GRDC Irrigation Project on Agronomy and Soil Amelioration

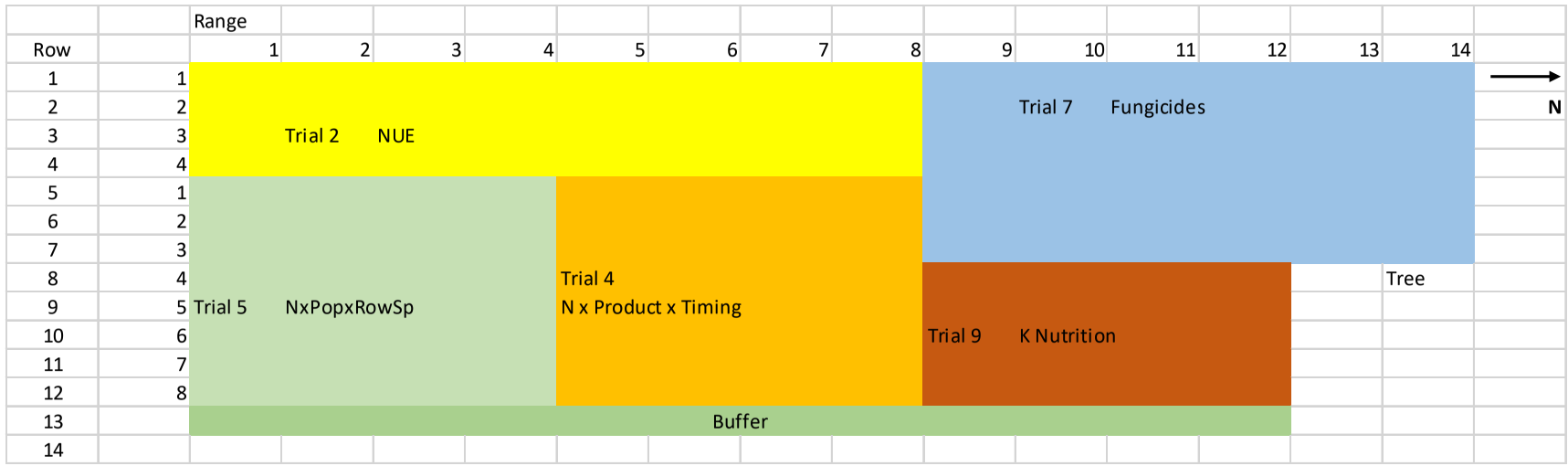
Summer Field Walk 2020

Maize Agronomy in Focus

Thursday January 30th

9:00am – 11:00am

Cnr Hallinan Rd and Gitsham Lane Wandella (Kerang)


Range
Row
1 2 3 4 5 6 7 8 9 10 11 12 13 14
1 2 3 4 5 6 7 8
Trial 2 NUE
Trial 7 Fungicides
N
Trial 5 NxPopxRowSp
Trial 4
N x Product x Timing
Trial 9 K Nutrition
Tree
Buffer

Paddock Summary

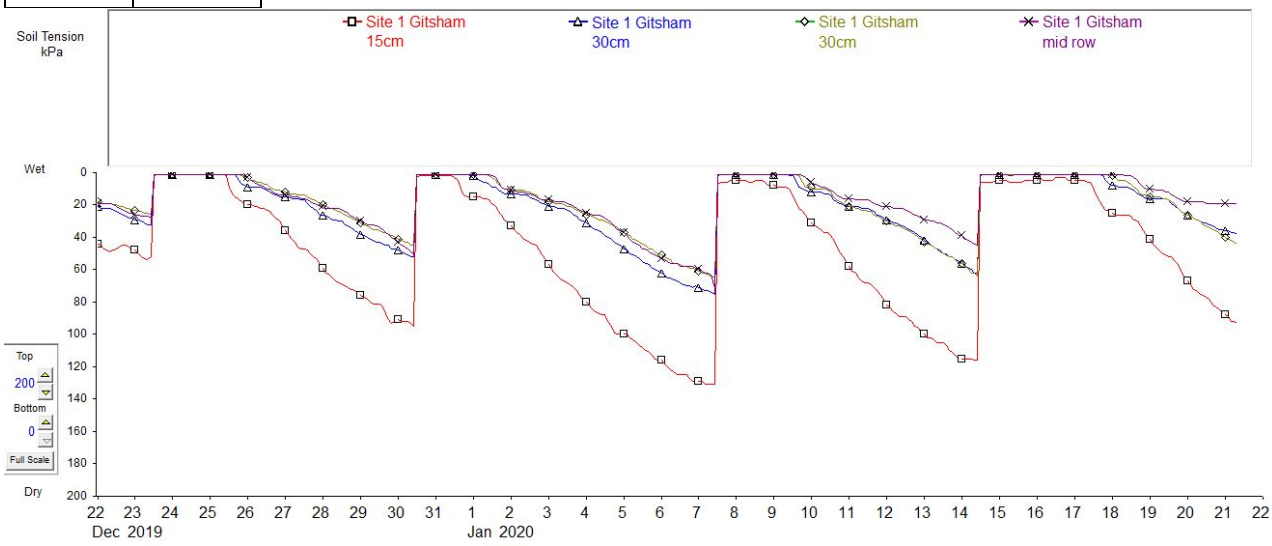
Paddock Preparation Timeline

Topsoil	
P colwell	78 ppm
K colwell	813 ppm
Sulphur	16.1 ppm
Organic C	1.40%
EC	0.22
pH water	8.3

Deep N	kg N/ha
0-30cm	21
30-60cm	13
60-90cm	13

Disced early October and levelled.
Gypsum spread October 27th
Double super spread @ 60 kg P/ha October 27th
Maize sown October 30th (thanks to John Russell of J + T Russell Contracting)
N pre-drilled November 1st.
Trial watered up November 4th.

Date	Ml/ha
4-Nov	1.1
22-Nov	0.9
9-Dec	0.8
17-Dec	0.8
23-Dec	0.7
30-Dec	0.7
7-Jan	0.7
14-Jan	0.7
22-Jan	0.7



Optimum timings and rates for the nitrogen (N) forms applied in irrigated crops of maize.

Protocol Objective:
These protocols evaluate nitrogen use efficiency in grain maize under different rates and timings of applied N fertiliser.

Protocol Nitrogen Use Efficiency Trial – N rates

Trial treatments: Seven rates of N (46% solid urea fertiliser) split 50% seedbed and 50% 3 to coincide with irrigation in the 4-6 leaf stage
Time of Sowing: October 30th 2019
Hybrid: Pioneer Hybrid 1756

Trial Treatments:

Trt.	Pre drill (Urea 46%N) kg N/ha	Post – em kg N/ha*	Total
1	0	0	0
2	40	40	80
3	80	80	160
4	120	120	240
5	160	160	320
6	200	200	400
7	240	240	480
8	280	280	560

*: Topdressed December 17th.

Management:
Standard farm management of inputs (irrigation and agrichemical input) except overall nitrogen

Nitrogen Use Efficiency Trial - N Timing and Product Trial

Trial treatments: 3 N timings (pre drill, 2wks post sow, 4 wks post sow) x 3 N rates x 4 replicates
Time of sowing: October 2019
Hybrid: Pioneer Hybrid 1756

Based on a N rate of 300 Kg N/ha

Trt.	Timing 1 N Rate	Timing 2 N Rate	Timing 3 N Rate	Timing 4 N Rate
	Seedbed	V2 (2-3 leaf)	V4 (3-4 leaf)	V6 (6-8 leaf)
1	---	---	---	---
2	300			
3				100
4	100	100	100	
5	100	---	100	100
6	100	66	66	66
7	200 (50/50 Entec and urea)	---	---	100
8	200 (50/50 Entec2 and urea)	---	---	100

Timing 2: November 22nd
Timing 3: December 9th
Timing 4:
December 23rd

"0N" plot January 7th

Nitrogen Use Efficiency – Plant population trial x nitrogen interaction

Trial treatments: 2 plant populations x 2 N rates applied pre drill x 2 row spacings
Time of sowing: October 2019
Hybrid: Pioneer Hybrid 1756 sown at 3 populations

Trt.	Plant pop (seeds sown/ha)	N rate Kg N/ha split	Row Spacing (inches)	Total
	Factor 1	Factor 2	Factor 3	
1	85,000	300	20	
2	85,000	300	30	
3	85,000	450	20	
4	85,000	450	30	
5	120,000	300	20	
6	120,000	300	30	
7	120,000	450	20	
8	120,000	450	30	

Influence of modern fungicides on the yield potential of grain maize

Protocol objectives

Broad spectrum fungicides such as group 3 DMI triazoles, group 7 succinate dehydrogenase inhibitors (SDHI's) and group 11 QoIs (strobilurins) are routinely used in irrigated cereal crops but the effects of these fungicides on grain maize is less well defined. In Protocols 7 & 8 objectives are related to disease management and green leaf retention.

Specifically, the individual objectives are as follows:

- To identify any foliar disease evident during the growing season (e.g. Northern Corn Leaf Blight - NCLB)
- To identify the influence of protectant and curative fungicide properties (using group 3 DMI triazoles and group 11 QoIs (strobilurins) on disease in grain maize
- To assess whether fungicides are associated with greater green leaf retention in grain maize hybrids in the absence of disease.

Location: Kerang and Yenda
Trial treatments: 4 fungicide programmes x 2 fungicide timings (8 leaf & VT*) x 4 replicates
Time of sowing: October 2019
Hybrid: Pioneer Hybrid 1756

Treatment List:

Trt.	Fungicide Product (active)	Timing *
	Factor 1 (rate of active ingredient)	Factor 2 (timing)
1	Untreated	----
2	DMI – Prothioconazole (Proline) (100g/ha)	Timing 1 (8 leaf)
3	DMI – Propiconazole (Tilt) (125g/ha)	Timing 1 (8 leaf)
4	QoI – Pyraclostrobin (Cabrio) (200g/ha)	Timing 1 (8 leaf)
5	DMI/QoI – Prothioconazole + Pyraclostrobin	Timing 1 (8 leaf)
6	Untreated	
7	DMI – Prothioconazole (Proline) (100g/ha)	Timing 2 (VT - Tasseling)
8	DMI – Propiconazole (Tilt) (125g/ha)	Timing 2 (VT - Tasseling)
9	QoI – Pyraclostrobin (Cabrio) (200g/ha)	Timing 2 (VT - Tasseling)
10	DMI/QoI – Prothioconazole + Pyraclostrobin	Timing 2 (VT - Tasseling)

***** *Foliar timings maybe adjusted according to safe operating height of boom sprayer for plot spraying equipment*

Row spacing x plant population interaction

Protocol objectives

A number of growers have expressed interest in whether 750mm row spacing allows the optimum spatial arrangement of maize plants in Australian environments. Narrower rows would allow greater plant to plant spacing within the row. This protocol has been established to look at how the interaction between row spacing and plant population influences dry matter production, nitrogen use efficiency, final grain yield and harvest index in grain maize.

Specifically, the individual objectives are as follows:

- To identify the optimum plant populations for the grain maize hybrid 1756 at 500 and 750mm row spacing for grain yield.
- To examine whether there is an interaction between plant population and row spacing in terms of dry matter production, nitrogen use efficiency, final grain yield and harvest index.

Trial treatments: 3 plant populations x 2 row spacing (500mm & 750mm) x 4 replicates
Time of sowing: October 2019
Hybrid: Pioneer Hybrid 1756

Treatment List:

Trt.	Plant pop (seeds sown/ha)	N rate (1st N dose)	Standard 2nd N dose*	Total
	Factor 1	Factor 2	Factor 3	
1	85,000	300	20	
2	85,000	300	30	
3	85,000	450	20	
4	85,000	450	30	
5	120,000	300	20	
6	120,000	300	30	
7	120,000	450	20	
8	120,000	450	30	

Potassium Use Efficiency – Ensuring adequate Potassium supply to maximise yield.

These trials evaluate the influence of increasing potassium supply to ensure an adequate supply of K during the peak uptake period from leaf 8 to silking, measuring dry matter production and grain yield in maize.

Location: Kerang, VIC 3579, Yenda, NSW 2681
Trial treatments: 4 rates of potassium supplying 0 (control), 20, 40 and 80 kg K/ha as K_2SO_4
Hybrid: Pioneer Hybrid 1756

Treatment	K rate (kg K/ha)	Timing
1	0	Leaf 4-6
2	20	Leaf 4-6
3	40	Leaf 4-6
4	80	Leaf 4-6
5	80	Split Leaf 4-6 and 8-10