

What's happening at the Hopetoun and Waitchie Landcare sites?

The Hopetoun and Waitchie Landcare Groups have both set up a paired paddock LandCare site to compare crop and pasture growth, water use and subsequent recharge between a lucerne paddock and the adjacent cropped paddock.

EM38 survey

In April both paddocks at Hopetoun and Waitchie were EM surveyed to map the soil variation across the sites. They were then soil sampled to calibrate the EM survey and give pre-sowing conditions in the cropped paddock.

The EM38 survey measures Electrical Conductivity which is a combination of both soil water and salt content and is used to show different soil characteristics across a paddock. To calibrate the EM survey for water, soil electrical conductivity, boron and chloride, 10 sites were selected to soil sample to 1.3 m depth for soil water and chemical analysis. The EM survey will be repeated at the end of the season.

Monitoring

BCG is monitoring the paddocks throughout the season to compare soil variation with crop growth and water use. A neutron probe is used during the season to monitor changes in soil water at five depths. Ten sample sites, five on the crop paddock and five on the lucerne paddock were used to install the neutron probe access tubes. These have been monitored four times to date. Plant populations, growth and yield will be measured at each of these sites.

Wind erosion risk assessment

Wind erosion risk assessments were carried out in the cropped paddocks post sowing.

The Leys Erosion risk assessment involves measuring stubble cover and dry sieving of the topsoil to measure the percentage of dry soil aggregates above a 0.85mm sieve. These are then calculated to give a wind erodibility measure of grams per metre per second.

Yield Prophet® www.yieldprophet.com.au

Three sites in the cropping paddock, with different soil characteristics have been selected to run the 'Yield Prophet' to look at the differences in crop growth and projected yield between these three sites within the one paddock.

The Yield Prophet uses the APSIM (Agricultural Production Systems Simulator) computer model which grows a crop daily given the paddock/soil conditions at sowing and the actual rainfall up to the day the model is run. It then uses long term climate data to give a probability of expected crop yield.

The model is a decision making tool and is used by many farmers to look at projected yields, sowing date, variety and nitrogen comparisons as well as in crop nitrogen status and moisture stress throughout the season. The model also gives climate probabilities for the season based on historical rainfall and the SOI (Southern Oscillation Index).

We are using the Yield Prophet at these sites to highlight the effects of soil water, chemical variation and hostile subsoils have on crop growth and yield potential.

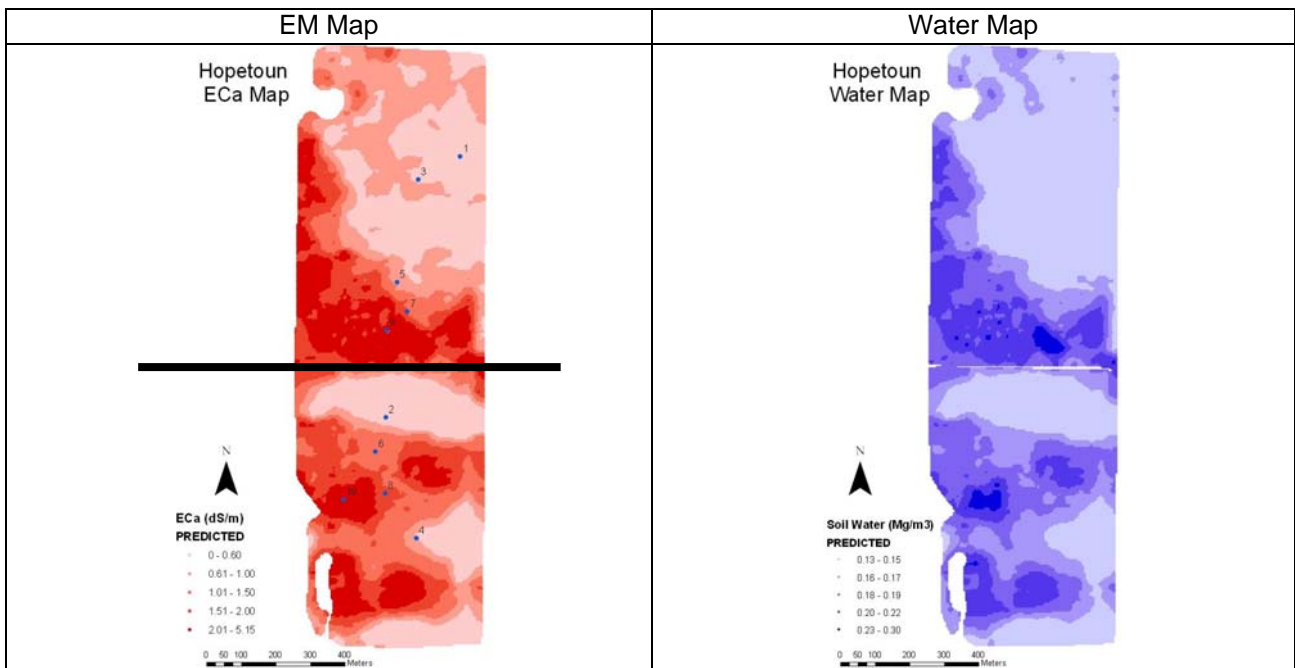
Lucerne variety trials

Two lucerne variety trials were also sown at the Hopetoun site. The lucerne paddock trial has had half of the plot deep ripped, the cropped paddock also has a lucerne trial on the limestone. Fifteen lucerne varieties and one tall wheat grass have been sown on 19 May 2005 at each site.

Winter active varieties are recommended for this area.

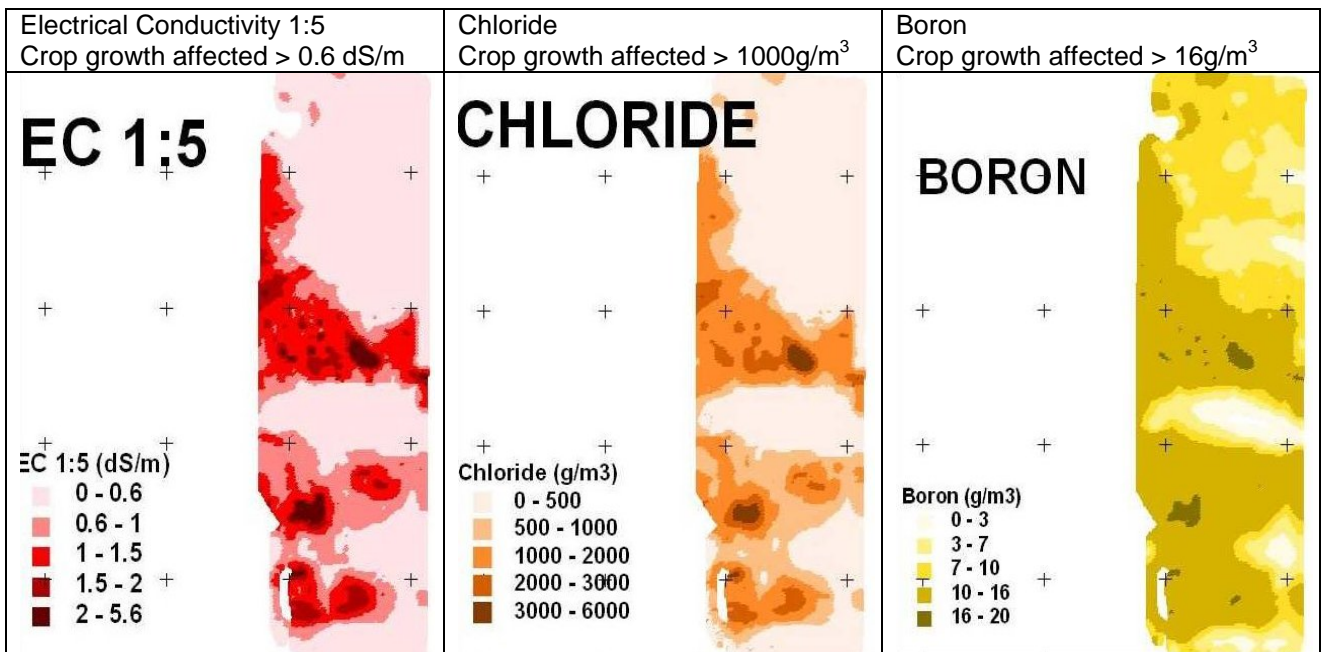
No.	Variety	Winter activity 10=active, 3=dormant	No.	Variety	Winter activity 10=active, 3=dormant
1	Australis	8	9	Sardi seven	7
2	Aurora	6	10	Sardi ten	10
3	Kaituna	5	11	Prime	3
4	Siriver	9	12	L 55	5
5	Venus	5	13	L 69	6
6	Genesis	7	14	L 90	9
7	PL54 Q 53	4	15	57 Q 75	7
8	Icon	6-7	16	Tall wheat grass	Dundas

Hopetoun Landcare site – maps, monitoring results and Yield Prophet.



The ECa map is drawn from the raw EM38 survey and shows the location of sample sites. The cropped paddock is in the north and lucerne in the south paddock. The water map is calibrated from the soil water measured at these sites at five depths to 1.3m.

From the chemical analysis taken at the ten sites the EM map can be calibrated to show Soil EC 1:5, Chloride and Boron levels across the paddock. The maps show the large areas of the paddock where crop growth will be affected by high salt and boron levels. The lower slopes have high EC and Chloride values in the root zone, and this will limit plant growth. There is also a large amount of limestone on and beneath the surface in some areas, which made some soil sampling difficult.



Wind erosion risk assessment

Wind erosion risk assessments (see Table 1) were carried out post sowing, at the end of July. Five sites were assessed for wind erosion risk in the cropped paddock; all were in the low risk class.

Table 1. Wind erosion risk assessment

Site	Erodibility Class *	g.m.s	Stubble cover %	Dry aggregates %
H1 sand hill	low	0.09	51	55
H3 mid slope	low	0.01	80	52
H5 lower slope	low	0.01	71	76
H7 lower slope	low	0.00	73	80
H9 lower slope	low	0.01	70	76

*Erodibility class g/m/s Low <5, Mod, 5-25, High >25

Crop Monitoring

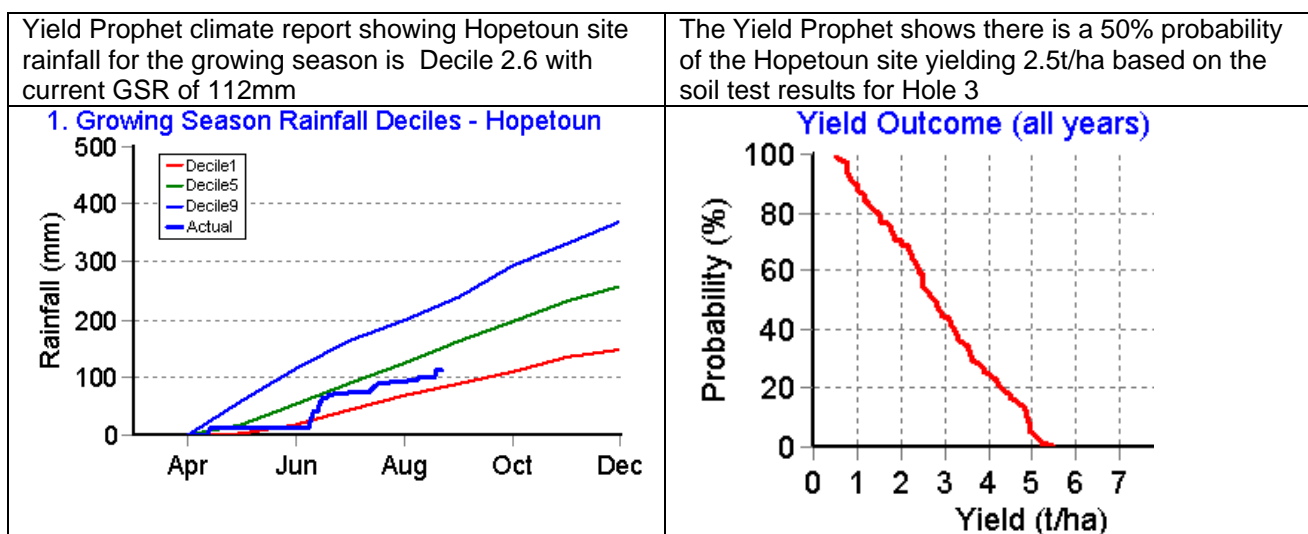
The BCG is monitoring the paddock throughout the season. The site was sown on 14 June 2005 to Sloop Vic Barley @ 60 kg/ha on the upper slopes and on the lower slope to Yitpi wheat on 20 June 2005 with 90 kg/ha Granulock 25-13 fertiliser. The first crop monitoring was at the end of July.

Table 2. Hopetoun Paddock - soil analysis and monitoring results at the end of July, 2005

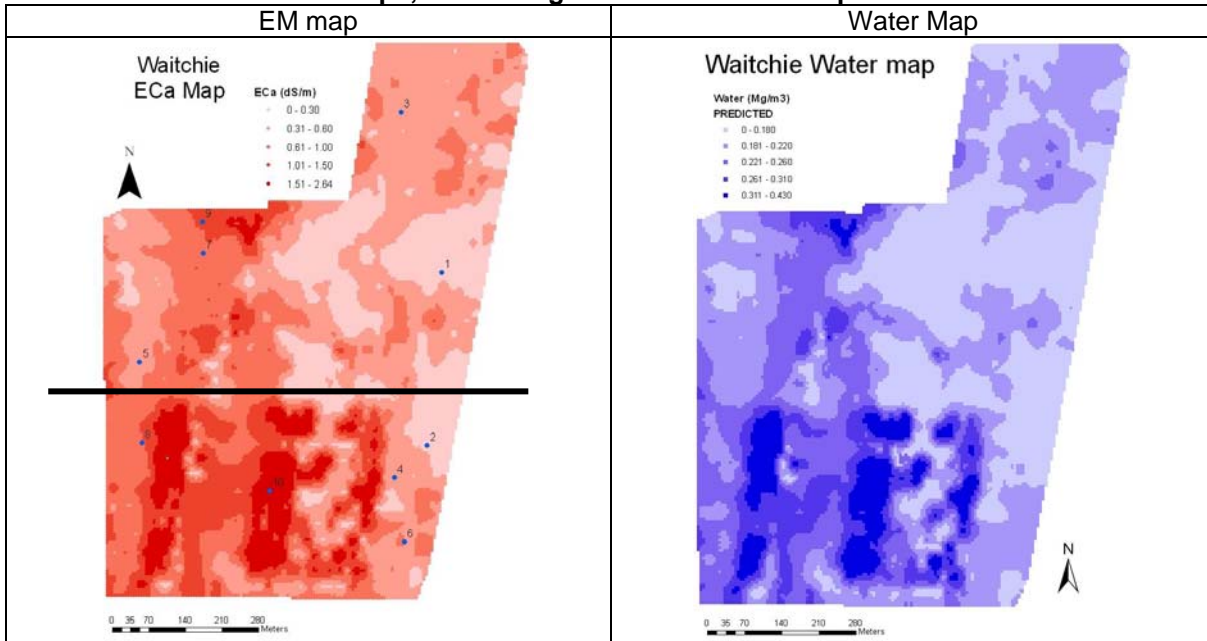
Site no	Description	April soil water total mm to 1m	April nitrate Kg N/ha to 1m	EC dS/m 40-70 cm	Plants/ m ² avg.	Sowing depth avg. cm
H1	Barley sandhill	131	112	0.1	110	2.3
H3	Barley mid slope	135	138	0.2	154	3.3
H5	Wheat lower slope	146	170	0.6	269	4.0
H7	Barley lower slope	188	220	0.9	193	1.9
H9	Barley lower slope	-	-	rock	138	1.1
H2	Lucerne	80	106	0.3	18	
H4	Lucerne	-	-	rock	29	
H6	Lucerne	131	172	1.3	34	
H8	Lucerne	-	-	rock	23	
H10	Lucerne	212	330	2.9	0	

At the end of July the barley crop was at the 4 leaf, early tillering stage and the wheat at the 3 leaf stage. There is a wide range of plant populations across the paddock. The optimum number of plants for barley is 150 to 175 plants/m² and for wheat 200 plants/m². Sowing depth was also variable with a range of 1 to 5cm. (Table 2.)

Yield Prophet simulation run on 22 August for the Hopetoun site.

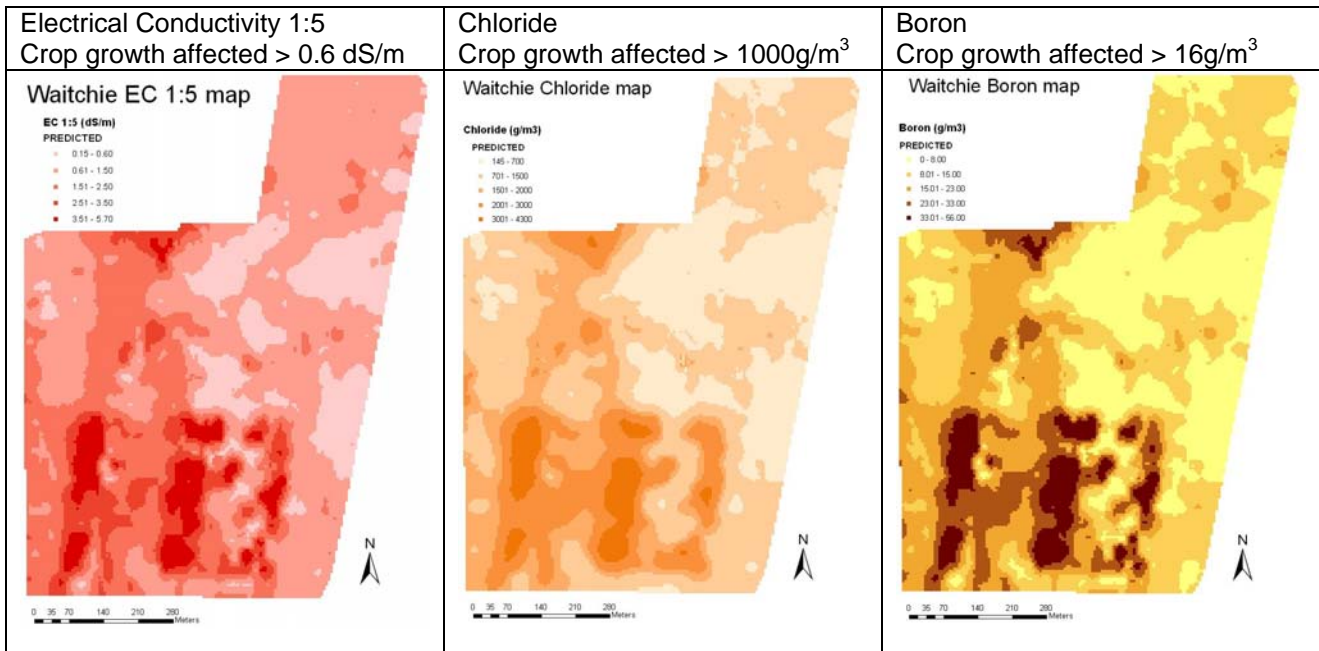


Waitchie Landcare site - maps, monitoring results and Yield Prophet.



The ECa map is drawn from the raw EM survey and shows the location of sample sites. The water map is calibrated from the soil water measured at these sites at five depths to 1.3m. The map clearly shows the cropping paddock (southern end) with higher soil water content in April than the Lucerne paddock (northern end). The EM map also shows where the monitoring sites are in the paddock.

From the chemical analysis taken at the ten sites the EM map can be calibrated to show Soil EC 1:5, Chloride and Boron levels across the paddock. The maps show the large areas of the paddock where crop growth will be affected by high salt and boron levels.



Wind erosion risk assessment

Three sites were measured for wind erosion risk in the cropped paddock and all were in the low risk class.

Table 3. Wind erosion risk assessment

Site	Erodibility Class *	g.m.s	Stubble cover %	Dry aggregates %
W2 bottom slope	low	0.32	52	67
W6 bottom slope	low	0.55	55	54
W8 sandhill	low	0.25	51	72

*Erodibility class g/m/s Low <5, Mod, 5-25, High >25

Crop Monitoring

The site was sown on 26 June 2005 to Sloop Barley @ 55kg/ha with 50kg/ha Granulock 10 Z.

Table 4. Waitchie Paddock soil analysis and monitoring results at the end of July, 2005

Site no	Description	April soil water total mm to 1m	April nitrate Kg N/ha to 1m	EC dS/m 40-70 cm	Plants/m ² avg	Sowing depth avg.
W2	Barley bottom slope	135	73	0.3	102	3.8
W4	Barley bottom slope	145	86	0.9	110	4.8
W6	Barley bottom slope	200	141	0.8	80	3.0
W8	Barley sandhill	292	294	3.4	112	3.0
W10	Barley mid slope	273	116	2.0	107	3.5
W1	Lucerne bottom slope	103	198	0.9	24	
W3	Lucerne lower slope	139	89	2.6	20	
W5	Lucerne sandhill	217	225	2.9	17	
W7	Lucerne mid slope	225	134	2.6	0	
W9	Lucerne mid slope	289	188	4.5	2	

At the end of July the barley crop was at the 2-3 leaf stage. The plant population is low in this paddock with only about 100 plants/m². The optimum number of plants for barley is 150-175 plants/m². Sowing depth is also variable with a range of 2 to 6cm. (Table 4.)

The sandhill and upper slopes have high EC values in the root zone, which will limit plant growth. This is reflected in the high soil water and nitrogen values in these areas from the previous year.

Yield Prophet simulation run on 22 August for the Waitchie site.

