



# Hart Beat

Hart Field Site Group Inc.  
www.hartfieldsite.org.au

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## From the Chairman



Welcome to the first edition of Hart Beat, an initiative of the Hart Field-Site Group, aimed at providing farmers and agronomists with an update of current and predicted crop and soil conditions.

This is part of a new GRDC funded project on improving water use efficiency (WUE), in collaboration with SARDI and the University of Adelaide. As such we have initiated four WUE sites to represent a range of soil and climatic differences that occur in the Mid-North. The sites aim to provide improved and timely information for making nitrogen and fungicide decisions, as these have been the most difficult and yet costly over the past few seasons.

The 1<sup>st</sup> edition of Hart Beat is complementary, however in order to receive further editions you will need to become a member. The information will be updated 4-5 times during the year and provide you with information on soil moisture and yield potential. We hope this can assist in making informed choices on the need for additional nitrogen and fungicide applications. The *Yield Prophet*® simulation is not a crystal ball, but provides a realistic prediction of the available soil water and nitrogen status of your crop.

We value and invite your feed back and ideas to improve this product. For technical questions in relation to *Yield Prophet*® visit the website, or contact Peter Hooper.

If this service was provided individually it would cost approximately \$500 per farm and hence we believe that many more farms can participate in the broad concept of *Yield Prophet*® by joining Hart and sharing the costs.

On behalf of the group I would like to invite you to become a member of Hart, and believe that between the Hart Beat newsletter and attendance at the annual field day we can add significant value to your business.

Grant Roberts  
Chairman Hart Field Site Group



2008 main field day



Matt Dare, Justin Wundke and Michael Jaeschke sowing the commercial crop

## Commercial crop update

The commercial crop was sown on the 29<sup>th</sup> May with Flagship barley at 80kg/ha with 50kg/ha DAP and the 2010 field day site was sown with Wintaroo oats sown at 140kg/ha and 50kg/ha DAP.

## Dates for 2009

### Winter Walk

Tuesday 28<sup>th</sup> July – at the site  
9:00am - noon

### Hart Field Day

Tuesday 15<sup>th</sup> September Gates  
open 9:00am

### Spring Twilight Walk

Thursday 15<sup>th</sup> October – at the site  
4:00pm

GRDC Grains Research & Development Corporation

YIELD PROPHET

# Hart

Site information as of 24th June 2009

**Soil type:** Sandy clay loam  
**PAWC:** 201mm  
**Average annual rainfall:** 400mm  
**Average GSR (Apr to Oct):** 305mm

## The season so far

**Rain to date:** 129mm  
**GSR to date:** 120mm  
**GSR decile:** 5  
**Maximum temp since sowing:** 22.7°C  
**Minimum temp since sowing:** 2.7°C  
**Day degrees since sowing:** 498°C  
**Current predicted soil N status:** 125kg/ha  
**Current predicted PAW:** 27mm

## Grain & hay yield predictions

**Yield prophet estimate: (Date of report 24/06/2009)**  
50% chance of producing 3.3t/ha grain or 6.1t/ha hay when sown on the 18<sup>th</sup> May (see graph).  
50% chance of producing 3.5t/ha grain or 6.2t/ha hay when sown on the 5<sup>th</sup> May.

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.

**French & Schultz yield estimate:** 4.0t/ha  
This model assumes that there is 110mm of evaporation and decile 5 (190mm) rainfall for the remainder of the growing season.

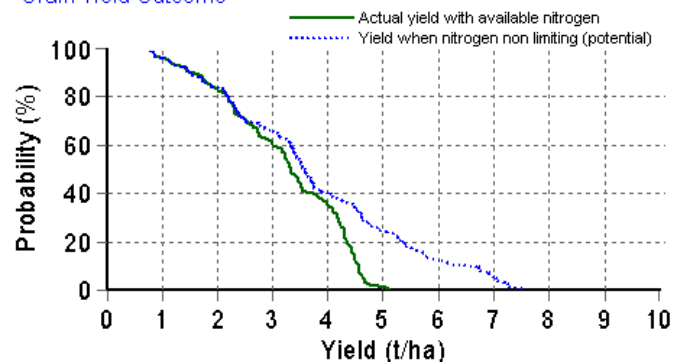
## Pre-sowing soil nitrogen and water

(measured 2<sup>nd</sup> April)  
**Soil N prior to sowing (0-90cm):** 94kg/ha  
**Plant available water at sowing (0-90cm):** 0mm

## Crop growth

**Variety:** Gladius  
**Sowing date:** 18<sup>th</sup> May  
**Nitrogen fertiliser at sowing:** 30kgN/ha  
**Plant density:** 162 plants per square metre  
**Current growth stage:** 2 leaf / 1 tiller (GS12/21)  
**Predicted date of stem elongation (GS30):** 2<sup>nd</sup> August  
**Predicted date of flowering:** 25<sup>th</sup> September

Grain Yield Outcome



# Condowie

Site information as of 24th June 2009

**Soil type:** Sandy loam  
**PAWC:** 127mm  
**Average annual rainfall:** 349mm  
**Average GSR (Apr to Oct):** 252mm

## The season so far

**Rain to date:** 111mm  
**GSR to date:** 102mm  
**GSR decile:** 6  
**Maximum temp since sowing:** 24.5°C  
**Minimum temp since sowing:** 0.5°C  
**Day degrees since sowing:** 724°C  
**Current predicted soil N status:** 241kg/ha  
**Current predicted PAW:** 19mm

## Grain & hay yield predictions

**Yield prophet estimate: (Date of report 24/06/2009)**  
50% chance of producing 2.6 t/ha grain or 4.5t/ha hay when sown on the 30<sup>th</sup> April (see graph).  
50% chance of producing 2.5t/ha grain or 4.5/ha hay when sown on the 15<sup>th</sup> May.

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.

**French & Schultz yield estimate:** 2.8t/ha  
This model assumes that there is 110mm of evaporation and decile 5 (149mm) rainfall for the remainder of the growing season.

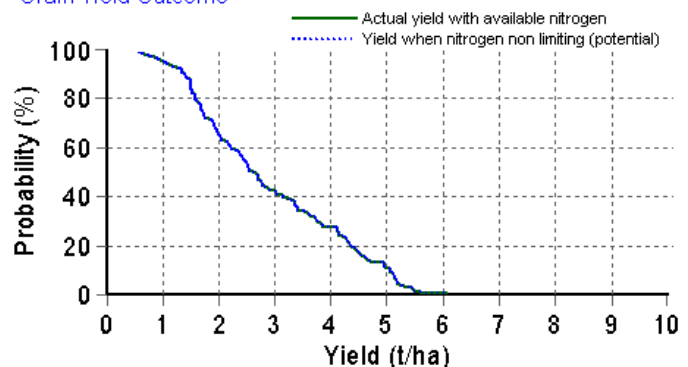
## Pre-sowing soil nitrogen and water

(measured 23<sup>rd</sup> March)  
**Soil N prior to sowing (0-90cm):** 244kg/ha  
**Plant available water at sowing (0-90cm):** 0mm

## Crop growth

**Variety:** Gladius  
**Sowing date:** 30<sup>th</sup> April  
**Nitrogen fertiliser at sowing:** 20kgN/ha  
**Plant density:** 162 plants per square metre  
**Current growth stage:** 4 leaf / 1 tiller (GS14/21)  
**Predicted date of stem elongation (GS30):** 6<sup>th</sup> July  
**Predicted date of flowering:** 2<sup>nd</sup> September

Grain Yield Outcome



# Spalding

Site information as of 24th June 2009

**Soil type:** Red brown earth  
**PAWC:** 150mm  
**Average annual rainfall:** 434mm  
**Average GSR (Apr to Oct):** 322mm

## The season so far

**Rain to date:** 168mm  
**GSR to date:** 148mm  
**GSR decile:** 7  
**Maximum temp since sowing:** 21.2°C  
**Minimum temp since sowing:** 0.2°C  
**Day degrees since sowing:** 584°C  
**Current predicted soil N status:** 133kg/ha  
**Current predicted PAW:** 65mm

## Grain & hay yield predictions

**Yield prophet estimate: (Date of report 24/06/2009)**  
50% chance of producing 4.8t/ha grain or 8.4t/ha hay when sown on the 9<sup>th</sup> May (see graph).  
50% chance of producing 4.8t/ha grain or 9.0t/ha hay when sown on the 20<sup>th</sup> May.

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.

**French & Schultz yield estimate: 4.7/ha**  
This model assumes that there is 110mm of evaporation and decile 5 (199mm) rainfall for the remainder of the growing season.

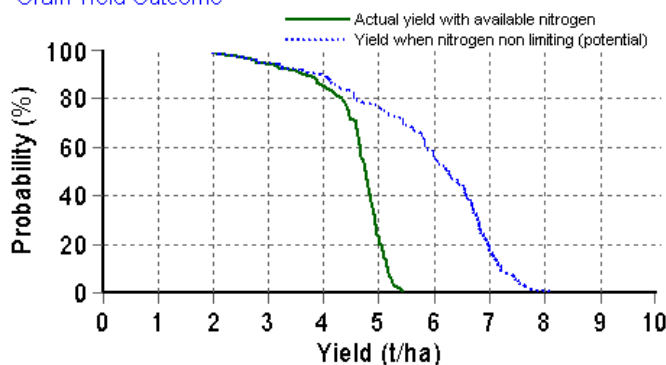
## Pre-sowing soil nitrogen and water

(measured 2<sup>nd</sup> April)  
**Soil N prior to sowing (0-90cm):** 107kg/ha  
**Plant available water at sowing (0-90cm):** 0mm

## Crop growth

**Variety:** Gladius  
**Sowing date:** 9<sup>th</sup> May  
**Nitrogen fertiliser at sowing:** 40kgN/ha  
**Plant density:** 182 plants per square metre  
**Current growth stage:** 3 leaf / 2 tillers (GS13/22)  
**Predicted date of stem elongation (GS30):** 24<sup>th</sup> July  
**Predicted date of flowering:** 21<sup>st</sup> September

Grain Yield Outcome



# Tarlee

Site information as of 24th June 2009

**Soil type:** Clay loam over rock  
**PAWC:** 122mm  
**Average annual rainfall:** 469mm  
**Average GSR (Apr to Oct):** 350mm

## The season so far

**Rain to date:** 151mm  
**GSR to date:** 131mm  
**GSR decile:** 4  
**Maximum temp since sowing:** 22.2°C  
**Minimum temp since sowing:** 2.2°C  
**Day degrees since sowing:** 279°C  
**Current predicted soil N status:** 166kg/ha  
**Current predicted PAW:** 62mm

## Grain & hay yield predictions

**Yield prophet estimate: (Date of report 24/06/2009)**  
50% chance of producing 4.6t/ha grain or 7.4t/ha hay when sown on the 1<sup>st</sup> June (see graph).  
50% chance of producing 5.0t/ha grain or 6.5t/ha hay when sown on the 10<sup>th</sup> May.

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.

**French & Schultz yield estimate: 6.1t/ha**  
This model assumes that there is 110mm of evaporation and decile 5 (283 mm) rainfall for the remainder of the growing season.

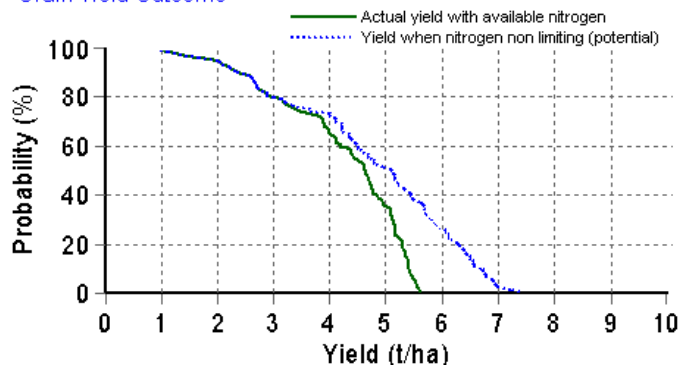
## Pre-sowing soil nitrogen and water

(measured 27<sup>th</sup> March)  
**Soil N prior to sowing (0-90cm):** 143kg/ha  
**Plant available water at sowing (0-90cm):** 7mm

## Crop growth

**Variety:** Gladius  
**Sowing date:** 1<sup>st</sup> June  
**Nitrogen fertiliser at sowing:** 50kgN/ha  
**Plant density:** (expected) 180 plants per square metre  
**Current growth stage:** 1 leaf (GS11)  
**Predicted date of stem elongation (GS30):** 12<sup>th</sup> August  
**Predicted date of flowering:** 1<sup>st</sup> October

Grain Yield Outcome



# Hart Beat

## WUE site locations



## 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.

**Day degrees** – the accumulation of temperature units, or warmth. It is the main environmental property that controls plant development.

**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.

The **French & Schultz** formula estimates the rainfall limited grain yield based on the growing season rainfall (GSR). It assumes evaporation of 110mm, it does not include stored water at sowing and a maximum grain yield potential of 20 kg/mm/ha.

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

**Yield Prophet®** has been very accurate throughout Australia, over the past 5 seasons. At the Hart fieldsite the **Yield Prophet®** 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®** 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 and nitrogen processes in the paddock, and crop growth. Yield Prophet calculates the amount of water and nitrogen available to the crop and the water and nitrogen demand of the crop.

**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.apsim.info](http://www.apsim.info) or [www.yieldprophet.com.au](http://www.yieldprophet.com.au).

**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

Site	Average annual rainfall (mm)	Soil type	Drained upper limit (mm to 150cm)	Crop lower limit (mm to 150cm)	Plant Available Water Capacity (mm)
Condowie	350	Sandy loam	376	249	127
Hart	400	Sandy clay loam	683	482	201
Spalding	430	Red brown earth	469	319	150
Tarlee	470	Clay loam over rock	383*	263*	120*

\*depth to 125cm

## Hart field site contact information

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