

HART BEAT

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ISSUE 38

Hart Field Site Group Inc

PO Box 939

CLARE SA 5453

0427 423 154

admin@hartfieldsite.org.au



flexi/coil



HART BEAT

Yield Prophet[®] simulations for 8 sites across the mid-north of SA

The Yield Prophet[®] 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 – 20th September 2016

Spring Twilight Walk – 18th October 2016

Getting The Crop In – March 2017

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Hart Beat site reports

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

www.hartfieldsite.org.au

Hart research program

2016

This season the Hart Field-Site Group are managing or hosting 40 trials across the Mid-North. **Come visit the site!** Join us at one of our events during the year or take a drive to Hart, there is a map on the front gate and the trials are signed. Below we have listed a few new and long-term research projects you can view.

Crop Nutrition

- Management strategies for productivity and reduced nitrous oxide emissions.
- Deep ripping and subsoil placement of chicken litter and fertiliser (*off-site*).
- Nutrient (N, P, K, S) stratification: Paddock case studies looking at effects of surface manure applications and chaff spread out the header (*off-site*).

Variety trials – includes the usual favourites; wheat, barely, durum and cereal forage options. There are also other demonstration trials looking at canola, pulses and pasture types.

Agronomy

- Wheat time of sowing - includes the varieties Mace, Trojan and RAC2341 at different seeding rates.
- The site has a number of variety and time of sowing trials this year including; faba bean, canola and barley.
- Wheat variety specific nitrogen management

Weeds and disease

- Legume and oilseed herbicide tolerance
- Early or delayed sowing for improved ryegrass control?
- Barley fungicide options for spot form and net form net blotch.
- Pulse disease trials investigating fungicide options for black spot in field pea and ascochyta in lentils.
- View some of the herbicide tolerant lentil and bean lines coming through the Pulse Breeding Australia program.

There are also a number of **long term** trials we are continuing to monitor in 2016. These include:

- Long term seeding systems trial – comparison of disc, knife-point and a strategic treatment, currently in its 17th season.
- Managing clethodim resistant annual ryegrass without oaten hay – which parts of the rotation to target and effective herbicide options.

*These trials are conducted with a number of collaborators from SARDI, CSIRO University of Adelaide and Upper North Farming Systems. Trials are currently funded through SAGIT, GRDC, Department of Agriculture, Landcare Australia and member funds. A **BIG thank you** to all the volunteer hours from consultants and farmers to help put the program together.*



Dr Jenny Davidson, SARDI talking to the Winter Walk crowd about pulse and canola disease management.

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 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.

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® has been very accurate throughout Australia, over the past 5 seasons. At the Hart field site the *Yield Prophet®* prediction on the 15th 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.

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.hartfieldsite.org.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 15 April (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	18	105
Spalding	430	Red brown earth	143	150	29	106
Condowie	350	Sandy loam	115	150	4	78
Kybunga	428	Clay loam	262	120	5	106
Farrell Flat	474	Light clay loam	172	120	52	103
Pinery	374	Silty clay loam	79	150	16	98
Eudunda	445	Gravelly loam	96	100	5	98
Tarlee	474	Sandy loam	113	150	50	91

2016 site locations



SANDY CLAY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 208 mm
 GSR to date: 147 mm (93 mm since last report) GSR decile: 5
 Current predicted PAW: 80 mm (39% full) PAWC: 206 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

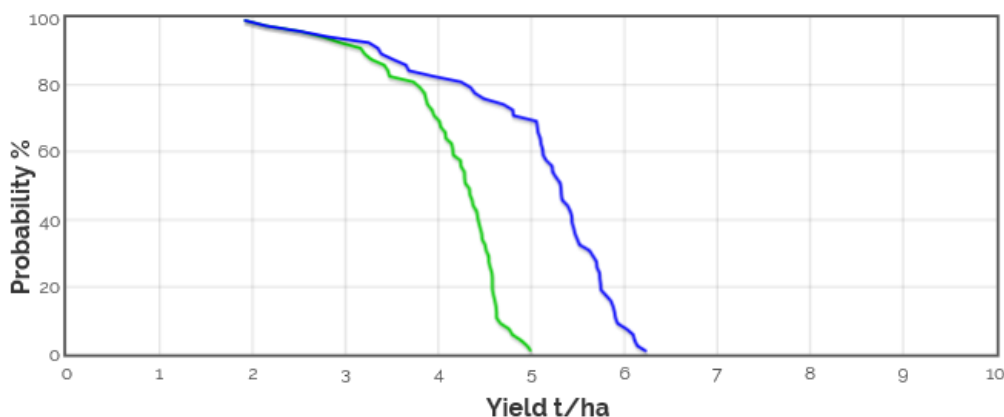
These estimates are based on a 50% probability

Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	4.7	+0.2	4.2	+0.3

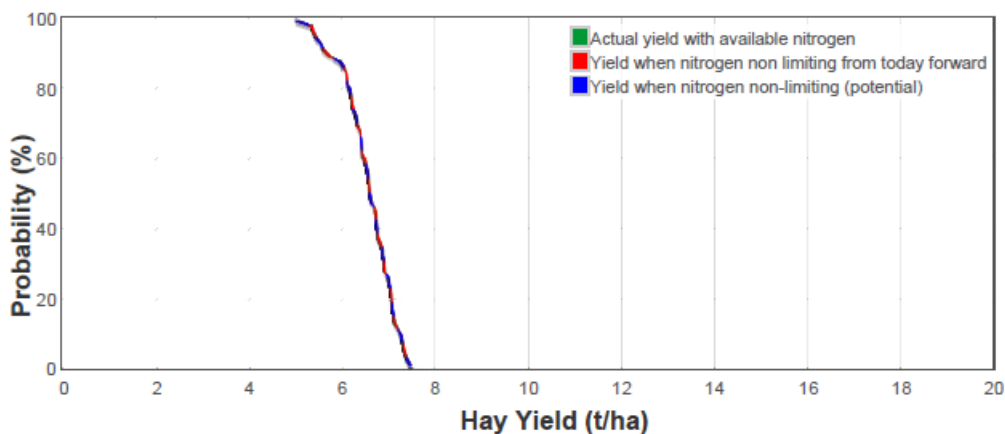
French & Schultz grain yield estimate:

100% WUE:	3.7 t/ha
80% WUE:	3.0 t/ha

This model assumes that there is 19 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: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 268 mm
 GSR to date: 163 mm (100 mm since last report)
 Current predicted PAW: 92 mm (64% full)

GSR decile: 6
 PAWC: 143 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

These estimates are based on a 50% probability

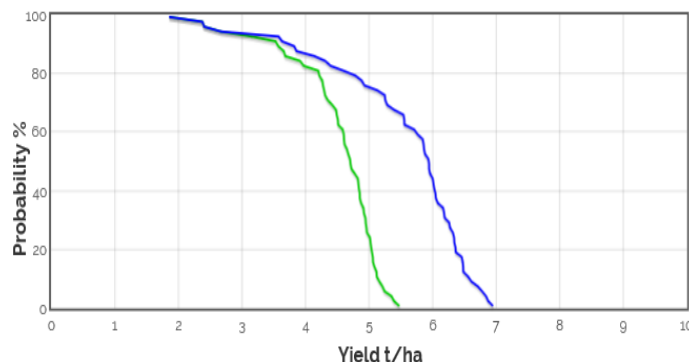
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	5.3	+ 0.7	4.2	+ 0.4

French & Schultz grain yield estimate:

100% WUE:	4.6 t/ha
80% WUE:	3.6 t/ha

This model assumes that there is 32 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (143 mm) for the rest of the season.

Grain 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.

CONDOWIE

SANDY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 214 mm
 GSR to date: 134 mm (81 mm since last report)
 Current predicted PAW: 65 mm (56% full)

GSR decile: 6
 PAWC: 115 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 13/07/2016)

These estimates are based on a 50% probability

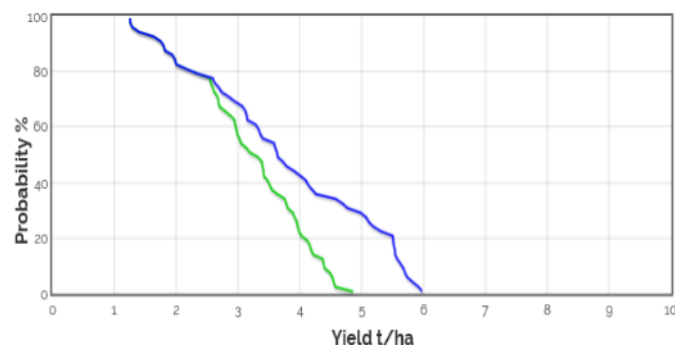
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	3.5	+ 1.0	2.7	+ 0.2

French & Schultz grain yield estimate:

100% WUE:	4.6 t/ha
80% WUE:	3.6 t/ha

This model assumes that there is 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (143 mm) for the rest of the season.

Grain 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.

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 326 mm
 GSR to date: 228 mm (129 mm since last report)
 Current predicted PAW: 138 mm (52% full)

GSR decile: 9
 PAWC: 262 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 13/07/2016)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	5.6	+ 0.9	5.4	+ 1.2

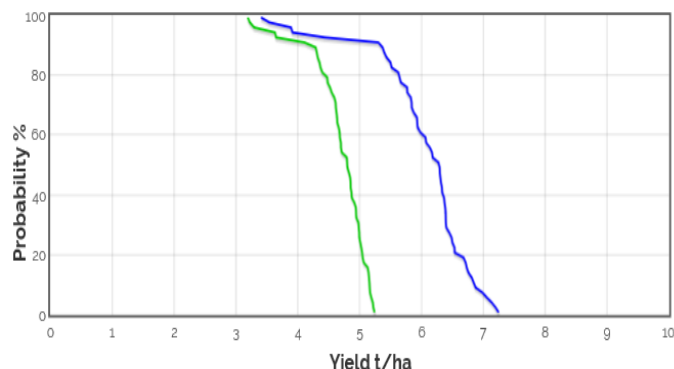
French & Schultz grain yield estimate:

100% WUE: 8.4 t/ha

80% WUE: 6.8 t/ha

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (186 mm) for the rest of the season.

Grain 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.

FARRELL FLAT

LIGHT CLAY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 342 mm
 GSR to date: 232 mm (142 mm since last report)
 Current predicted PAW: 172 mm (100% full)

GSR decile: 8
 PAWC: 172 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	6.0	+ 0.2	6.1	+ 0.1

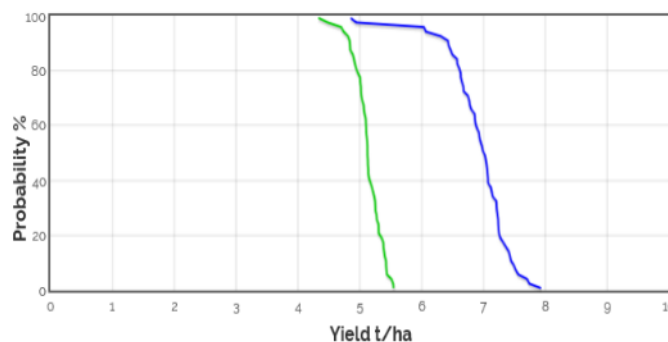
French & Schultz grain yield estimate:

100% WUE: 6.4 t/ha

80% WUE: 5.2 t/ha

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (167 mm) for the rest of the season.

Grain 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.

SILTY CLAY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 300 mm
 GSR to date: 200 mm (120 mm since last report)
 Current predicted PAW: 70 mm (89% full)

GSR decile: 7
 PAWC: 79 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

These estimates are based on a 50% probability

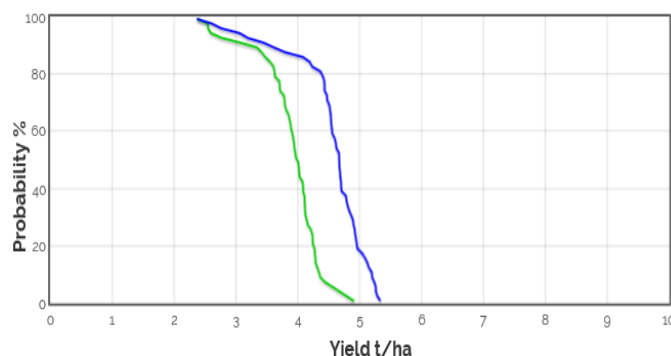
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	4.3	0.0	4.1	+ 0.3

French & Schultz grain yield estimate:

100% WUE: 5.1 t/ha
 80% WUE: 4.1 t/ha

This model assumes that there is 30 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (135 mm) for the rest of the season.

Grain 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.

GRAVELLY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 313 mm
 GSR to date: 203 mm (114 mm since last report)
 Current predicted PAW: 76 mm (79% full)

GSR decile: 6
 PAWC: 96 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

These estimates are based on a 50% probability

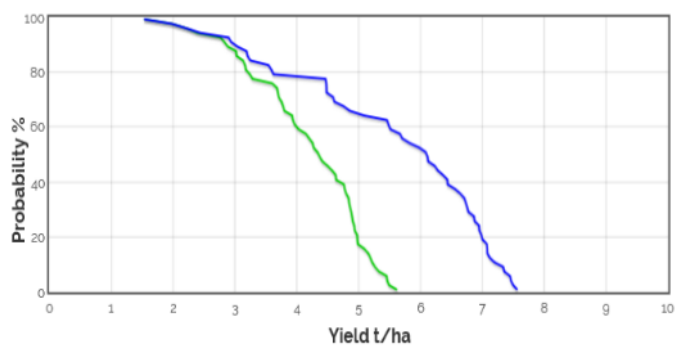
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	5.2	+ 0.4	4.5	+ 0.3

French & Schultz grain yield estimate:

100% WUE: 5.6 t/ha
 80% WUE: 4.5 t/ha

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (156 mm) for the rest of the season.

Grain 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.

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 409 mm
 GSR to date: 295 mm (179 mm since last report) GSR decile: 10
 Current predicted PAW: 113 mm (100% full) PAWC: 113 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 25/07/2016)

These estimates are based on a 50% probability

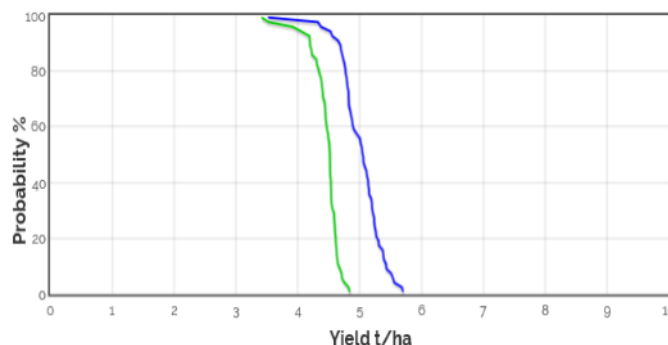
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	4.9	0.0	5.1	+ 0.1

French & Schultz grain yield estimate:

100% WUE: 7.7 t/ha
 80% WUE: 6.1 t/ha

This model assumes that there is 34 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (165 mm) for the rest of the season.

Grain 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.

Hart Field Day 2016

September 20th 2016

International Year of Pulses

Author & chef **Simon Bryant** (pictured)

'Eat what you grow' – it really is easy to cook with pulses

International guest speaker

Bert van den Berg

Canadian pulse researcher

Lunch time guest speaker

Peter Wilson

Pulse Australia chairman

Plus the broad range of cereal, oilseed, herbicide, variety and agronomy trials you expect.

