HART BEAT

27th June 2018

ISSUE 45

HART

SA's premier cropping field site

flexi coil

ROCKY RIVER AG

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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

IN THIS ISSUE

HART EVENTS

Winter Walk – July 17, 2018
Hart Field Day – September 18, 2018
Spring Twilight Walk – October 16, 2018

www.hartfieldsite.org.au

From the chairman

Welcome to the first edition of Hart Beat for 2018.

This is our 10th year providing detailed yield prediction information for the Mid-North of South Australia through our Hart Beat newsletters. Again featuring eight sites of varying soil types and rainfall across the region, we hope this resource proves to be valuable when making operational decisions throughout the growing season.

Farming is always a mixed bag and this season is proving to be no different. Most of us have now had enough rain to get our crops and pastures established, there has been much looking to the sky and counting of every ½ mm rain event. In particular, pastures and stock feed have been very slow to get going, this has seen a very high demand for feed grain and fodder.

Hart has had a decent start with our trials programme, early May saw 19mm over 2 days which has given us some moisture to get things going.

We have a large trial programme in 2018 for people to check out. This year we have 31 trials, 2 are off site at Booleroo Centre and Washpool. In addition to our own trials we will be working with SARDI, The University of Adelaide and others on some fantastic projects. Our trials programme was underway early again this year with the time of sowing trials beginning on the 20th of March, they required some irrigation to enable germination. These trials show us the possible benefits and also risks of early sowing on limited moisture. Our last trials were sown on the 14th of June. Trials across the Hart site have emerged well while the trial at Booleroo Centre has incurred some set backs due to severe moisture stress and wildlife grazing pressure.

Thanks to a GRDC Infrastructure grant, we have been able to erect a new shed and provide power to the site this year. Our new shed will be home to a small lab and work area as well as our sample drying oven and fridge. The existing shed will be used for more extension and workshop sessions. It's been exciting to see our facilities upgraded.

At our AGM in April we said farewell to two valuable board members as they completed their terms.

- After thirteen years on the board, most as treasurer, Graham Trengove retired from the Hart board. Thank you Graham for your years of service.

- Mick Lines decided not to renominate for a board position this year. Mick has been an important member of the board with a valued insight to trials management.

On the flip side we have again been fortunate to have two high quality candidates join our team, Ryan Wood (Vice-Chair) and Alex Thomas. We welcome their input over the coming seasons. You can learn more about Ryan, Alex and the rest of our team on our website.

Our Regional Internship in Applied Grains Research programme, funded by SAGIT, is now in its 3rd year with 2018 intern Emma Pearce joining us from WA. Sarah, Sandy and the board are to be congratulated on the success of the programme. Emma has settled into the role really well and we look forward to sharing some of her research over the coming months. Our 2017 intern Dylan Bruce joined the SARDI team at Clare straight after completing his time with Hart; we're really pleased to see him continuing in grains research.

Finally, we invite you to join us at our annual Winter Walk on Tuesday the 17th of July starting at 9am. We have another fantastic trial program at Hart and I hope to see many of you there to check it out.

Damien Sommerville
Hart Chairperson
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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 dashed line** displays the actual grain yield with the current soil available nitrogen. The **blue dashed 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. Both these lines also now take into account frost and heat effects on grain 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.

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 or www.yieldprophet.com.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 16 April (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	17	77
Spalding	430	Red brown earth	143	150	16	68
Condowie	350	Sandy loam	115	150	0	80
Kybunga	428	Clay loam	262	120	22	72
Farrell Flat	474	Light clay loam	172	120	11	68
Pinery	374	Silty clay loam	79	150	0	59
Eudunda	445	Gravelly loam	96	100	19	67
Tarlee	474	Sandy loam	113	150	26	76

2018 site locations

HART

SANDY CLAY LOAM

Crop growth

Variety: Mace wheat | **Sowing date:** 1st May | **Nitrogen fertiliser:** 30 kg N/ha at seeding
Emergence date: 12th May

The season so far

Annual rain to date: 103 mm
GSR to date: 79 mm | **GSR decile:** 3
Current predicted PAW: 48 mm (23 % full) | **PAWC:** 206 mm

Grain yield predictions (Yield Prophet)

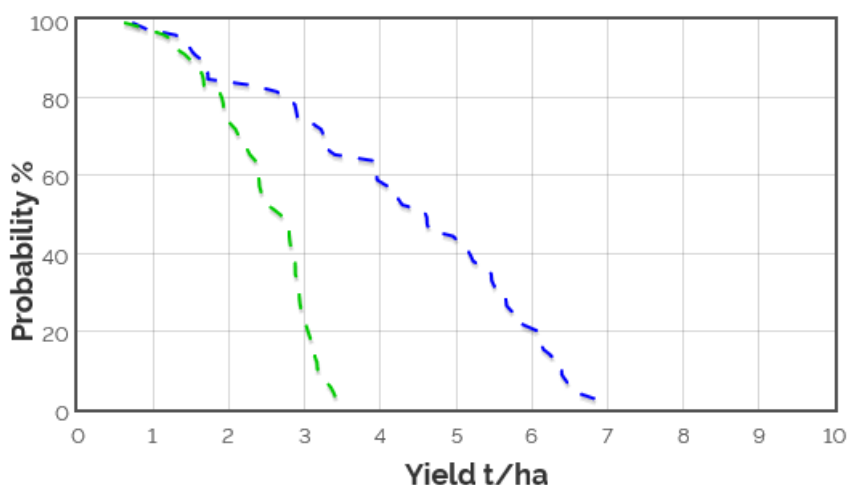**Yield prophet estimate:** *(Date of report 27/06/2018)*

These estimates are based on a 50% probability

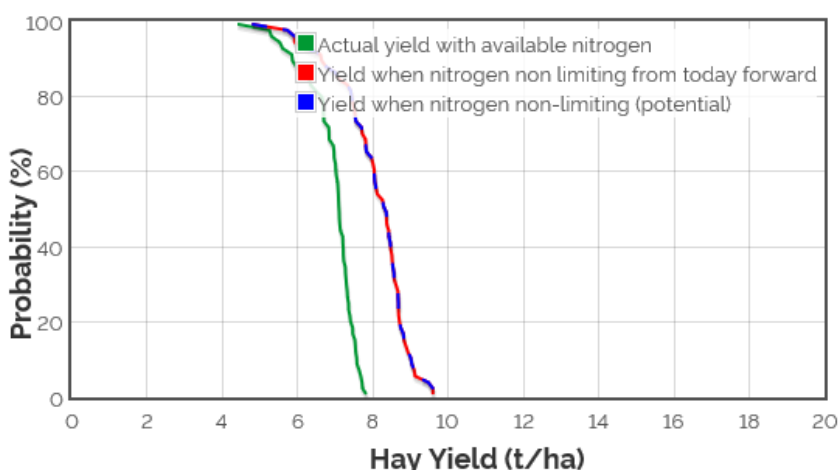| Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	3.7	4.3	3.4	4.3

French & Schultz grain yield estimate:

100% WUE:	**3.1 t/ha**
80% WUE:	**2.5 t/ha**

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (178 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.

Legend:
- Actual yield with available nitrogen
- Yield when nitrogen non limiting from today forward
- Yield when nitrogen non-limiting (potential)

SPALDING

RED BROWN EARTH

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding
Emergence date: 11th May

The season so far
Annual rain to date: 128 mm
GSR to date: 99 mm   **GSR decile:** 5
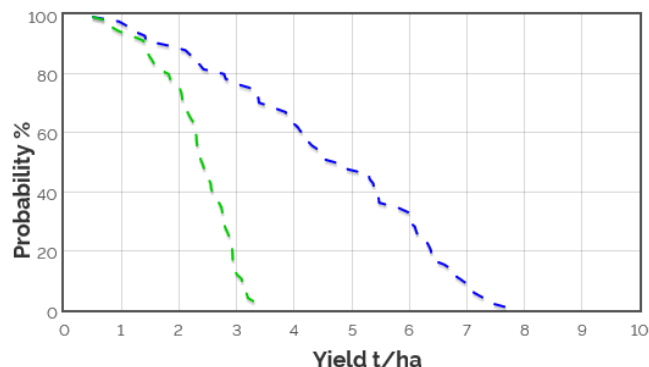**Current predicted PAW:** 58 mm (41 *% full*)   **PAWC:** 143 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 27/06/201)*

These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	3.6	3.6	3.3	3.2

French & Schultz grain yield estimate:

100% WUE:	2.6 t/ha
80% WUE:	2.1 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (132 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:** 30 kg N/ha at seeding
Emergence date: 12th May

The season so far
Annual rain to date: 97 mm
GSR to date: 78 mm   **GSR decile:** 4
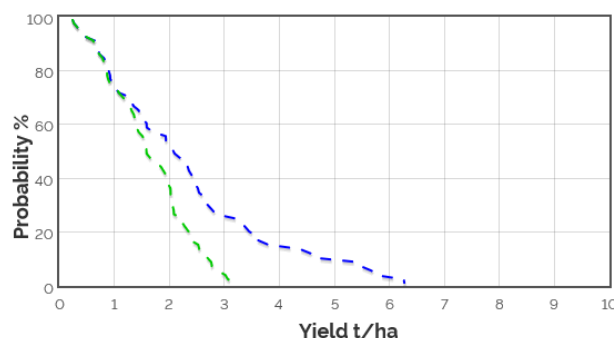**Current predicted PAW:** 13 mm (11 *% full*)   **PAWC:** 115 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 27/06/2018)*

These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	1.8	2.6	1.3	2.5

French & Schultz grain yield estimate:

100% WUE:	2.3 t/ha
80% WUE:	1.8 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (141 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.

KYBUNGA

CLAY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding
Emergence date: 11ᵗʰ May

The season so far
Annual rain to date: 129 mm
GSR to date: 107 mm   **GSR decile:** 5
Current predicted PAW: 55 mm (21 *% full*)   **PAWC:** 262 mm

Grain yield predictions (Yield Prophet)
Yield prophet estimate: *(Date of report 27/06/2018)*

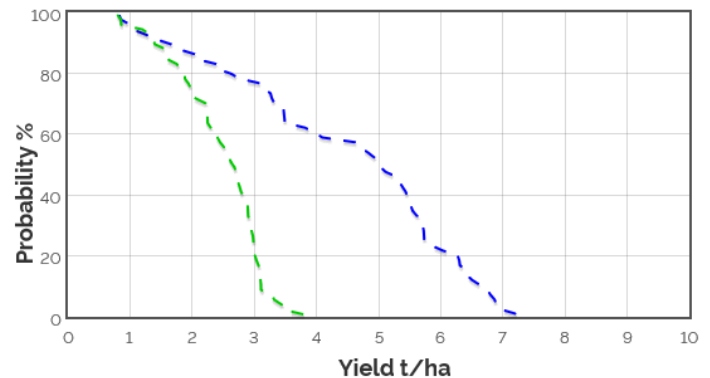*These estimates are based on a 50% probability*

Yield t/ha	Sown 1ˢᵗ May *(see graph)*	This time last year	Sown 20ᵗʰ May	This time last year
Grain	3.9	4.8	3.2	4.6

French & Schultz grain yield estimate:

100% WUE:	4.7 t/ha
80% WUE:	3.8 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (232 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:** 30 kg N/ha at seeding
Emergence date: 12ᵗʰ May

The season so far
Annual rain to date: 154 mm
GSR to date: 123 mm   **GSR decile:** 5
Current predicted PAW: 65 mm (38*% full)*   **PAWC:** 172 mm

Grain yield predictions (Yield Prophet)
Yield prophet estimate: *(Date of report 27/06/2018)*

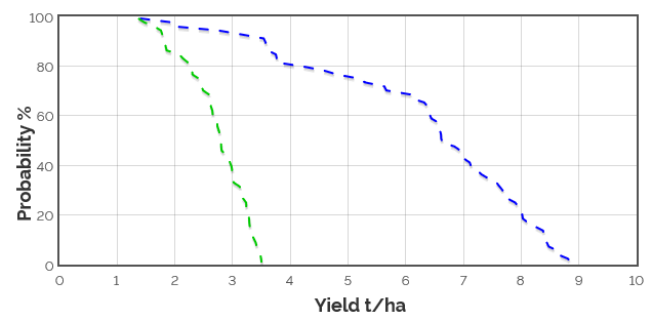*These estimates are based on a 50% probability*

Yield t/ha	Sown 1ˢᵗ May *(see graph)*	This time last year	Sown 20ᵗʰ May	This time last year
Grain	4.7	4.7	4.2	4.5

French & Schultz grain yield estimate:

100% WUE:	4.9 t/ha
80% WUE:	3.9 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (222 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.

PINERY

SILTY CLAY LOAM

Crop growth
Variety: Mace wheat | **Sowing date:** 1st May | **Nitrogen fertiliser:** 30 kg N/ha at seeding
| | **Emergence date:** 13th May | |

The season so far
Annual rain to date: 97 mm
GSR to date: 75 mm | | **GSR decile:** 2
Current predicted PAW: 46 mm (58 *% full*) | | **PAWC:** 79 mm

Grain yield predictions (Yield Prophet)
Yield prophet estimate: *(Date of report 27/06/2018)*
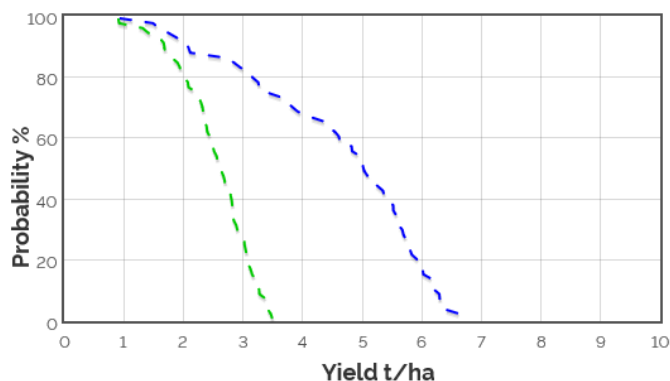
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	3.7	3.8	3.3	3.5

French & Schultz grain yield estimate:
100% WUE:	3.0 t/ha
80% WUE:	2.4 t/ha

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (177 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.

EUDUNDA

GRAVELLY LOAM

Crop growth
Variety: Mace wheat | **Sowing date:** 1st May | **Nitrogen fertiliser:** 30 kg N/ha at seeding
| | **Emergence date:** 14th May | |

The season so far
Annual rain to date: 118 mm
GSR to date: 79 mm | | **GSR decile:** 3
Current predicted PAW: 39 mm (40 *% full*) | | **PAWC:** 96 mm

Grain yield predictions (Yield Prophet)
Yield prophet estimate: *(Date of report 27/06/2018)*
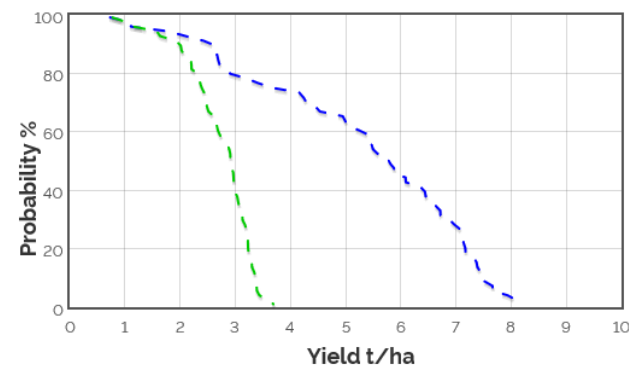
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.3	2.8	3.9	3.1

French & Schultz grain yield estimate:
100% WUE:	3.7 t/ha
80% WUE:	3.0 t/ha

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (205 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.

TARLEE

SANDY LOAM

Crop growth

Variety: Mace wheat **Sowing date:** 1st May **Nitrogen fertiliser:** 30 kg N/ha at seeding

Emergence date: 10th May

The season so far

Annual rain to date: 98 mm

GSR to date: 77 mm **GSR decile:** 2

Current predicted PAW: 35 mm (31 *% full*) **PAWC:** 113 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 26/06/2018)*

These estimates are based on a 50% probability

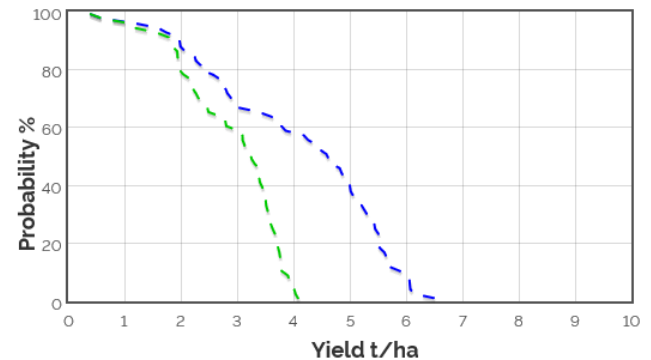| Yield t/ha	Sown 1st May *(see graph)*	Change Since Last Report	Sown 20th May	Change Since Last Report
Grain	3.9	4.5	3.5	4.9

French & Schultz grain yield estimate:

100% WUE:	3.8 t/ha
80% WUE:	3.0 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (215 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.

Trial seeding 2018