

HART BEAT



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

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



ISSUE 61
July 12, 2022

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 probability curves 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. Dashed **green** and **blue**

lines show each scenario with seasonal frost and heat effects. The **red** dot indicates the location of the average yield reported on each graph.

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 110 mm, includes stored water at sowing (30% of Jan to Mar rainfall) and a maximum grain yield potential of 22 kg/mm/ha.

Yield Potential = GSR (Apr-Oct) – evaporation (110mm) * 22 kg/mm/ha
(increased from 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). Click on these links for more information about [APSIM](#) or [Yield Prophet®](#).

Location:

HART

HART BEAT

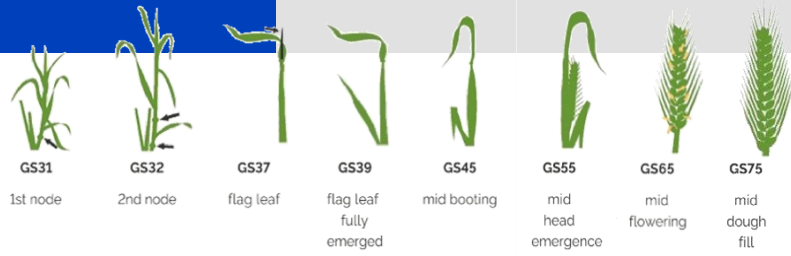
Date of report: July 12, 2022

Soil type: Sandy clay loam

Average annual rainfall: 400 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: June 10, 2022
 Soil sampling date: May 4, 2022
 Starting N: 63 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



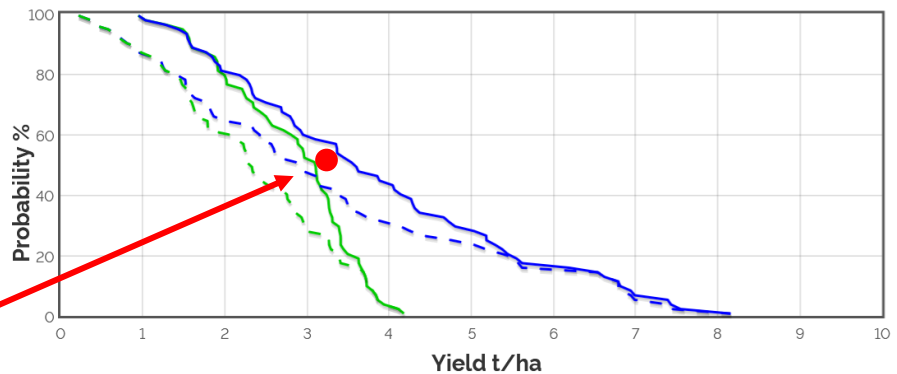
The season so far

Annual rainfall to date: 145 mm
 GSR to date: 102 mm
 Current GSR decile: 3
 Current predicted PAW: 50 mm (24% full)
 PAWC: 206 mm

Yield Prophet® predictions

(based on a 50% probability)

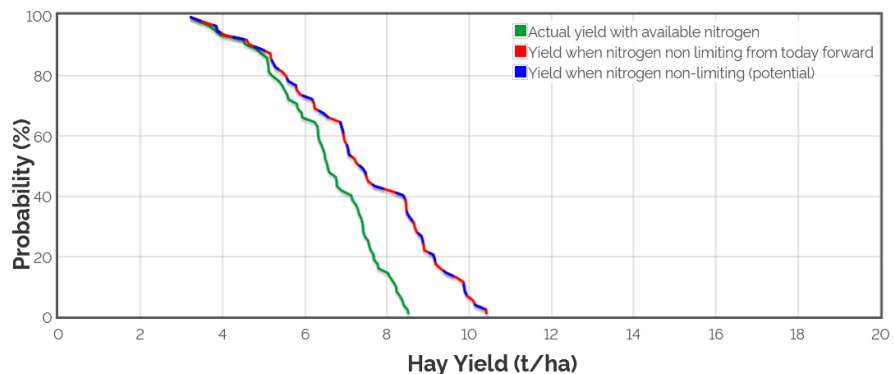
Wheat sown May 1
3.4 t/ha
 (+0.1 t/ha since last report)
 As shown in graph



Grain yield outcome

Wheat sown May 20
3.4 t/ha
 (+0.1 t/ha since last report)

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

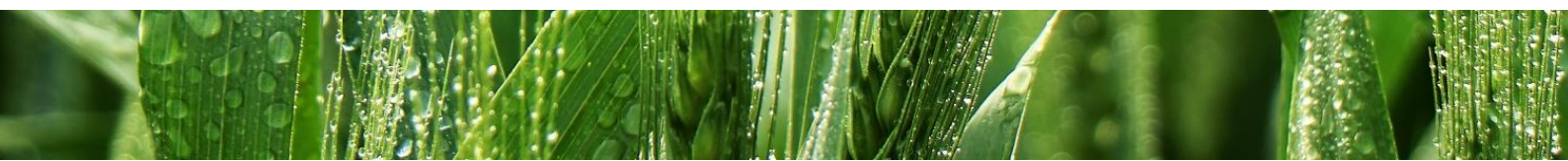


Hay yield outcome

French & Schultz predictions

This model assumes that there is 15.3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (151 mm) for the remainder of the growing season.

100% WUE **3.4 t/ha**
 80% WUE **2.7 t/ha**



Location: SPALDING

HART BEAT

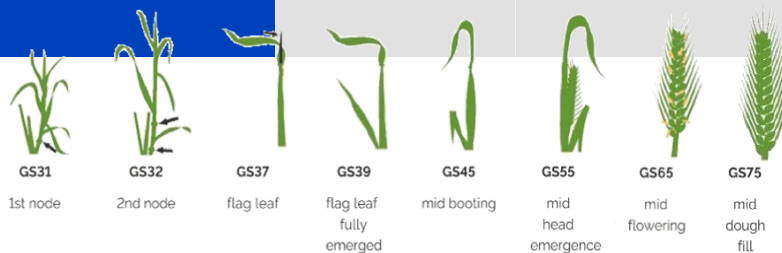
Date of report: July 12, 2022

Soil type: Red brown earth

Average annual rainfall: 430 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: May 13, 2022
 Soil sampling date: April 27, 2022
 Starting N: 67 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



The season so far

Annual rainfall to date: 114 mm
 GSR to date: 95 mm
 Current GSR decile: 2
 Current predicted PAW: 75 mm (52% full)
 PAWC: 143 mm

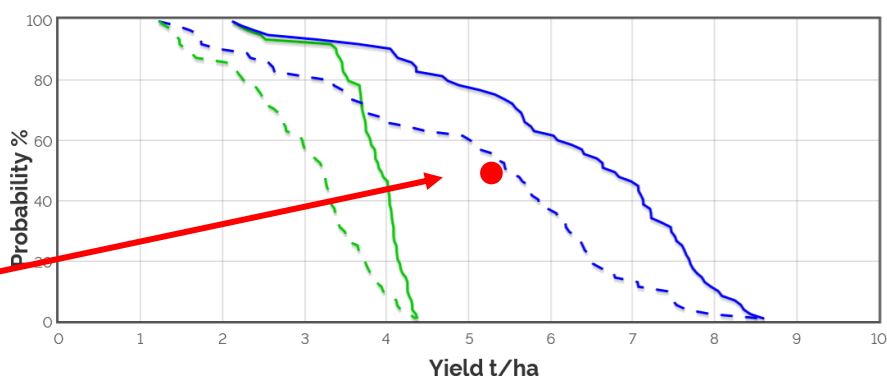
Yield Prophet® predictions

(based on a 50% probability)

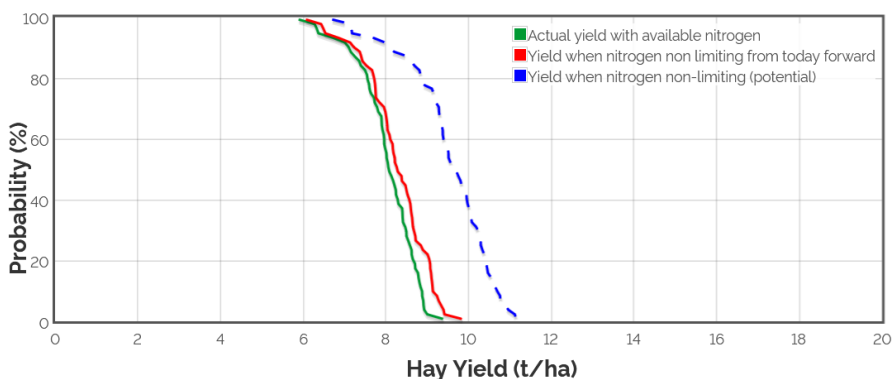
Wheat sown May 1
5.3 t/ha
 (+0.5 t/ha since last report)
 As shown in graph

Wheat sown May 20
4.4 t/ha
 (0.0 t/ha since last report)

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



Grain yield outcome



Hay yield outcome

French & Schultz predictions

This model assumes that there is 5.6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (167 mm) for the remainder of the growing season.

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



Location: CONDOWIE

HART BEAT

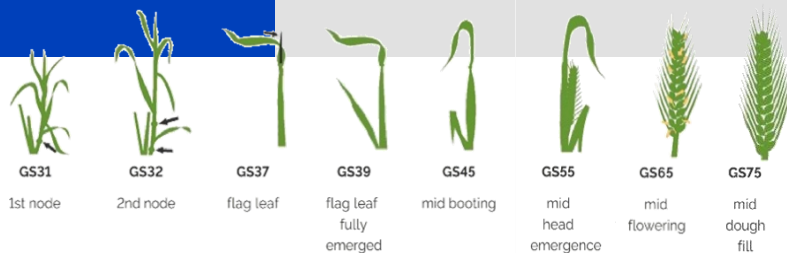
Date of report: July 12, 2022

Soil type: Sandy loam

Average annual rainfall: 350 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: June 10, 2022
 Soil sampling date: April 27, 2022
 Starting N: 67 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



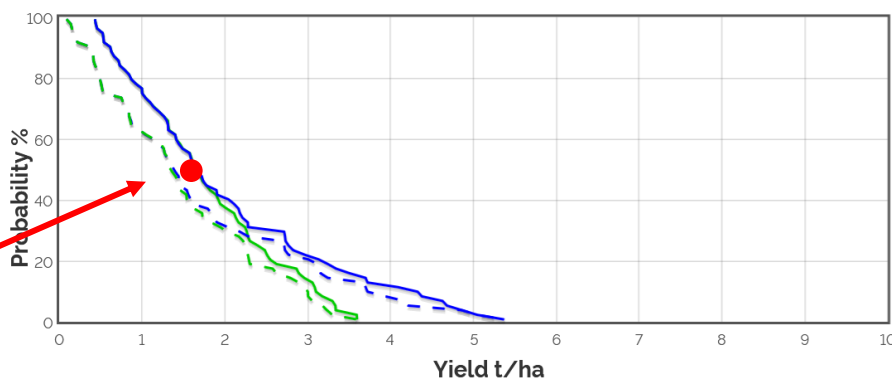
The season so far

Annual rainfall to date: 132 mm
 GSR to date: 81 mm
 Current GSR decile: 3
 Current predicted PAW: 18 mm (16% full)
 PAWC: 115 mm

Yield Prophet® predictions

(based on a 50% probability)

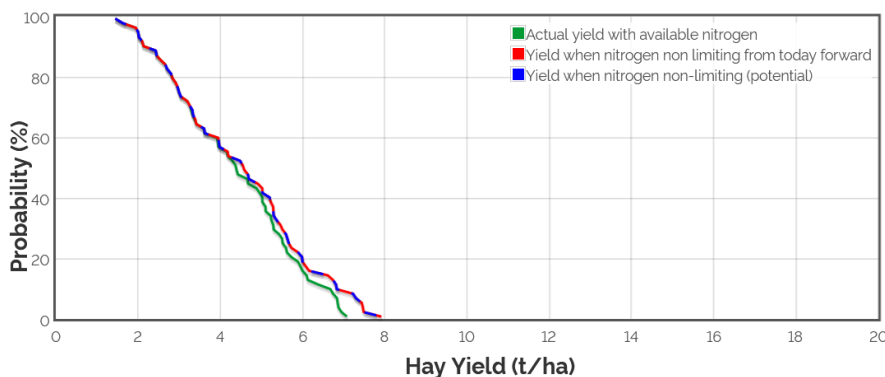
Wheat sown May 1
1.7 t/ha
 (-0.3 t/ha since last report)
 As shown in graph



Grain yield outcome

Wheat sown May 20
1.7 t/ha
 (-0.3 t/ha since last report)

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



Hay yield outcome

French & Schultz predictions

This model assumes that there is 15 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (116 mm) for the remainder of the growing season.

100% WUE **2.2 t/ha**
 80% WUE **1.8 t/ha**

Location: KYBUNGA

HART BEAT

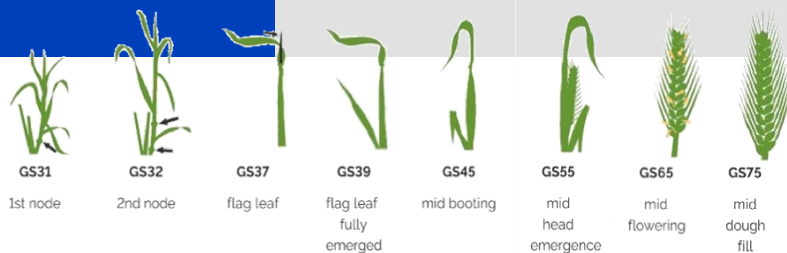
Date of report: July 12, 2022

Soil type: Clay loam

Average annual rainfall: 428 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: May 16, 2022
 Soil sampling date: April 27, 2022
 Starting N: 66 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



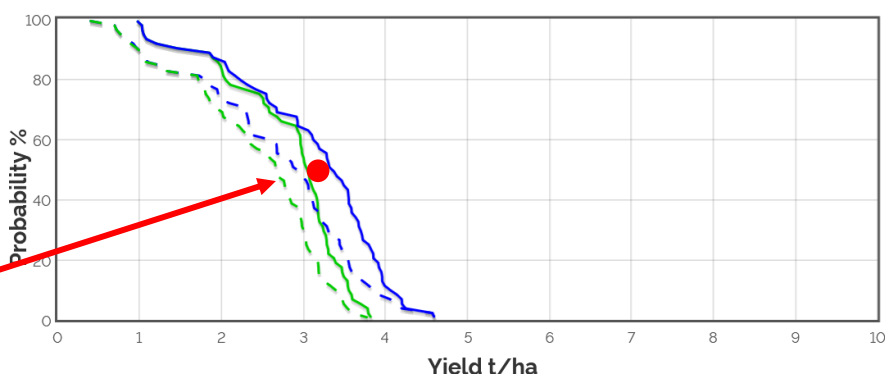
The season so far

Annual rainfall to date: 173 mm
 GSR to date: 120 mm
 Current GSR decile: 2
 Current predicted PAW: 39 mm (15% full)
 PAWC: 262 mm

Yield Prophet® predictions

(based on a 50% probability)

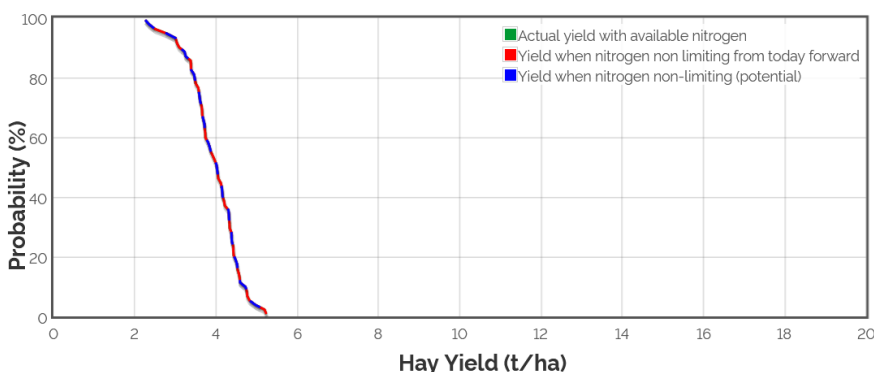
Wheat sown May 1
3.2 t/ha
 (+0.5 t/ha since last report)
 As shown in graph



Grain yield outcome

Wheat sown May 20
3.1 t/ha
 (-0.1 t/ha since last report)

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



Hay yield outcome

French & Schultz predictions

This model assumes that there is 16 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (186 mm) for the remainder of the growing season.

100% WUE **4.7 t/ha**
 80% WUE **3.7 t/ha**

Location: FARRELL FLAT

HART BEAT

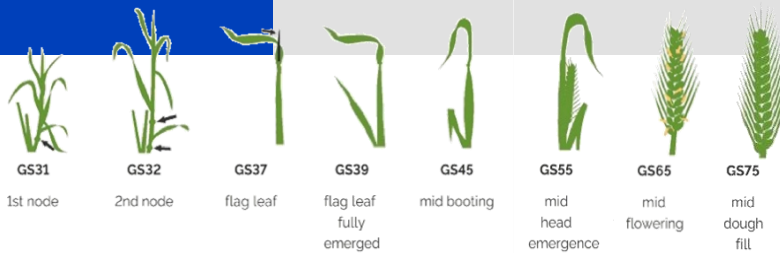
Date of report: July 12, 2022

Soil type: Light clay loam

Average annual rainfall: 474 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: June 13, 2022
 Soil sampling date: April 27, 2022
 Starting N: 65 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



The season so far

Annual rainfall to date: 156 mm
 GSR to date: 97 mm
 Current GSR decile: 2
 Current predicted PAW: 26 mm (15% full)
 PAWC: 172 mm

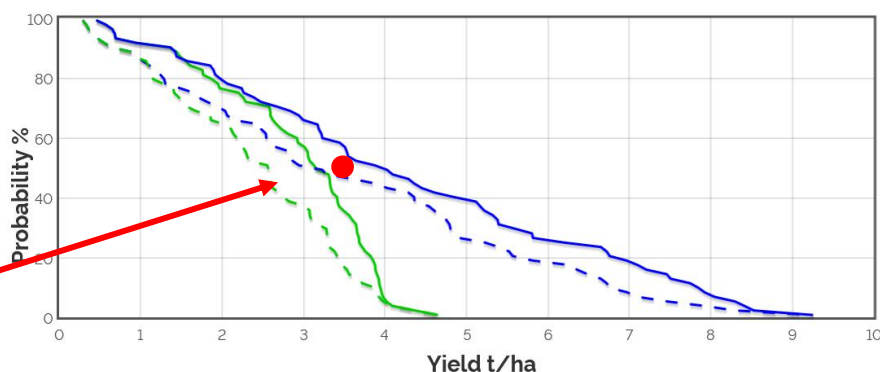
Yield Prophet® predictions

(based on a 50% probability)

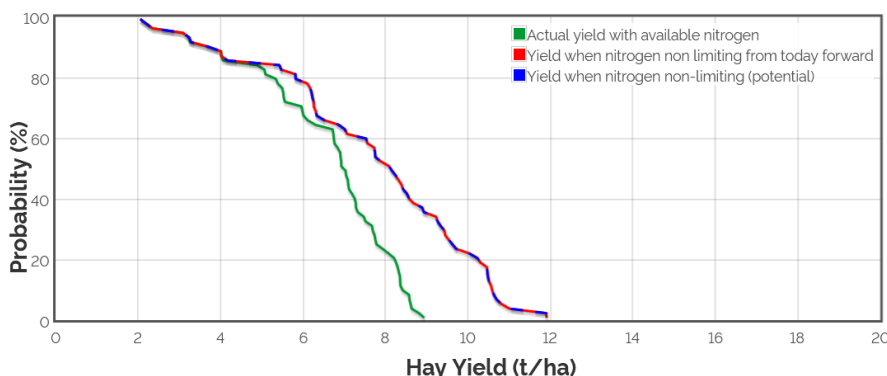
Wheat sown May 1
3.6 t/ha
 (-0.1 t/ha since last report)
 As shown in graph

Wheat sown May 20
3.6 t/ha
 (-0.1 t/ha since last report)

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



Grain yield outcome



Hay yield outcome

French & Schultz predictions

This model assumes that there is 18 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (190 mm) for the remainder of the growing season.

100% WUE **4.3 t/ha**
 80% WUE **3.4 t/ha**

Location: PINERY

HART BEAT

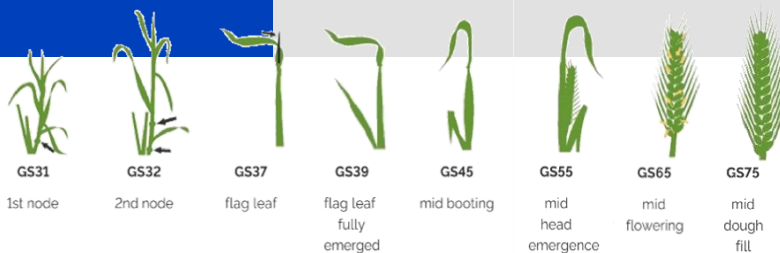
Date of report: July 12, 2022

Soil type: Silty clay loam

Average annual rainfall: 374 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: May 15, 2022
 Soil sampling date: April 27, 2022
 Starting N: 65 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



The season so far

Annual rainfall to date: 240 mm
 GSR to date: 146 mm
 Current GSR decile: 7
 Current predicted PAW: 54 mm (68% full)
 PAWC: 79 mm

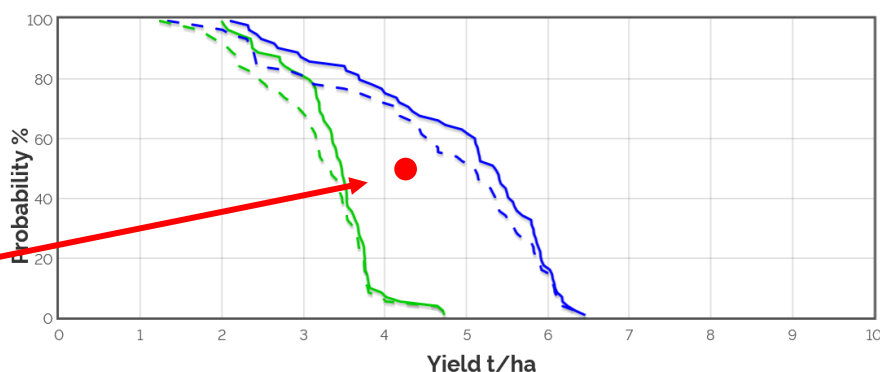
Yield Prophet® predictions

(based on a 50% probability)

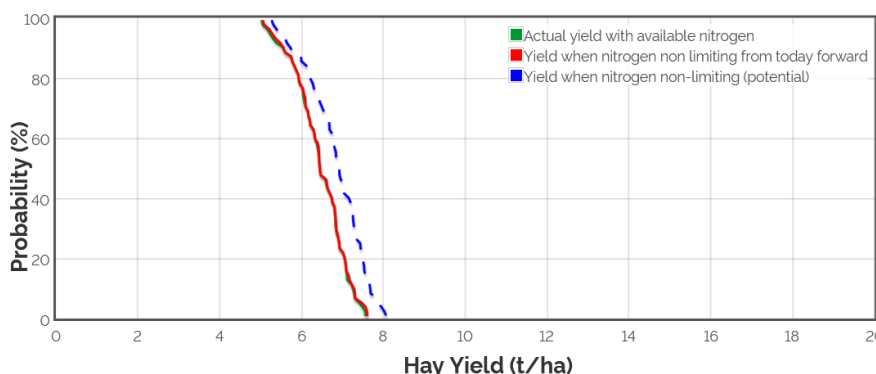
Wheat sown May 1
4.4 t/ha
 (+0.8 t/ha since last report)
 As shown in graph

Wheat sown May 20
3.9 t/ha
 (+0.5 t/ha since last report)

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



Grain yield outcome



Hay yield outcome

French & Schultz predictions

This model assumes that there is 28 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (154 mm) for the remainder of the growing season.

100% WUE **4.8 t/ha**
 80% WUE **3.8 t/ha**

Location: EUDUNDA

HART BEAT

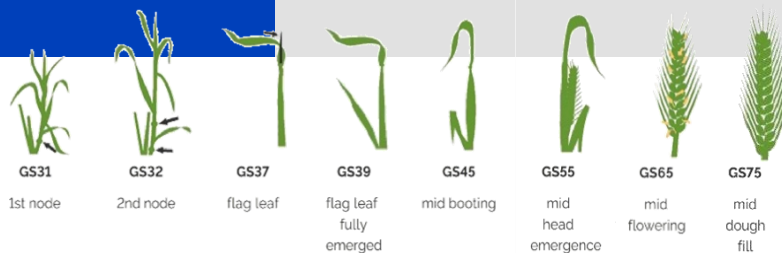
Date of report: July 12, 2022

Soil type: Gravelly loam

Average annual rainfall: 445 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: May 12, 2022
 Soil sampling date: April 27, 2022
 Starting N: 58 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 40 kg N/ha on July 10



The season so far

Annual rainfall to date: 208 mm
 GSR to date: 128 mm
 Current GSR decile: 5
 Current predicted PAW: 43 mm (45% full)
 PAWC: 96 mm

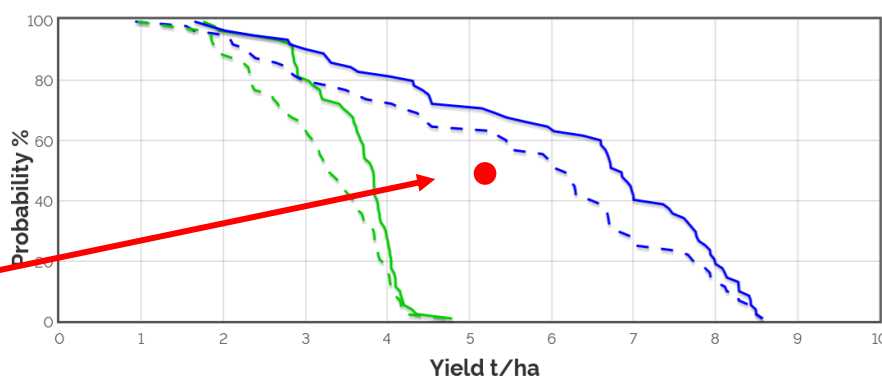
Yield Prophet® predictions

(based on a 50% probability)

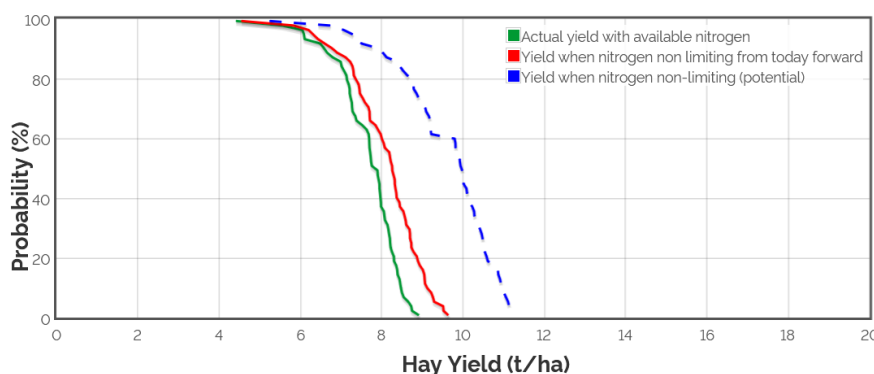
Wheat sown May 1
5.3 t/ha
 (+0.6 t/ha since last report)
 As shown in graph

Wheat sown May 20
4.6 t/ha
 (-0.1 t/ha since last report)

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



Grain yield outcome



Hay yield outcome

French & Schultz predictions

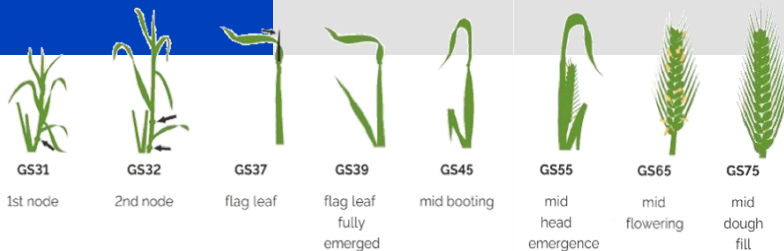
This model assumes that there is 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (183 mm) for the remainder of the growing season.

100% WUE **4.9 t/ha**
 80% WUE **4.0 t/ha**

Location: TARLEE

HART BEAT

Date of report: July 12, 2022



Soil type: Sandy loam

Average annual rainfall: 474 mm

Crop growth

Variety: Scepter wheat
 Sowing date: May 1, 2022
 Emergence: May 12, 2022
 Soil sampling date: April 27, 2022
 Starting N: 60 kg N/ha
 Nitrogen fertiliser: 20 kg N/ha @ seeding
 + 50 kg N/ha on July 10

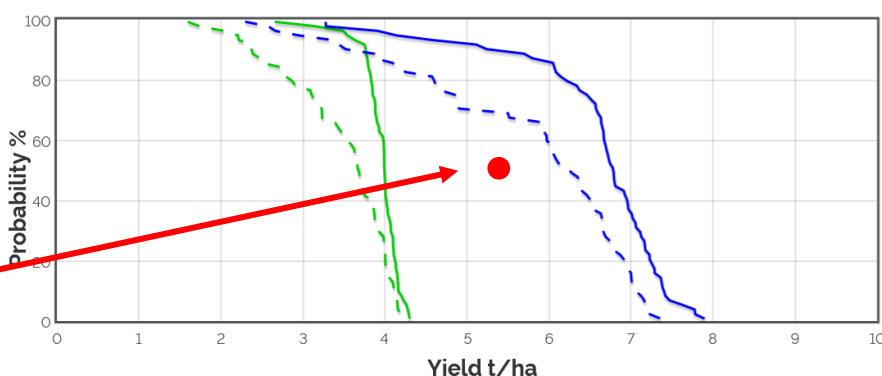
The season so far

Annual rainfall to date: 202 mm
 GSR to date: 145 mm
 Current GSR decile: 5
 Current predicted PAW: 104 mm (92% full)
 PAWC: 113 mm

Yield Prophet® predictions

(based on a 50% probability)

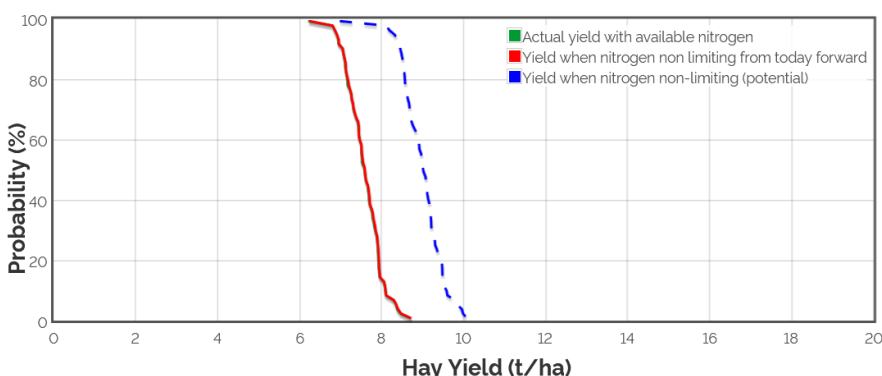
Wheat sown May 1
5.4 t/ha
 (+1.0 t/ha since last report)
 As shown in graph



Grain yield outcome

Wheat sown May 20
5.1 t/ha
 (+0.8 t/ha since last report)

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



Hay yield outcome

French & Schultz predictions

This model assumes that there is 17 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (188 mm) for the remainder of the growing season.

100% WUE **5.3 t/ha**
 80% WUE **4.2 t/ha**

A new
workshop
from Hart



**Improving
climate risky
decision
making**

**August 2
2022**

9am - 12pm

Blyth Town Hall

with
Peter Hayman, Climate Applications Scientist, SARDI
Barry Mudge, Low Rainfall Farmer & Consultant

Explore NEW climate forecast products
and more importantly, how we can use
them to make better on-farm decisions

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