HART BEAT

7th June 2016

ISSUE 37

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 – 19th July 2016

HART FIELD DAY – 20th September 2016

Spring Twilight Walk – 18th October 2016

Getting The Crop In – March 2017

www.hartfieldsite.org.au

From the chairman

Welcome to the first edition of Hart Beat for 2016.

2015 proved an interesting year across the region with some areas finishing before the moisture ran out, whilst others were left with limited options to convert good biomass into a viable return on investment. It was a year where farming systems focused on moisture retention and tools like Yield Prophet came into their own for informed decision making.

With the early finish to spring and minimal rainfall events over the summer many farmers in the region elected to start sowing crops dry in April. The recent break has been well received and it is great to see some relief for those within the Pinery Fire Zone.

Hart has been no exception with many trials in the ground before the break, creating many challenges, but essential to get the program underway. Our time of sowing trials required watering to ensure that there was a difference in emergence timing but the rains over the last fortnight have been very welcome, as seeding come to a close in early June.

In April we were fortunate to be awarded the PIRSA Sustainable Farming Award for our work towards long-term organisational sustainability at the annual Ag Excellence Awards Dinner. This award recognises the strong team involved with all we do at Hart, the guidance from our past chairs and the stability provided from our staff and contractors. Well done all. Hart's AGM was held in April and as expected, we have seen some changes to the make-up of our team.

- Justin Wundke's three year term as chairman has come to an end. Justin has done a great job and his contribution to Hart has been much appreciated. I was elected to the role of Chair for the next term until 2018. I am grateful that Justin has agreed to serve as Vice-Chair for the next 12 months - his support will be of great value as I begin my term.

- Two valued members of our team have stepped down from the Hart Board. Craig Weckert, a local farmer with a passion for improving the viability of the regions farms, has been with us for 6 years and

has been a fantastic contributor to the committee and at all of our events. Peter Hooper joined Hart as our Trials Manager, having taken over from Allan Mayfield in the mid-2000's. On handing the role on to our current Research & Extension Manager, Sarah in 2013, he stayed on as a Board Member and Contractor to mentor Sarah and support the group through a period of structural change. We are grateful for the many hours and dedication Peter has put into the research program and group. I would like to thank Peter and Craig for their efforts and look forward to still catching up with them both at our events.

- Joining us on the Hart Board with both experience and enthusiasm are Peter Baker, a consultant from Clare and Leigh Fuller, a farmer from Koolunga. They'll be great additions to the group and I look forward to working closely with them both.

Our first Regional Intern in Applied Grains Research join us in March of this year; Rochelle Wheaton will be with us for 12 months, predominately working alongside Sarah. Rochelle is originally from Streaky Bay, and is now living in Clare. I hope you enjoy your 12 months with us Rochelle. Thanks to SARDI for their collaboration and SAGIT for their funding support to allow us to offer this position and foster the future of agriculture research in South Australia.

This year will be a busy one for Hart with many trials and a special focus on the International Year of the Pulse which is especially timely considering how many pulses are being grown in recent years.

Our winter walk will be on Tuesday the 19th of July starting at 9am, I hope to see many of you out there.

Damien Sommerville
Hart Chairperson
0417 850 587
chairperson@hartfieldsite.org.au

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.

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 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

HART

SANDY CLAY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 40 kg N/ha at seeding

The season so far
Annual rain to date:	115 mm		
GSR to date:	53 mm	**GSR decile:**	3
Current predicted PAW:	33 mm (16*% full*)	**PAWC:**	206 mm

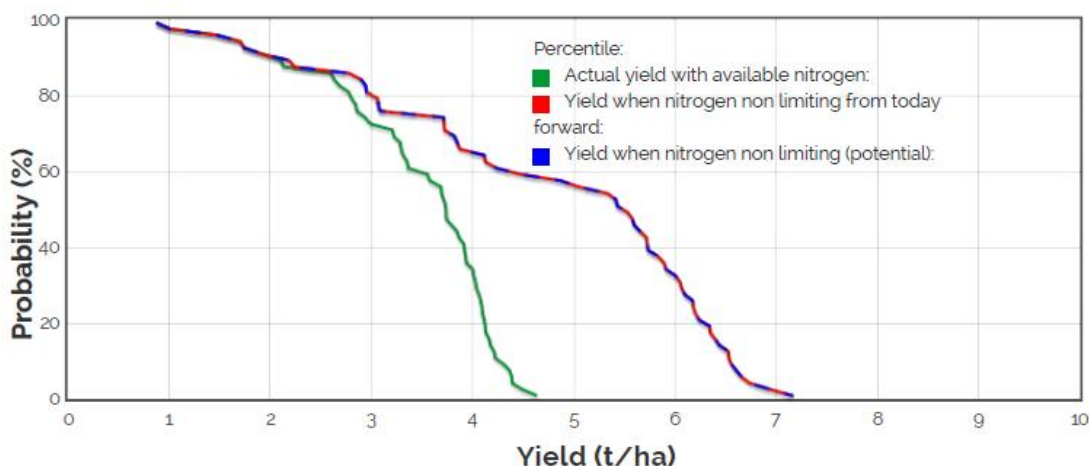## Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*

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	4.5	5.2	3.9	5.3

French & Schultz grain yield estimate:

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

This model assumes that there is 19 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (209 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.
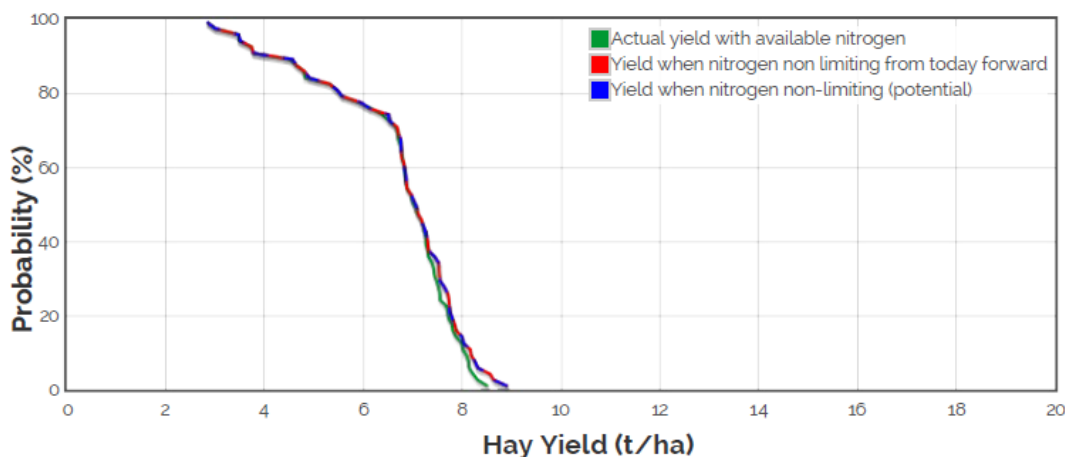
SPALDING

RED BROWN EARTH

Crop growth
Variety: Mace wheat　　**Sowing date:** 1st May　　**Nitrogen fertiliser:** 40 kg N/ha at seeding

The season so far
Annual rain to date: 168 mm
GSR to date: 63 mm　　**GSR decile:** 5
Current predicted PAW: 54 mm (*38% full*)　　**PAWC:** 143 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
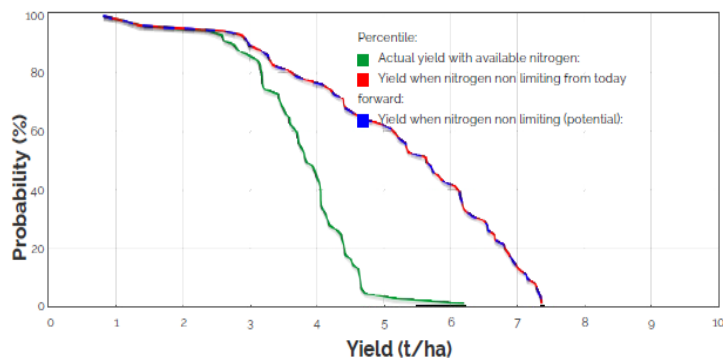
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.6	4.0	3.8	3.4

French & Schultz grain yield estimate:

100% WUE:	4.2 t/ha
80% WUE:	3.3 t/ha

This model assumes that there is 32 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (224 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

The season so far
Annual rain to date: 133 mm
GSR to date: 53 mm　　**GSR decile:** 5
Current predicted PAW: 25 mm (*22% full*)　　**PAWC:** 115 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 01/06/2016)*
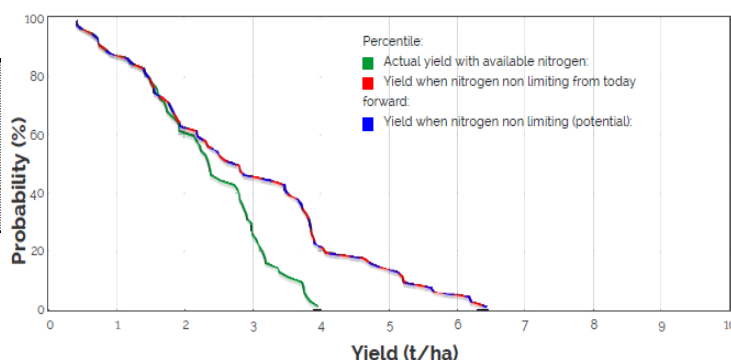
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	2.5	2.2	2.5	2.0

French & Schultz grain yield estimate:

100% WUE:	2.8 t/ha
80% WUE:	2.2 t/ha

This model assumes that there is 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (172 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:** 40 kg N/ha

The season so far
Annual rain to date: 197 mm
GSR to date: 99 mm **GSR decile:** 6
Current predicted PAW: 50 mm (*19% full*) **PAWC:** 262 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
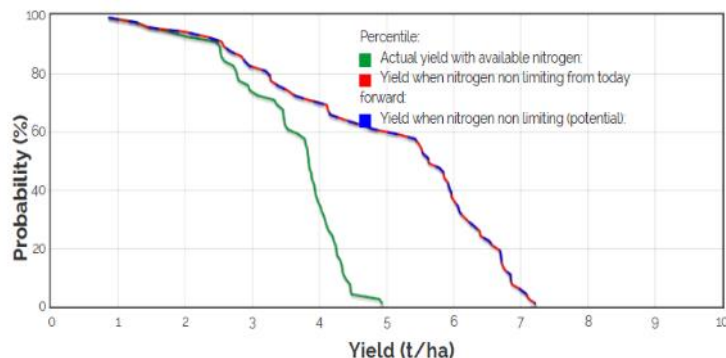
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.7	5.4	4.2	4.9

French & Schultz grain yield estimate:

100% WUE:	5.9 t/ha
80% WUE:	**4.7 t/ha**

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (275 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

The season so far
Annual rain to date: 200 mm
GSR to date: 90 mm **GSR decile:** 6
Current predicted PAW: 97 mm (*56% full*) **PAWC:** 172 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
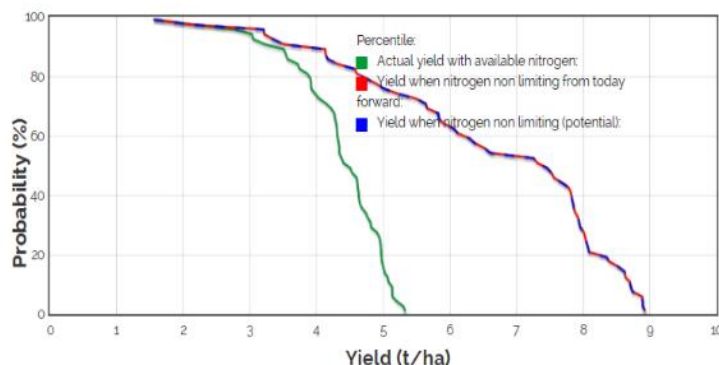
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	5.8	5.4	6.0	4.9

French & Schultz grain yield estimate:

100% WUE:	5.4 t/ha
80% WUE:	**4.3 t/ha**

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (259 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:** 40 kg N/ha at seeding

The season so far
Annual rain to date: 179 mm
GSR to date: 80 mm   **GSR decile:** 5
Current predicted PAW: 61 mm *(77% full)*   **PAWC:** 79 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
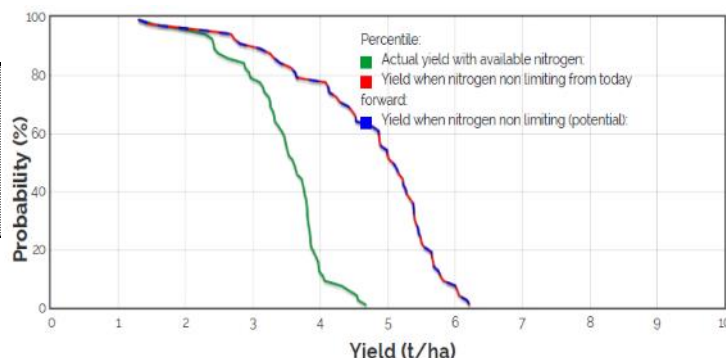
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.3	3.4	3.8	2.8

French & Schultz grain yield estimate:

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

This model assumes that there is 30 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.

EUDUNDA

GRAVELLY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 40 kg N/ha at seeding

The season so far
Annual rain to date: 200 mm
GSR to date: 89 mm   **GSR decile:** 5
Current predicted PAW: 45 mm *(47% full)*   **PAWC:** 96 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
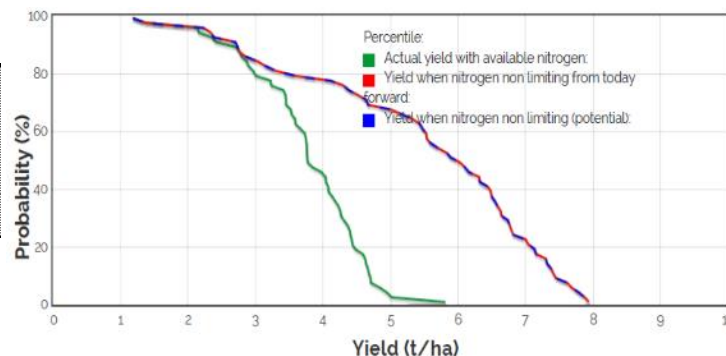
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.8	4.4	4.2	3.6

French & Schultz grain yield estimate:

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

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (243 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

The season so far
Annual rain to date: 230 mm
GSR to date: 116 mm   **GSR decile:** 7
Current predicted PAW: 99 mm (*88% full*)   **PAWC:** 113 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 06/06/2016)*
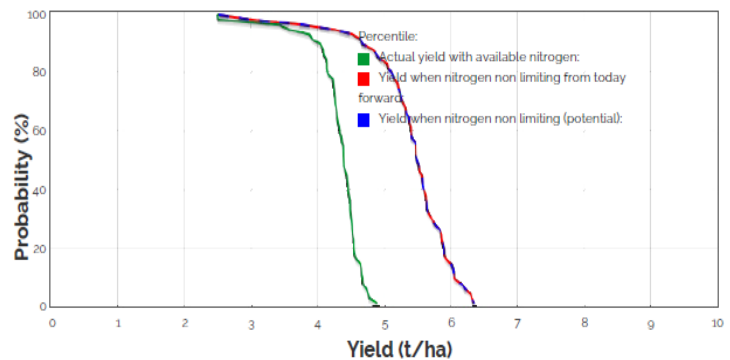
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	This time last year	Sown 20th May	This time last year
Grain	4.9	4.5	5.0	4.4

French & Schultz grain yield estimate:

100% WUE:	6.0 t/ha
80% WUE:	**4.8 t/ha**

This model assumes that there is 34 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (262 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's commercial crop

Our commercial crop was sown to Trojan wheat on April 25th this year.

As you can see, it's well and truly up and out of the ground, now at 2.5 leaf.

Proceeds from the grain sold after harvest will contribute to the costs associated with running next year's events and Hart-funded trials.

Thanks to Matt Dare, our commercial crop manager and to all our supporters for their contributions and assistance, both with the commercial crop and this year's trial program.