Saskatchewan
Ministry of
Agriculture

Fungicides and Irrigation Water Management

Moose Jaw, Dec 6 & 7
ICDC/SIPA Conference

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Saskatchewan Ministry of Agriculture

Projects

- Dry Bean Irrigation Scheduling
- White Mold Disease Survey
- White Mold Control in Dry Beans
- Fungicide Application Timing on Wheat
- Canola Fungicide Demonstration
- Irrigation Water Management


HEGE 212
20 km
HURLEY

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Dry Bean Irrigation Scheduling

- Objective was to demonstrate two irrigation strategies for dry beans
- Two treatments and a dry land check
  - Adequate Irrigation
  - Deficit irrigation (no irrigation prior to flowering)
- Varieties – WM2, Winchester, AC Island, Othello, Medicine Hat, Maya

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Dry Bean Irrigation Scheduling

- Project was located at CSIDC
  - Dr. Jazeem Wahab
  - Greg Larson
- Adequate Irrigation
  - First irrigation June 15
  - Nine irrigations for 112.5mm (4.5 inches)
- Deficit Irrigation (prior to flowering)
  - First irrigation July 27
  - Five Irrigations for 62.5mm (2.5 inches)

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Dry Bean Irrigation Scheduling

- Results of this project are still being processed

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White Mold Disease Survey

- Objective to determine the critical control period for white mold in dry beans in the LDDA
- Surveyed six fields every week from the start of July to the end of August
  - Three in Riverhurst
    - Dale Ewen, Gordon Kent, Rodney Kent
  - Three in Luck Lake
    - Garth Weitermen, Grant Carlson (two fields)

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White Mold Disease Survey

- ∑ ((severity class x number of plants in class) x 100) / number of plants

- Severity classes
  - 0 = No disease
  - 1 =Small lesions less than 5cm in the longest dimension
  - 2= Expanding lesions on branches or stem
  - 3= Up to half of branches or stem colonized
  - 4= More than half of the branches or stem colonized and/or plant dead

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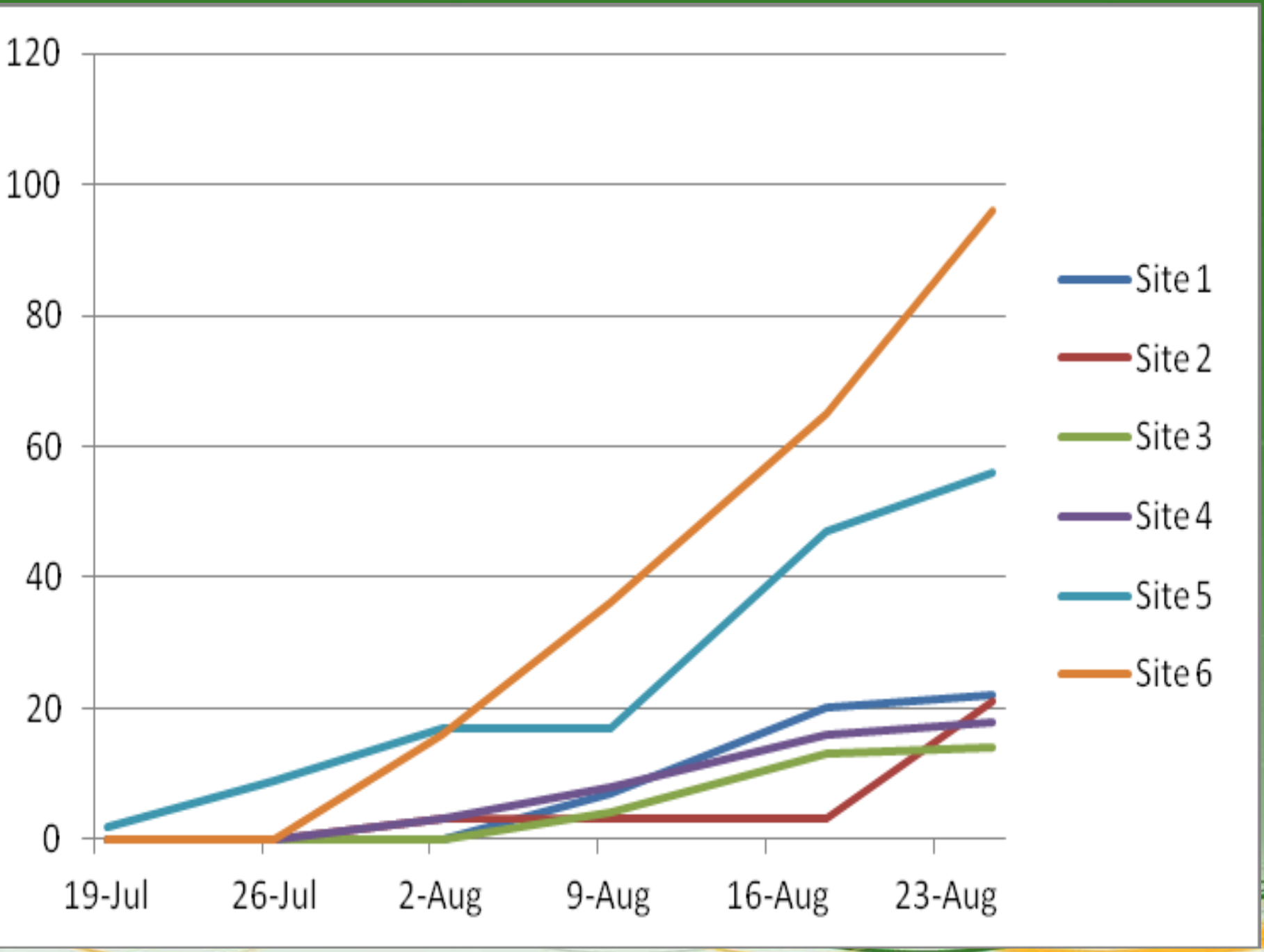
White Mold Disease Survey

- 100 plants were surveyed each week to determine disease severity
- Disease Severity

Date	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
19-Jul	0	0	0	0	2	0
26-Jul	0	0	0	0	9	0
2-Aug	1	3	1	3	17	16
9-Aug	7	3	4	8	17	36
18-Aug	20	3	13	16	47	65
25-Aug	22	21	14	18	56	96

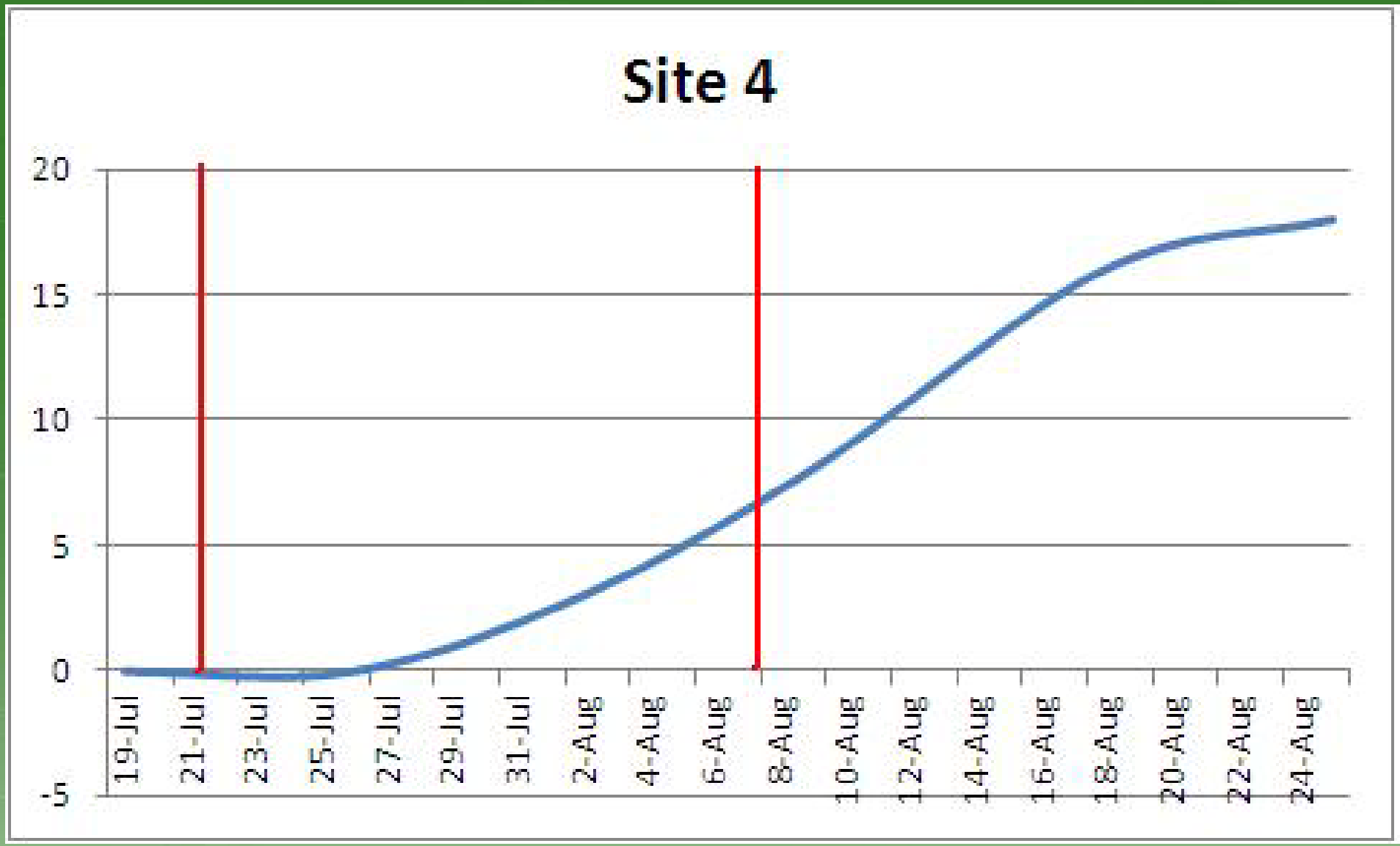
- Used the following equation to determine disease severity


120
100
80
60
40
20
0
19-Jul
26-Jul
2-Aug
9-Aug
16-Aug
23-Aug
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6


Site 1
25
20
15
10
5
0
-5
19-Jul
21-Jul
23-Jul
25-Jul
27-Jul
29-Jul
31-Jul
2-Aug
4-Aug
6-Aug
8-Aug
10-Aug
12-Aug
14-Aug
16-Aug
18-Aug
20-Aug
22-Aug
24-Aug


Site 2
25
20
15
10
5
0
-5
19-Jul
21-Jul
23-Jul
25-Jul
27-Jul
29-Jul
31-Jul
2-Aug
4-Aug
6-Aug
8-Aug
10-Aug
12-Aug
14-Aug
16-Aug
18-Aug
20-Aug
22-Aug
24-Aug

Site 4


20
15
10
5
0
-5
19-Jul
21-Jul
23-Jul
25-Jul
27-Jul
29-Jul
31-Jul
2-Aug
4-Aug
6-Aug
8-Aug
10-Aug
12-Aug
14-Aug
16-Aug
18-Aug
20-Aug
22-Aug
24-Aug


Site 5
60
50
40
30
20
10
0
19-Jul
21-Jul
23-Jul
25-Jul
27-Jul
29-Jul
31-Jul
2-Aug
4-Aug
6-Aug
8-Aug
10-Aug
12-Aug
14-Aug
16-Aug
18-Aug
20-Aug
22-Aug
24-Aug

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White Mold Disease Survey

- White mold first showed up on July 19
- Was present in all fields by August 2
- A application of fungicide in the middle of July prevented early infection
- An application of fungicide after infection occurred stopped further development in two cases

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White Mold Control in Dry Beans

- Objective was to demonstrate the best combination of fungicides in two fungicide application system
- One demonstration site
  - Craig and Michael Millar, Birsay SK
- Three treatments
  - Lance – Allegro
  - Allegro – Lance
  - Allegro - Allegro

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White Mold Control in Dry Beans

- 2011 had a low incidence of white mold
- Disease severity on Aug 24
  - Lance – Allegro 20
  - Allegro – Lance 21
  - Allegro - Allegro 15
- Yield on Sept 11
  - Lance – Allegro 2154 lb./acre
  - Allegro – Lance 2211 lb./acre
  - Allegro - Allegro 2995 lb./acre

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Fungicide Application Timing

- Objective was to demonstrate the best timing for a fungicide application on wheat
- One demonstration site
  - Grant Pederson, Outlook SK
- Three treatments and untreated check
  - Application at flag leaf
  - Application at flowering
  - Combination

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Fungicide Application Timing

- Leaf samples taken on Aug 11 showed visual difference of disease presence


AUG 11
PROSARO


Project 2011-08 Fungicide Timing in Wheat
AUG 11
QUILT & PROSARO


Project 2011-08 Fungicide Timing in Wheat
AUG 11
QUILT


Project 2011-08 Fungicide Timing in Wheat
AUG 11
CHECK

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Fungicide Application Timing

- Harvest results on Sept 10

Treatment	Flowering	Flag Leaf	Combination	Untreated
Yield (bu./acre)	72	60	59	55
F.graminearium	4%	7.5%	4%	2.5%
Total Fusarium	5%	10.5%	7%	3%
TKW	34.68	33.42	33.20	32.88
Grade	2	2	2	2

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Canola Fungicide Demonstration

- The objective of this project was to compare a single fungicide application to two fungicide applications in canola
- One demonstration site
  - Mark Gravalle, Riverhurst SK.
- Two treatments compared to an untreated area
  - One application of fungicide
  - Two applications of fungicide

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Canola Fungicide Demonstration

- There was a noticeable difference between the treated and untreated areas

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Canola Fungicide Demonstration

- There was a noticeable difference between the treated and untreated areas
- The producer noted that the treated areas were much easier to harvest
- Disease Severity (equation next slide)
  - Two Applications – 1.6
  - One Application – 2.2
  - Check – 4.3

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Canola Fungicide Demonstration

Sum of the rating of all infected plants = Disease severity

The number of infected plants

0 - No symptoms

1 – Infection of pods only

2- Lesions situated on main stem or branches with potential to affect up to ¼ of seed formation and filling on plant

3- Lesions situated on main stem or branches with potential to affect up to ½ of seed formation and filling on plant

4- Lesions situated on main stem or branches with potential to affect up to ¾ of seed formation and filling on plant

5- Main stem lesion with potential effects on seed formation and filling of entire plant

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Canola Fungicide Demonstration

- Harvest results on Sept 12

Treatment	Two App	One App	Check
Yield bu./acre	62	52	47
TKW	3.165g	3.193g	2.953g

- There was a sandy knoll in the single app treatment where the crop was visibly thinner. Favors the two app treatment

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Irrigation Water Management

- The Objective of this project was to compare actual on farm water management practices to the optimum predicted by the Alberta Irrigation Management Model (AIMM)
- Six sites – Three in the LLID and three in the RID
  - Roy King, Randy Bergstrom, Craig Langer, Gary Ewen

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Irrigation Water Management

- Local weather station in each irrigation district collected environmental data
- Actual crop water use was calculated using the water balance formula

$ET = (P + I) - R - D \pm \Delta S$

Where ET = actual crop water use or evapotranspiration

P	**=**	**precipitation**
I	**=**	**effective irrigation**
R	**=**	**runoff**
D	**=**	**deep percolation**
ΔS	**=**	**change in soil moisture**

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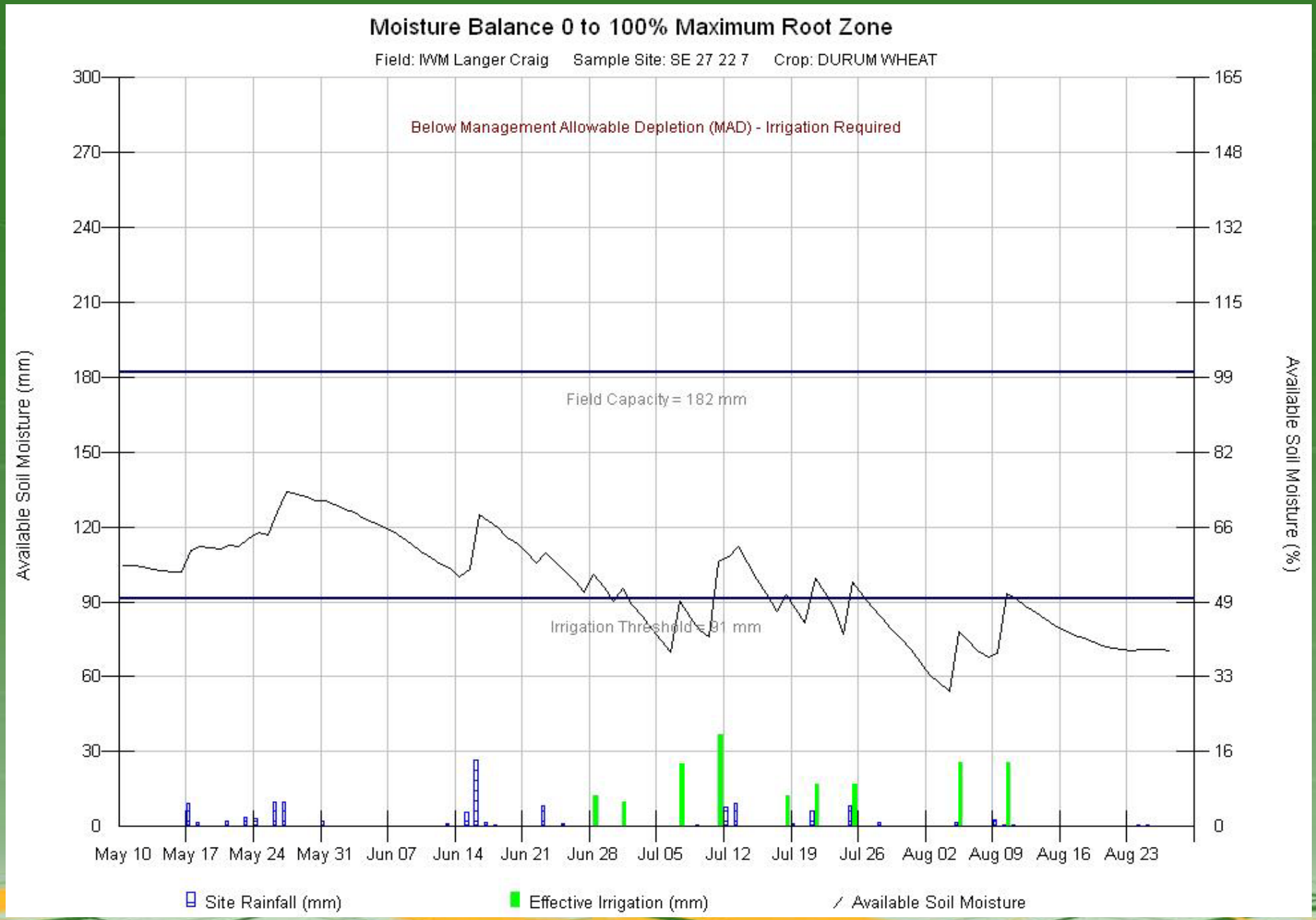
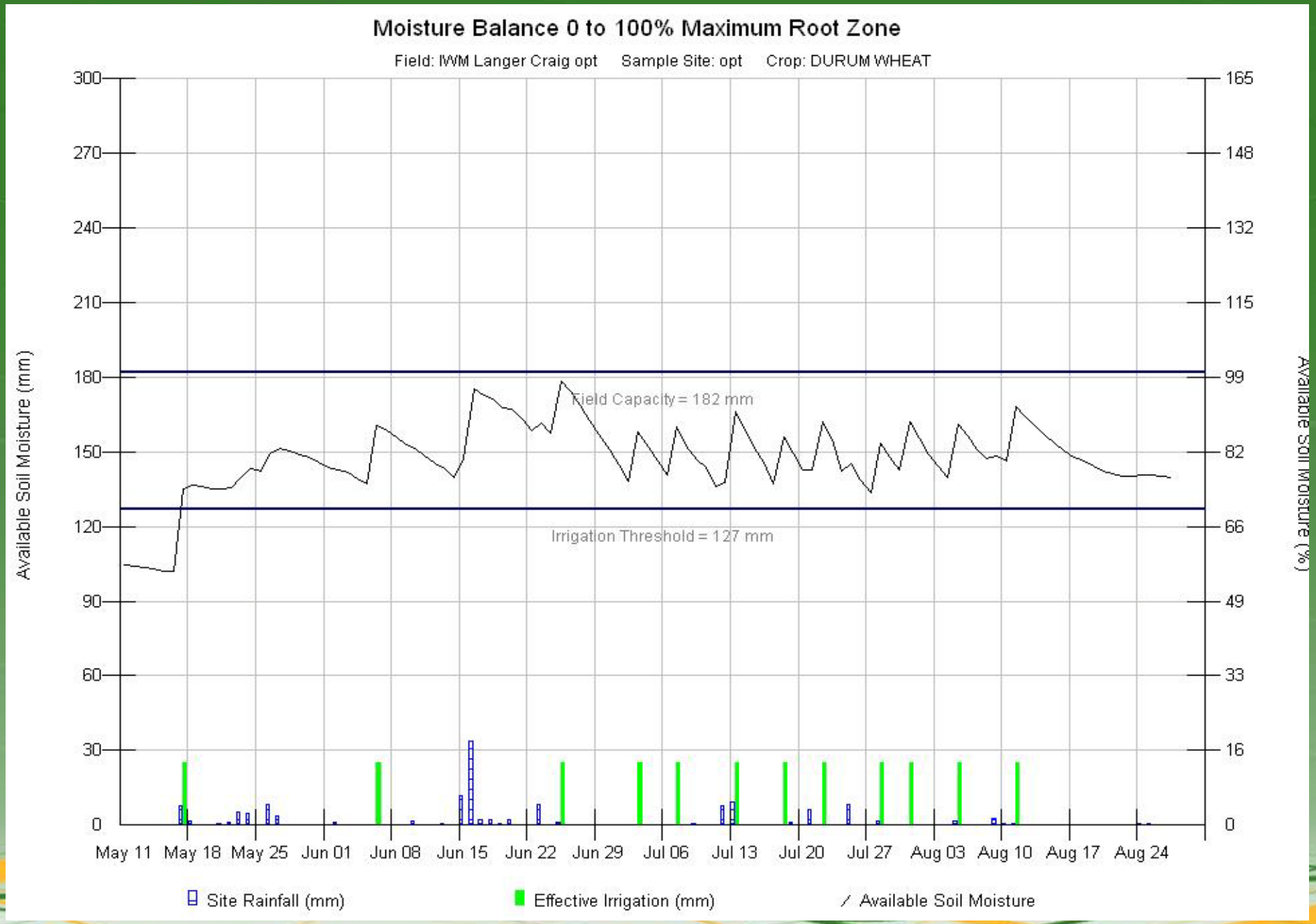
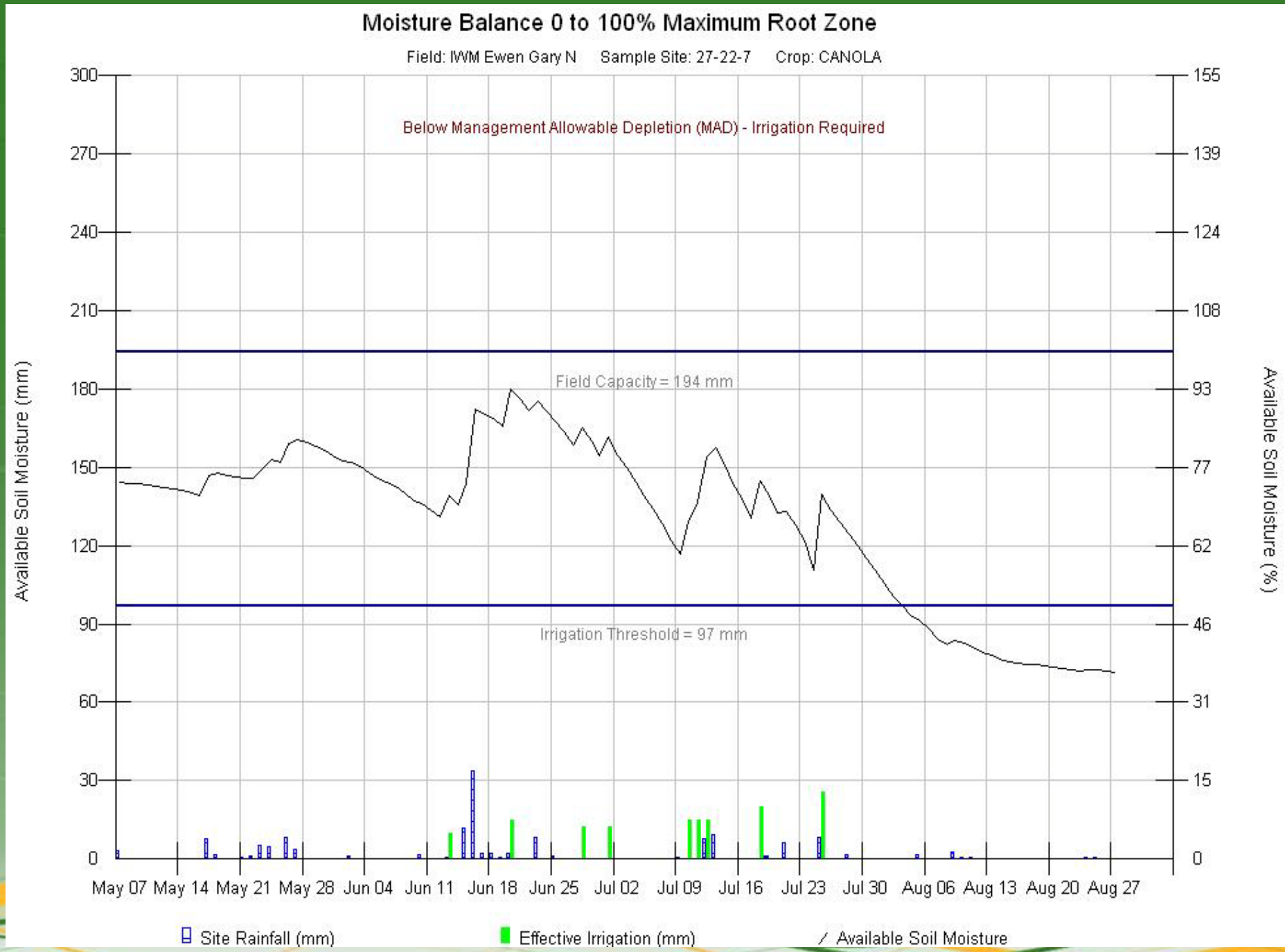
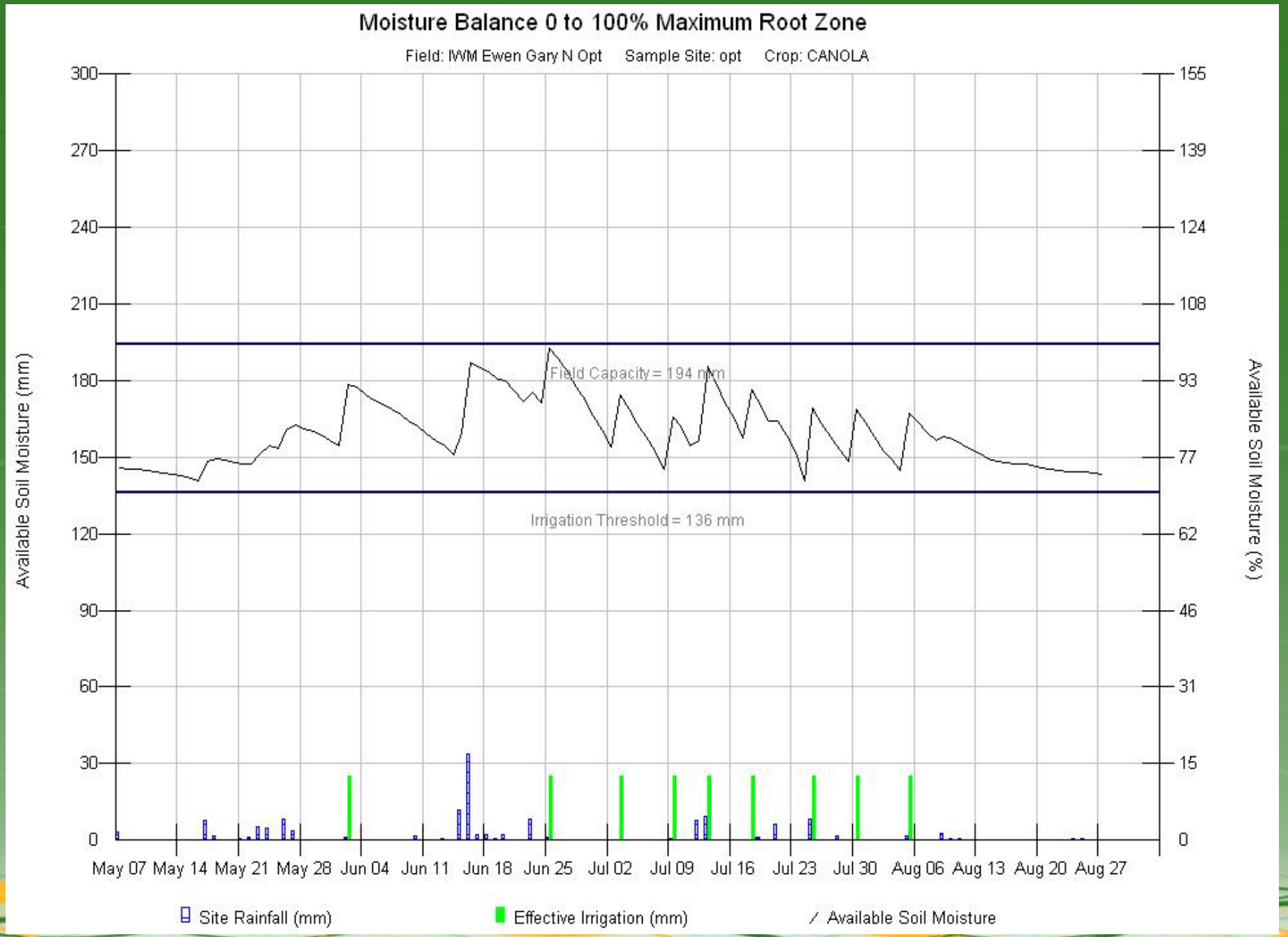
Irrigation Water Management

- Sites were visited weekly
- Optimum irrigation plan was developed in AIMM based on field, crop, and local weather
- Irrigation events were added in 25mm increments at least 3 days apart and were managed to keep soil moisture at an optimum level above 70%


Moisture Balance 0 to 100% Maximum Root Zone
Field: IWM Langer Craig Sample Site: SE 27 22 7 Crop: DURUM WHEAT
Below Management Allowable Depletion (MAD) - Irrigation Required
Field Capacity = 182 mm
Irrigation Threshold = 91 mm
Available Soil Moisture (mm)
Available Soil Moisture (%)
300
270
240
210
180
150
120
90
60
30
0
165
148
132
115
99
82
66
49
33
16
0
May 10
May 17
May 24
May 31
Jun 07
Jun 14
Jun 21
Jun 28
Jul 05
Jul 12
Jul 19
Jul 26
Aug 02
Aug 09
Aug 16
Aug 23
Site Rainfall (mm)
Effective Irrigation (mm)
Available Soil Moisture


Moisture Balance 0 to 100% Maximum Root Zone
Field: IWM Langer Craig opt
Sample Site: opt
Crop: DURUM WHEAT
Available Soil Moisture (mm)
Available Soil Moisture (%)
300
270
240
210
180
150
120
90
60
30
0
165
148
132
115
99
82
66
49
33
16
0
Field Capacity = 182 mm
Irrigation Threshold = 127 mm
May 11
May 18
May 25
Jun 01
Jun 08
Jun 15
Jun 22
Jun 29
Jul 06
Jul 13
Jul 20
Jul 27
Aug 03
Aug 10
Aug 17
Aug 24
Site Rainfall (mm)
Effective Irrigation (mm)
Available Soil Moisture


Moisture Balance 0 to 100% Maximum Root Zone
Field: IWM Ewen Gary N Sample Site: 27-22-7 Crop: CANOLA
Below Management Allowable Depletion (MAD) - Irrigation Required
Field Capacity = 194 mm
Irrigation Threshold = 97 mm
Available Soil Moisture (mm)
Available Soil Moisture (%)
300
270
240
210
180
150
120
90
60
30
0
155
139
124
108
93
77
62
46
31
15
0
May 07 May 14 May 21 May 28 Jun 04 Jun 11 Jun 18 Jun 25 Jul 02 Jul 09 Jul 16 Jul 23 Jul 30 Aug 06 Aug 13 Aug 20 Aug 27
Site Rainfall (mm)
Effective Irrigation (mm)
Available Soil Moisture


Moisture Balance 0 to 100% Maximum Root Zone
Field: IWM Ewen Gary N Opt
Sample Site: opt
Crop: CANOLA
Available Soil Moisture (mm)
Available Soil Moisture (%)
300
270
240
210
180
150
120
90
60
30
0
155
139
124
108
93
77
62
46
31
15
0
Field Capacity = 194 mm
Irrigation Threshold = 136 mm
May 07
May 14
May 21
May 28
Jun 04
Jun 11
Jun 18
Jun 25
Jul 02
Jul 09
Jul 16
Jul 23
Jul 30
Aug 06
Aug 13
Aug 20
Aug 27
Site Rainfall (mm)
Effective Irrigation (mm)
Available Soil Moisture

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Irrigation Water Management

District	Crop	Crop Water use		Act/opt
		Actual(mm)	Optimum(mm)	
Riverhurst	Durum	345	405	85%
	Canola	353	367	96%
	Flax	372	393	95%
Luck Lake	Durum	339	380	89%
	HSW	339	383	89%
	Flax	314	363	87%
All sites average		344	382	90%

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Irrigation Water Management

District	Crop	Effective Irrigation		Act/opt
		Actual(mm)	Optimum(mm)	
Riverhurst	Durum	182	300	61%
	Canola	140	225	62%
	Flax	129	250	52%
Luck Lake	Durum	98	225	44%
	HSW	91	280	33%
	Flax	101	225	45%
All sites average		124	251	49%

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Irrigation Water Management

- Results indicate that farmers irrigate less than what is required for optimum production
- Indicate that irrigation is starting late

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2012 Irrigation Agronomic and Economics

- Aiming to release it at crop production show

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Thank you!

- Any Questions ?