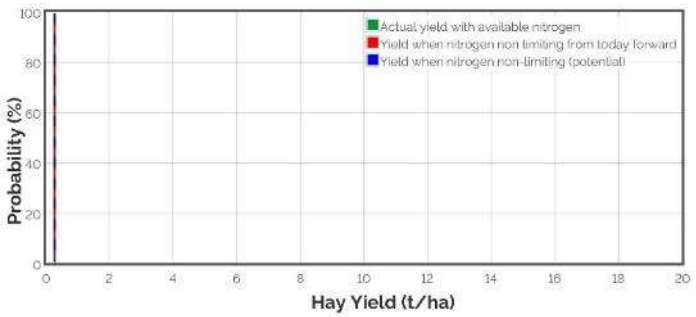
also see graphs below

Wheat sown May 20: **0.3 t/ha** (no change since September report)

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 23 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (6 mm) for the remainder of the growing season.

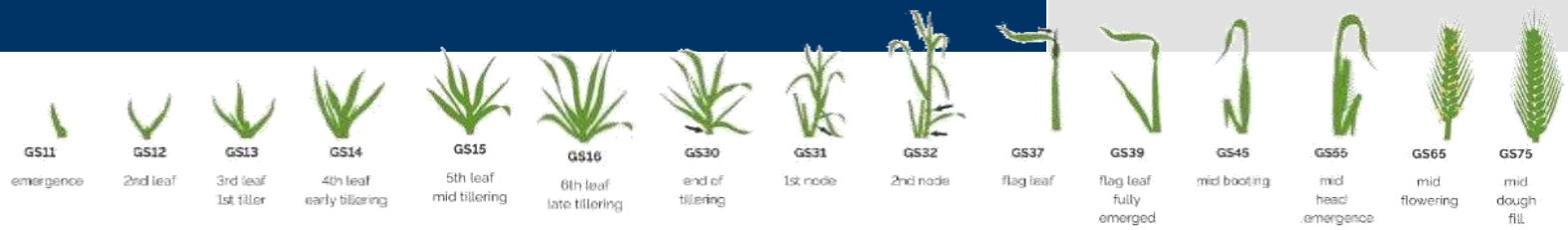
100% WUE **2.2 t/ha**

80% WUE **1.8 t/ha**

Location:

KYBUNGA

HART BEAT



KYBUNGA

Soil type: Clay loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 12, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 40 kg N/ha on July 10

The season so far

Annual rainfall to date:	358 mm
GSR to date:	292 mm *(81 mm since last report)*
GSR Decile:	4
Current predicted PAW:	42 mm (16%)
PAWC:	262 mm

Yield Prophet® predictions

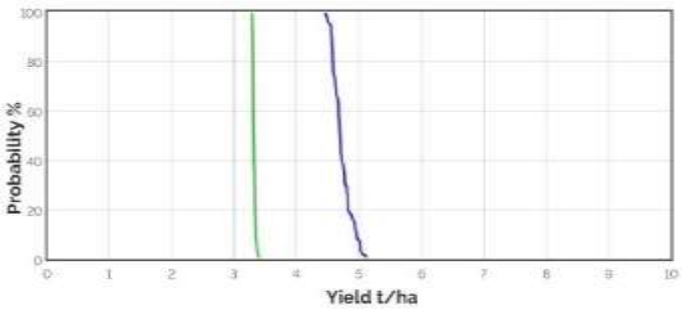
(*based on a 50% probability)*

Wheat sown May 1: **4.0 t/ha** (+ 0.3 t/ha since September report)

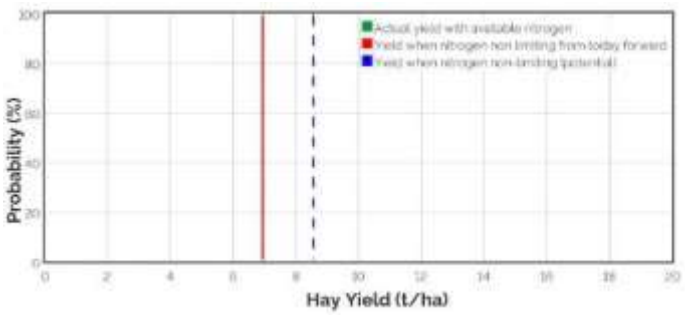
also see graphs below

Wheat sown May 20: **3.9 t/ha** (+ 0.7 t/ha since September report)

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 20 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (12 mm) for the remainder of the growing season.

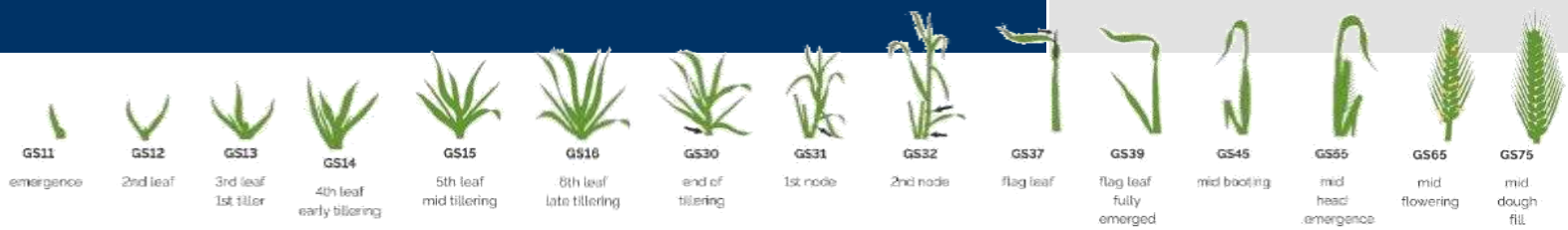
100% WUE **4.3 t/ha**

80% WUE **3.4 t/ha**

Location:

FARRELL FLAT

HART BEAT



FARRELL FLAT

Soil type: Light clay loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 13, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 40 kg N on July 10

The season so far

Annual rainfall to date:	405 mm
GSR to date:	333 mm *(103mm since last report)*
GSR Decile:	6
Current predicted PAW:	49 mm (28%)
PAWC:	172 mm

Yield Prophet® predictions

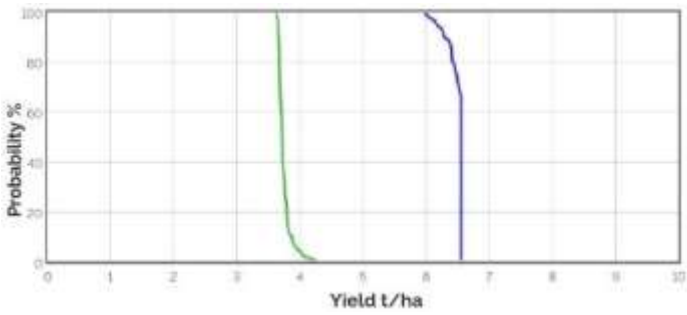
(*based on a 50% probability)*

Wheat sown May 1: **5.2 t/ha** (+ 0.9 t/ha since September report)

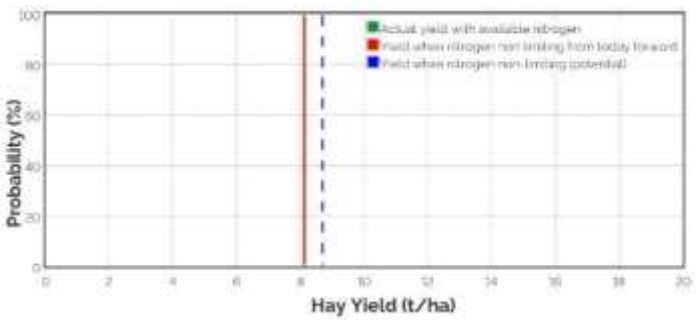
also see graphs below

Wheat sown May 20: **3.7 t/ha** (+ 1.1 t/ha since September report)

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 22 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (13 mm) for the remainder of the growing season.

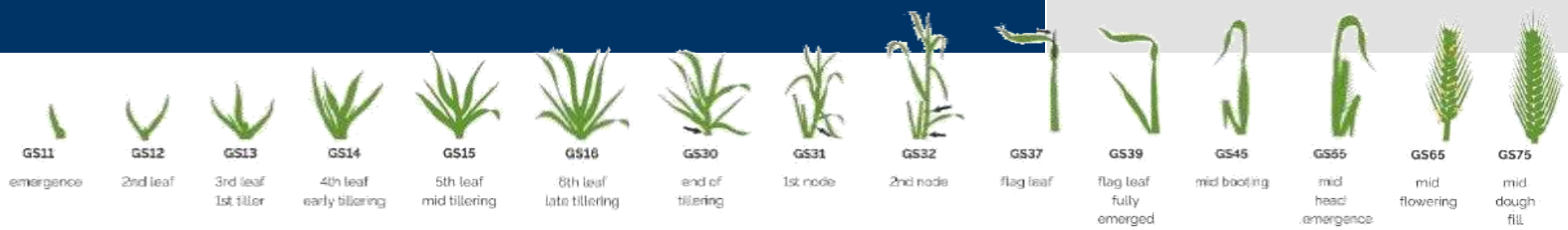
100% WUE **5.1 t/ha**

80% WUE **4.1 t/ha**

Location:

PINERY

HART BEAT



PINERY

Soil type: Silty clay loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 11, 2020
Nitrogen fertiliser:	40 kg N/ha @ seeding + 20 kg N/ha on July 10

The season so far

Annual rainfall to date:	320 mm
GSR to date:	276 mm *(81 mm since last report)*
GSR Decile:	4
Current predicted PAW:	54 mm (68%)
PAWC:	79 mm

Yield Prophet® predictions

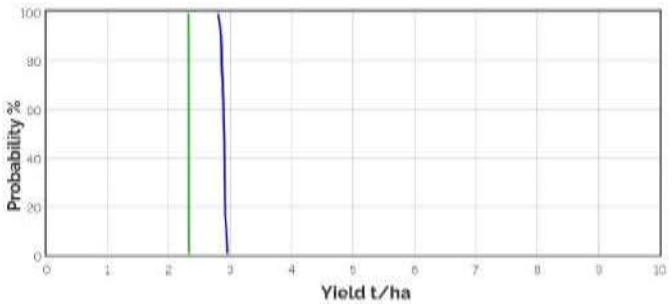
(*based on a 50% probability)*

Wheat sown May 1: **2.6 t/ha** (- 0.3 t/ha since September report)

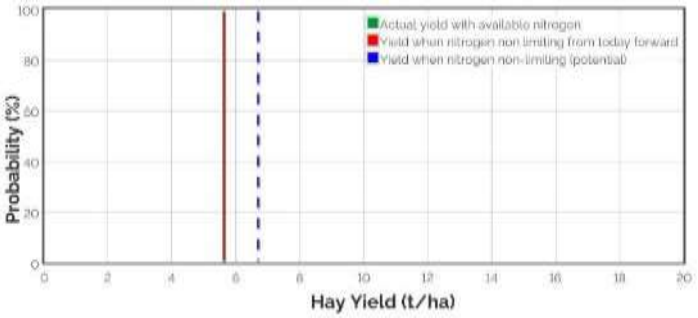
also see graphs below

Wheat sown May 20: **3.3 t/ha** (+ 0.8 t/ha since September report)

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 13 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (9 mm) for the remainder of the growing season.

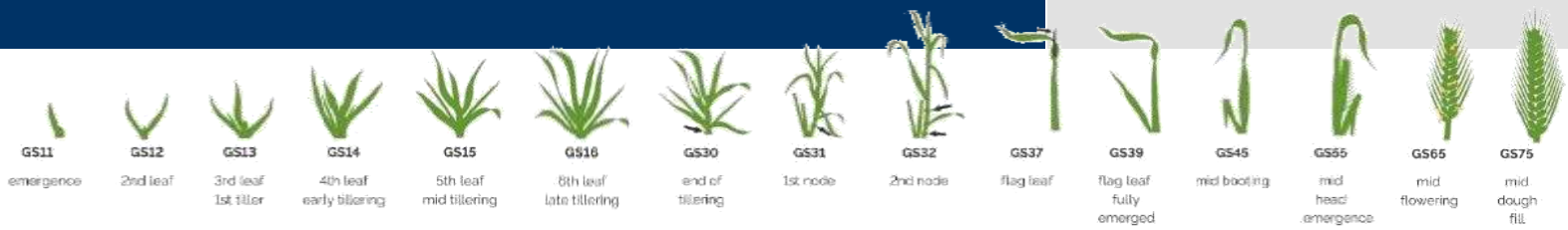
100% WUE **3.8 t/ha**

80% WUE **3.0 t/ha**

Location:

EUDUNDA

HART BEAT



EUDUNDA

Soil type: Gravelly loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 12, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 20 kg N/ha on July 10

The season so far

Annual rainfall to date:	364 mm
GSR to date:	321 mm *(87 mm since last report)*
GSR Decile:	6
Current predicted PAW:	44 mm (46%)
PAWC:	96 mm

Yield Prophet® predictions

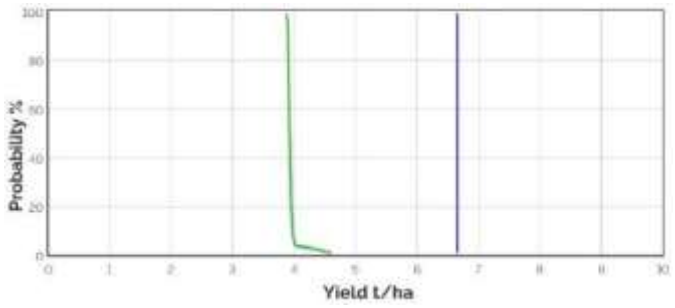
(*based on a 50% probability)*

Wheat sown May 1: **5.3 t/ha** (- 0.1 t/ha since September report)

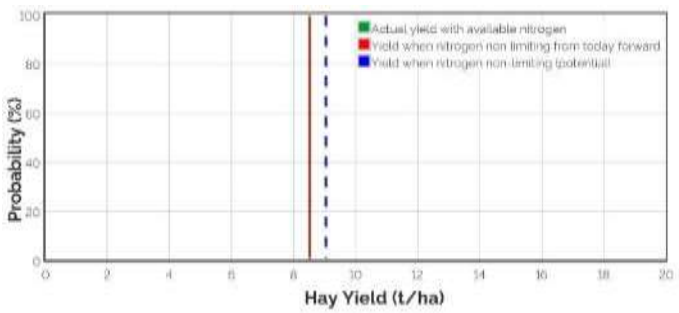
also see graphs below

Wheat sown May 20: **5.1 t/ha** (+ 0.7 t/ha since September report)

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 13 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (10 mm) for the remainder of the growing season.

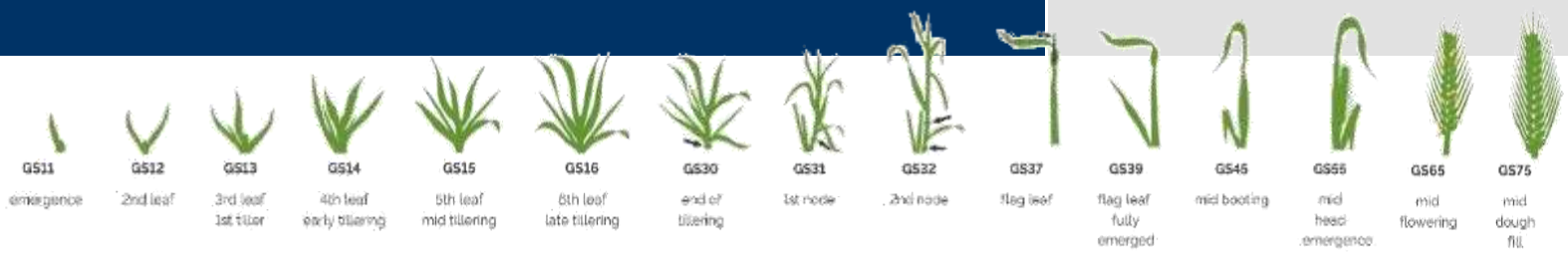
100% WUE **4.7 t/ha**

80% WUE **3.7 t/ha**

Location:

TARLEE

HART BEAT



TARLEE

Soil type: Sandy loam

Date of report: October 21, 2020

Crop growth

Variety:	Scepter wheat
Sowing date:	May 1, 2020
Emergence:	May 11, 2020
Nitrogen fertiliser:	30 kg N/ha @ seeding + 20 kg N/ha on July 10

The season so far

Annual rainfall to date:	365 mm
GSR to date:	330 mm *(98 mm since last report)*
GSR Decile:	6
Current predicted PAW:	87 mm (77%)
PAWC:	113 mm

Yield Prophet® predictions

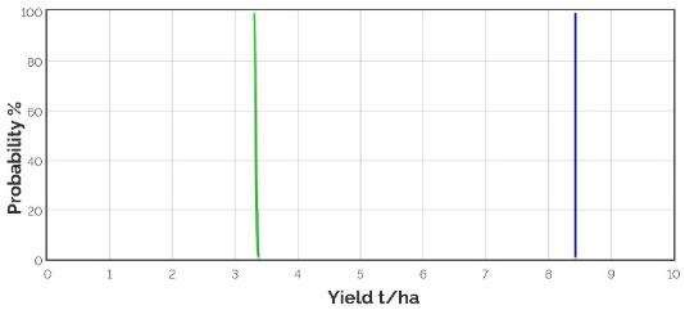
(*based on a 50% probability)*

Wheat sown May 1: **5.9 t/ha** (+ 0.2 t/ha since September report)

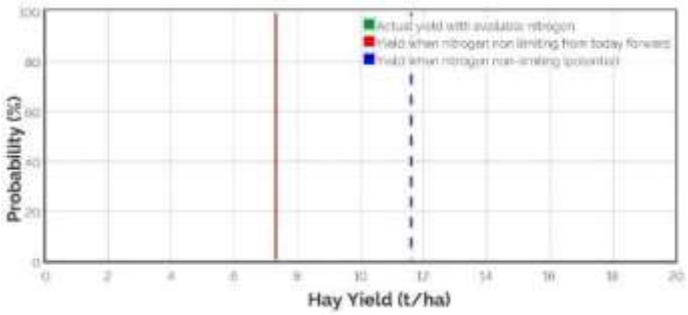
also see graphs below

Wheat sown May 20: **5.5 t/ha** (+ 1 t/ha since September report)

Grain yield outcome graph



Hay yield outcome graph



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French & Schultz predictions

This model assumes that there is 10 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (13 mm) for the remainder of the growing season.

MID NORTH HIGH RAINFALL ZONE

100% WUE **4.9 t/ha**

80% WUE **3.9 t/ha**

More from Hart

HART BEAT

How can you access more Hart research in 2020?

The Hart Field Day Guide is available online now, for **free**. It features trial layouts and supporting articles, plus additional articles to support your farming business.

www.hartfieldsite.org.au

Videos of the presentations delivered at our mini-events, 'Managing Weeds' & 'Managing Varieties', will be available to view a videos online for **free** very soon.

www.hartfieldsite.org.au

Guided & self-guided tours of the Hart site for groups or individuals are welcome by appointment.
We'll close soon for harvest so please make a booking now if you'd like to visit.

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At just $35 / person, a Hart membership is about the best value annual subscription you'll pay. And it helps us offer our events and resources free or at very low cost. If you haven't already, please consider joining now. **www.hartfieldsite.org.au**

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