HART
SA's premier cropping field site

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Hart Beat

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Controlling annual ryegrass along fence-lines

Glyphosate is widely used for controlling weeds along fence lines and crop margins. Continual reliance on glyphosate for weed control, without using other herbicides or effective control methods, means resistance can occur.

In 2009 the University of Adelaide and Hart conducted a trial to look at the ability of glyphosate mixtures and alternative herbicides to control glyphosate-resistant annual ryegrass on a fence line (Figure 1).

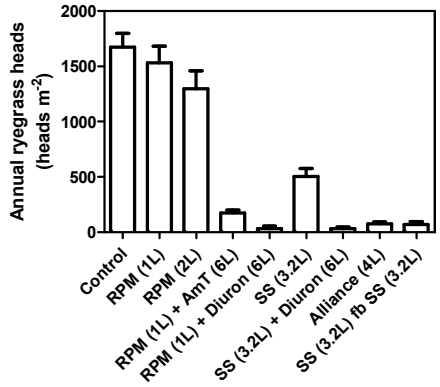


Figure 1: *The efficacy of different mixes and rates of herbicides on glyphosate resistant ryegrass. RPM = Roundup PowerMax, SS = Spray.Seed, AmT = Amitrole T, fb = followed by after 14 days.*

Roundup PowerMax at 1 L/ha and 2 L/ha provided very little control of the ryegrass on the fence line. Some mixtures with glyphosate were more effective. Adding Amitrole at 6 L/ha to Roundup PowerMax did not provide sufficient control. Diuron at 6 L/ha was a more effective mixing partner.

Spray Seed alone at 3.2 L/ha was insufficient to control the ryegrass. Diuron at 6 L/ha added to Spray.Seed was effective, as was Alliance or two applications of Spray.Seed 14 days apart. Additional treatments are being explored in other trials.

If patches of ryegrass survive along fence-lines treating them again with a different herbicide or method might be needed to prevent glyphosate resistance moving into the cropped area.

Resistance testing of surviving ryegrass plants is being conducted for no cost. More information can be obtained at www.plantscienceconsulting.com.

This work is part of GRDC project UA00104 and managed by Peter Boutsalis, Jenna Malone and Chris Preston of the University of Adelaide.

HART WINTER WALK

Our Winter Walk held on July 27th saw more than 60 in attendance.

Hart Site information as of 5th August 2010

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

The season so far

Annual rain to date: 244mm
GSR to date: 169mm (15mm since last report)
GSR decile: 5.0
Maximum temp since sowing: 26.7ºC
Minimum temp since sowing: -1.4ºC
Average temp accumulation per day: 10.1ºC
Current predicted soil N status: 71kg/ha
Current predicted PAW: 34mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 05/08/2010)

These estimates are based on a 50% probability

Yield t/ha	Sown 14th May (see graph)	Change from last report	Sown 5th May	Change from last report
Grain	3.0	-0.5	2.8	-0.1
Hay	6.0	-0.5	3.3	-2.2

French & Schultz grain yield estimate:
100% WUE: 3.5t/ha, 80% WUE: 2.8t/ha
This model assumes that there is 110mm of evaporation and decile

Pre-sowing soil nitrogen and water

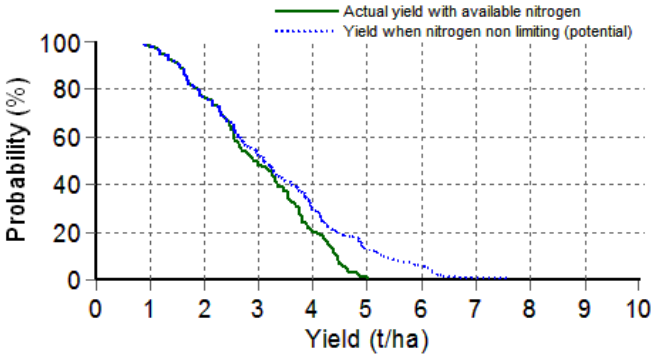
(measured 15th March)
Soil N prior to sowing (0-90cm): 68kg/ha
Plant available water at sowing (0-90cm): 0mm

Crop growth

Variety: Gladius
Sowing date: 14th May
Nitrogen fertiliser at sowing: 51kgN/ha
Targeted plant density: 150 plants per square metre
Current growth stage: 1st node (GS31)
Predicted date of head (GS55): 22nd September

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.

Grain Yield Outcome



Condowie Site information as of 5th August 2010

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

The season so far

Annual rain to date: 190mm
GSR to date: 151mm (13mm since last report)
GSR decile: 5.5
Maximum temp since sowing: 27.7ºC
Minimum temp since sowing: -0.8ºC
Average temp accumulation per day: 11.8ºC
Current predicted soil N status: 185kg/ha
Current predicted PAW: 23mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 05/08/2010)

These estimates are based on a 50% probability

Yield t/ha	Sown 29th April (see graph)	Change from last report	Sown 15th May	Change from last report
Grain	3.2	-0.3	2.5	-0.5
Hay	5.5	-0.3	5.3	-0.5

French & Schultz grain yield estimate:
100% WUE: 2.7t/ha, 80% WUE: 2.1t/ha
This model assumes that there is 110mm of evaporation and decile

Pre-sowing soil nitrogen and water

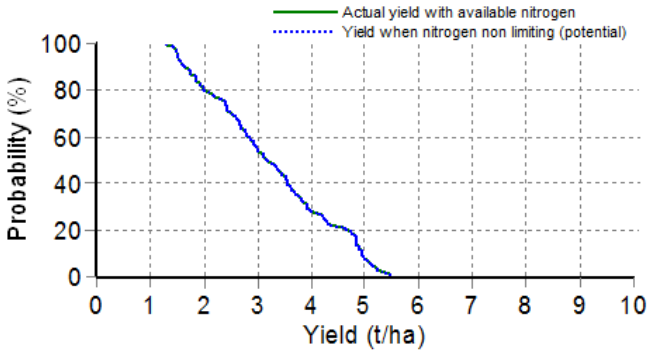
(measured 15th March)
Soil N prior to sowing (0-90cm): 215kg/ha
Plant available water at sowing (0-90cm): 0mm

Crop growth

Variety: Gladius
Sowing date: 29th April
Nitrogen fertiliser at sowing: 6kgN/ha
Targeted plant density: 120 plants per square metre
Current growth stage: Flag leaf emerged (GS39)
Predicted date of head (GS55): 24th August

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.

Grain Yield Outcome



Spalding Site information as of 5th August 2010

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

The season so far

Annual rain to date: 238mm
GSR to date: 198mm (18mm since last report)
GSR decile: 6.0
Maximum temp since sowing: 25.5ºC
Minimum temp since sowing: -4.1ºC
Average temp accumulation per day: 9.2ºC
Current predicted soil N status: 85kg/ha
Current predicted PAW: 71mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 05/08/2010)

These estimates are based on a 50% probability

Yield t/ha	Sown 6th May (see graph)	Change from last report	Sown 15th May	Change from last report
Grain	5.5	-0.2	5.0	-0.4
Hay	8.0	0.0	8.0	-0.5

French & Schultz grain yield estimate:
100% WUE: 4.3t/ha, 80% WUE: 3.4t/ha
This model assumes that there is 110mm of evaporation and decile

Pre-sowing soil nitrogen and water

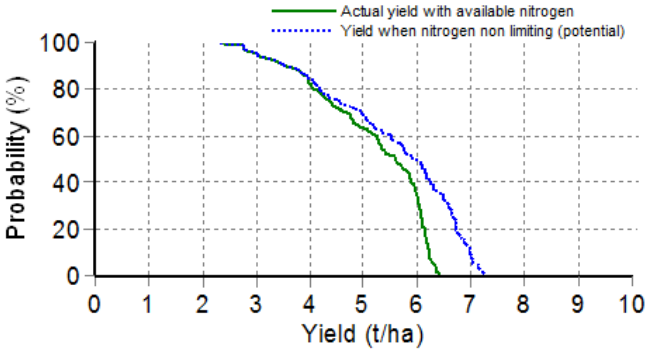
(measured 15th March)
Soil N prior to sowing (0-90cm): 102kg/ha
Plant available water at sowing (0-90cm): 0mm

Crop growth

Variety: Gladius
Sowing date: 6th May
Nitrogen fertiliser at sowing: 42kgN/ha
Targeted plant density: 150 plants per square metre
Current growth stage: 2nd node (GS32)
Predicted date of head (GS55): 10th September

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.

Grain Yield Outcome



Tarlee Site information as of 5th August 2010

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

The season so far

Annual rain to date: 242mm
GSR to date: 210mm (32mm since last report)
GSR decile: 5.0
Maximum temp since sowing: 27.8ºC
Minimum temp since sowing: -0.2ºC
Average temp accumulation per day: 11.3ºC
Current predicted soil N status: 73kg/ha
Current predicted PAW: 78mm

Grain & hay yield predictions

Yield prophet estimate: (Date of report 05/08/2010)

These estimates are based on a 50% probability

Yield t/ha	Sown 13th May (see graph)	Change from last report	Sown 5th May	Change from last report
Grain	6.1	+0.1	6.0	0.0
Hay	8.0	0.0	7.5	0.0

French & Schultz grain yield estimate:
100% WUE: 4.9t/ha, 80% WUE: 3.9t/ha
This model assumes that there is 110mm of evaporation and decile

Pre-sowing soil nitrogen and water

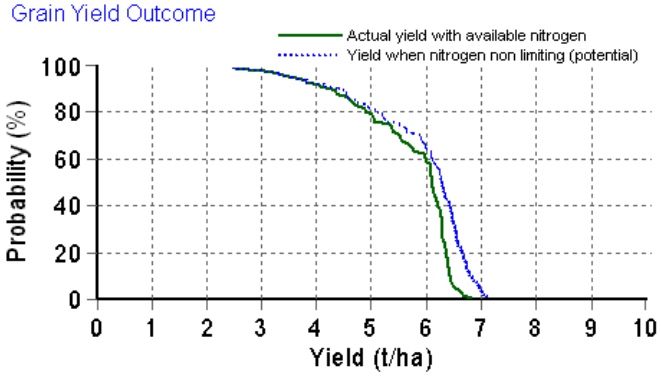
(measured 13th April)
Soil N prior to sowing (0-90cm): 103kg/ha
Plant available water at sowing (0-90cm): 35mm

Crop growth

Variety: Correll
Sowing date: 13th May
Nitrogen fertiliser at sowing: 0kgN/ha
Targeted plant density: 150 plants per square metre
Current growth stage: 1st node (GS31)
Predicted date of head (GS55): 9th September

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.

Grain Yield Outcome



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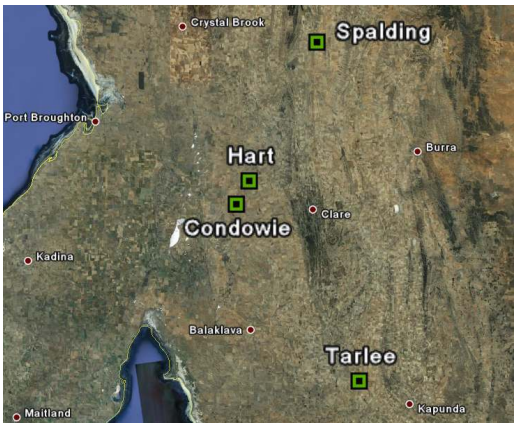
WUE site locations



How to use *Yield Prophet®*

To run *Yield Prophet*® (YP) on your own farm the model requires information from:

- a soil test (increments down to 120cm) for moisture and nitrogen sampled prior to planting
- a soil classification (see below)
- historic and current climate data from the nearest met weather station
- rainfall data for the paddock
- crop and fertiliser details

The soil classification is very important and will influence the accuracy of YP. It includes values of plant available water capacity and soil chemistry. The most accurate method is to measure and test the paddock using a trained technician, or selecting the closest matching soil from a national database.

This can be accessed through the APSRU website and also viewed in Google Earth, the link for which is,

http://www.apsim.info/Wiki/APSoil.ashx

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.

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.

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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 clay on rock	511	348	163

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