

HART BEAT

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ISSUE 29

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CARING
FOR
OUR
COUNTRY



flexi/coil
CNI INDUSTRIAL CAPITAL
CASE II



THIS ISSUE

Article: Improving grass control in cereals

Definitions

Site information

Hart Beat site reports

- Hart
- Spalding
- Crystal Brook
- Condowie
- Kybunga
- Jamestown
- Farrell Flat
- Pinery
- Eudunda
- Tarlee

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 - 16th September 2014
Spring Twilight Walk - 21st October 2014

www.hartfieldsite.org.au

Improving grass control in cereals

Over the past two years the Hart Field Site Group has hosted trials looking at grass control in durum, barley and wheat. This work was initiated as effective herbicide options in durum are limited and it has poor competition with annual ryegrass compared to bread wheat or barley.

Management factors over two years of trials focused on variety, seeding rate, wider seed rows (spreader boot), row spacing and seed size.

Consistently, Fathom barley has been more competitive than Hindmarsh barley, bread wheat and durum. Within the durum varieties trialed Tjilkuri was more competitive than the older variety Tamaroi (2012) and Saintly has been shown to be as competitive as Tjilkuri (2013).

In both years the spreader boot or higher seeding rates (180 plants per square metre) significantly reduced annual ryegrass head numbers (Figure 1 and 2). Narrower row spacing was also able to reduce ryegrass head number, although less consistently. Reducing the seeding rate to 100 plants per metre squared significantly increased ryegrass head numbers by 50% in both seasons however, this did not result in a significant yield penalty (Figure 2).

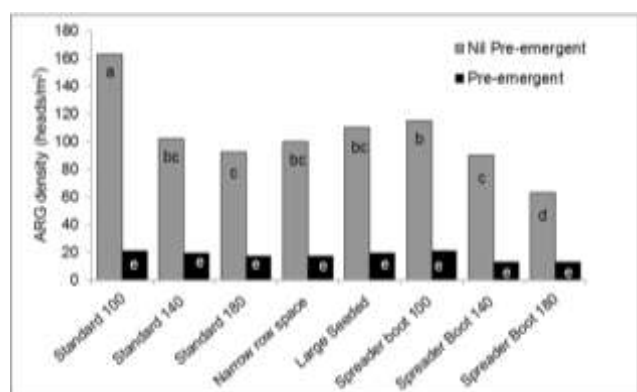


Figure 1. Effect of treatments (pre-emergent herbicide, seed rate, size and spread) on annual ryegrass plant density (heads per square metre) at Hart 2013.



Photo 1. Saintly durum sown at 150 plants/m² with and without a pre-emergent herbicide application, at Hart 2013.

The use of a pre-emergent herbicide mix (Boxer Gold and tri-allate) gave very good annual ryegrass control in 2013 and no other management factor was able to improve control further. Despite differences in annual ryegrass numbers between sprayed and unsprayed plots (Photo 1) this did not have a significant effect on final grain yield in 2013.

The differences observed in crop competition in unsprayed treatments shows some simple and effective non-chemical strategies to reduce weed pressure, especially higher sowing rates and wider seed rows i.e spreader boot. This trial work is being continued at the Hart field site in 2014 with Mace wheat and UAD0951096 durum. For full trial results see the 2012 and 2013 Hart trial results books online.

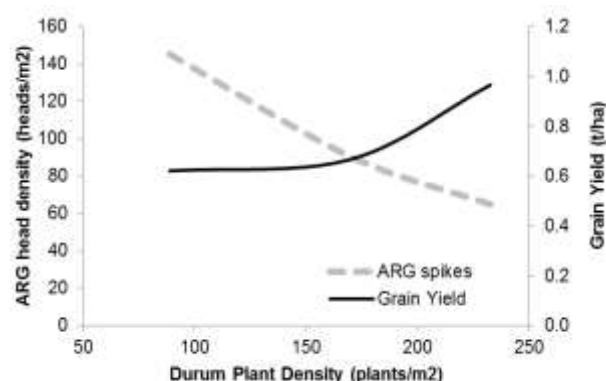


Figure 2. The relationship between durum crop plant density (plants per square metre) and annual ryegrass head density (heads per square metre) and grain yield (t/ha) averaged across all durum varieties in selected treatments at Hart 2012.

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 or www.yieldprophet.com.au.

Site information

Rainfall and water soil characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	Pre-sowing soil nitrogen (0-90cm) (kg/ha)	Plant Available Water Capacity (mm)
Hart	400	Sandy clay loam	94	206
Spalding	430	Red brown earth	108	143
Crystal Brook	398	***	**	**
Jamestown	453	***	**	**
Condowie	350	Sandy loam	64	115
Kybunga	428	Friable clay loam	89	262
Farrell Flat	474	Red clay loam over clay	97	172
Pinery	374	Silty clay loam over clay	98	79
Eudunda	445	Loam over clay loam	86	96
Tarlee	474	Sandy loam over clay on rock	174	113

2014 site locations



SANDY CLAY LOAM

The season so far

Annual rain to date: 374 mm (23 mm since last report)
 GSR to date: 262 mm
 GSR decile: 8
 Current predicted PAW: 145 mm (70% full)
 PAWC: 206 mm

Crop growth

Variety: Mace wheat Sowing date: 1st May
 Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)

These estimates are based on a 50% probability

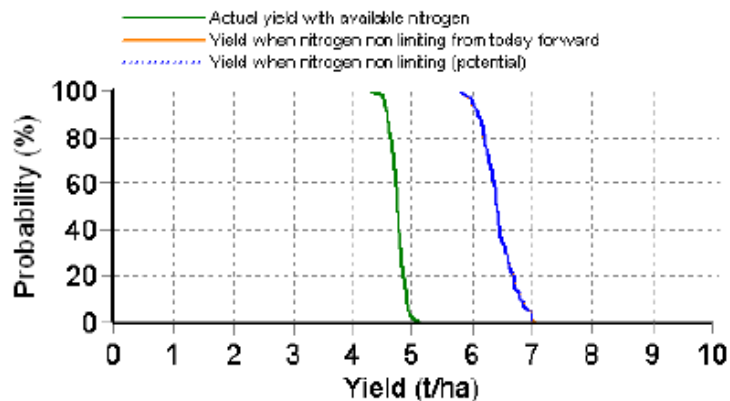
Yield t/ha	Sown 1 st May (see graph)	Change since last report	Sown 20 th May	Change since last report
Grain	5.5	0.0	6.0	+0.1

French & Schultz grain yield estimate:

100% WUE: 5.5 t/ha, 80% WUE: 4.4 t/ha

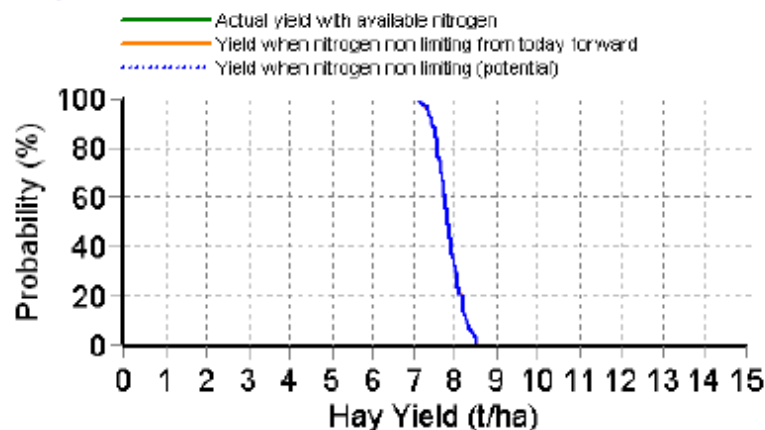
This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and decile 5 (90 mm) rainfall for the rest of the season.

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

Hay Yield Outcome



SPALDING

RED BROWN EARTH

The season so far

Annual rain to date: 342 mm (24 mm since last report)

GSR to date: 261 mm

GSR decile: 8

Current predicted PAW: 102 mm (71% full)

PAWC: 143 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)

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	6.1	0.0	5.3	-0.4

French & Schultz grain yield estimate:

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

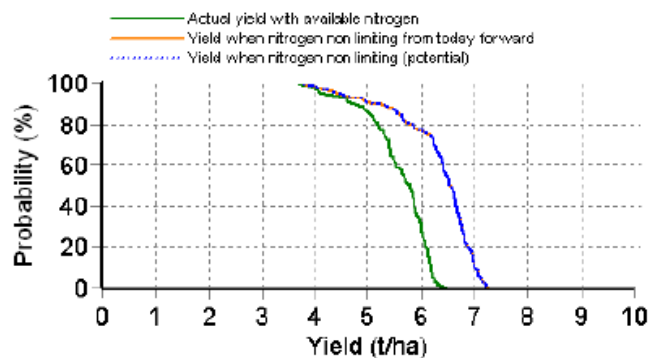
This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (119 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May

Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



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.

CRYSTAL BROOK

COMING SOON!

Site confirmed,
pending final soil analysis results

CONDOWIE

SANDY LOAM

The season so far

Annual rain to date: 343 mm (10 mm since last report)

GSR to date: 240 mm

GSR decile: 9

Current predicted PAW: 82 mm (71% full)

PAWC: 115 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)

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	4.0	-0.1	3.1	-0.3

French & Schultz grain yield estimate:

100% WUE: 4.8 t/ha, 80% WUE: 3.8 t/ha

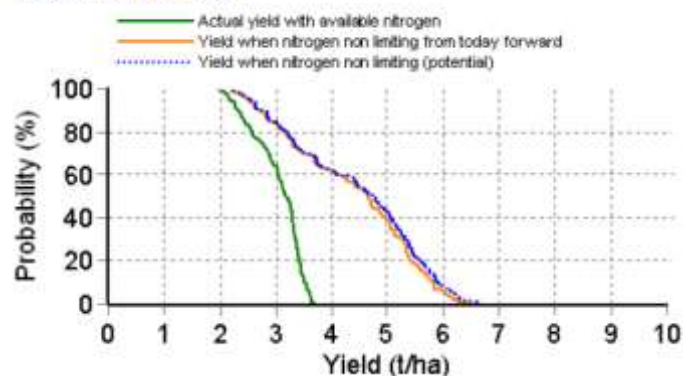
This model assumes that there is 31 mm stored moisture, 110 mm of evaporation and decile 5 (78 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May

Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

JAMESTOWN

COMING SOON!

Site confirmed,
pending final soil analysis results

CLAY LOAM

The season so far

Annual rain to date: 387 mm (41 mm since last report)
 GSR to date: 293 mm
 GSR decile: 9
 Current predicted PAW: 156 mm (60% full)
 PAWC: 262 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)
 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	5.4	0.0	6.0	0.0

French & Schultz grain yield estimate:

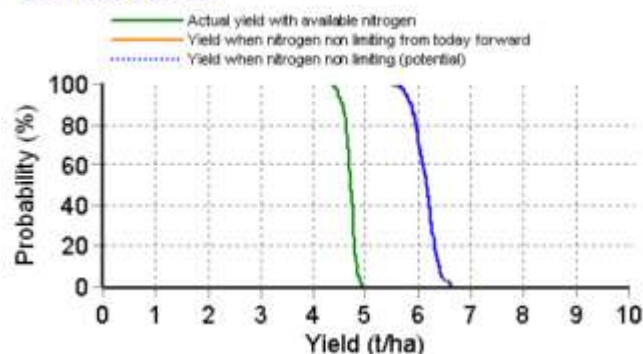
100% WUE: 6.8 t/ha, 80% WUE: 5.5 t/ha

This model assumes that there is 28 mm stored moisture, 110 mm of evaporation and decile 5 (131 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May
 Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

FARRELL FLAT

LIGHT CLAY LOAM

The season so far

Annual rain to date: 464 mm (42 mm since last report)
 GSR to date: 369 mm
 GSR decile: 9
 Current predicted PAW: 147 mm (85% full)
 PAWC: 172 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)
 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	6.4	0.0	6.4	-0.1

French & Schultz grain yield estimate:

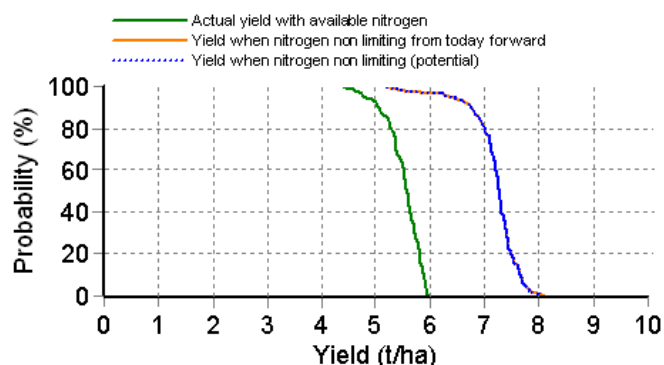
100% WUE: 8.5 t/ha, 80% WUE: 7.0 t/ha

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and decile 5 (140 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May
 Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

SILTY CLAY LOAM

The season so far

Annual rain to date: 296 mm (33 mm since last report)

GSR to date: 206 mm

GSR decile: 9

Current predicted PAW: 48 mm (61% full)

PAWC: 79 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)

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	4.4	-0.1	3.6	-0.3

French & Schultz grain yield estimate:

100% WUE: 4.5 t/ha, 80% WUE: 3.6 t/ha

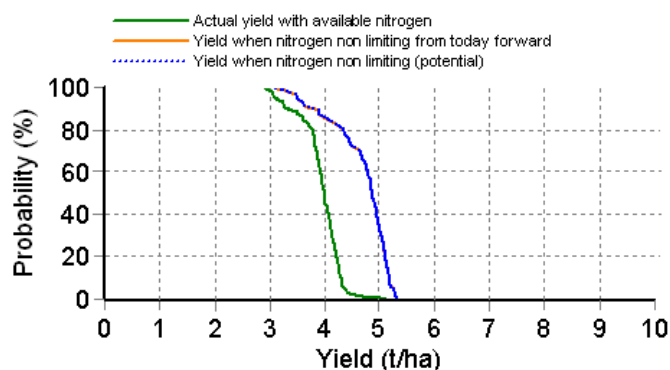
This model assumes that there is 27 mm stored moisture, 110 mm of evaporation and decile 5 (105 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May

Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

GRAVELLY LOAM

The season so far

Annual rain to date: 446 mm (49 mm since last report)

GSR to date: 332 mm

GSR decile: 9

Current predicted PAW: 84 mm (88% full)

PAWC: 96 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)

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	0.0	4.9	0.0

French & Schultz grain yield estimate:

100% WUE: 6.9 t/ha, 80% WUE: 6.0 t/ha

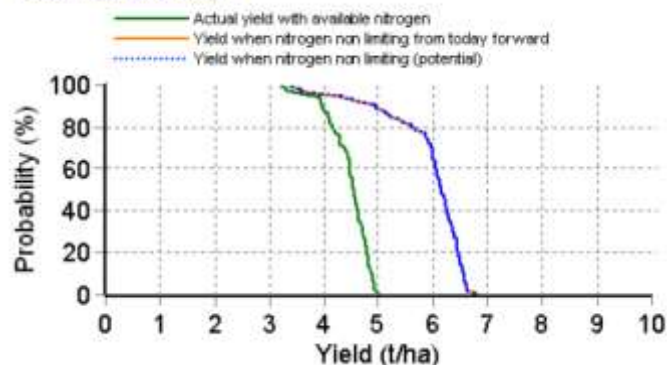
This model assumes that there is 34 mm stored moisture, 110 mm of evaporation and decile 5 (121 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May

Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

SANDY LOAM



The season so far

Annual rain to date: 382 mm (35 mm since last report)
 GSR to date: 292 mm
 GSR decile: 8
 Current predicted PAW: 87 mm (77% full)
 PAWC: 113 mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 18/08/2014)
 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	5.5	-0.2

French & Schultz grain yield estimate:

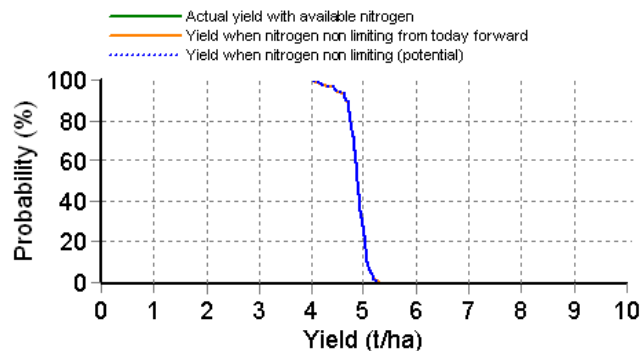
100% WUE: 6.7 t/ha, 80% WUE: 5.4 t/ha

This model assumes that there is 27 mm stored moisture, 110 mm of evaporation and decile 5 (126 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat Sowing date: 1st May
 Nitrogen fertiliser: 30 kg N/ha + 46 kg N/ha

Grain Yield Outcome



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100 yrs) to simulate remainder of the season.

Aerial photos from Hart – August 8th 2014

