FOUNDATION FOR ARABLE RESEARCH

FAR®

Research field walk

Thursday 11th December

Northern Crops Research Site

Health & Safety

Please take appropriate care and be aware of potential hazards. For your safety, please:

- Follow instructions from FAR staff at all times.
- Stay within the areas specified by FAR.
- Report any hazards noted directly to a member of FAR staff.

First aid and emergencies

FAR staff are qualified First Aiders and there are First Aid kits on site. Should you require any assistance, please ask a FAR staff member.

In case of emergency notify a FAR staff member or call 111 and provide the address of the event:

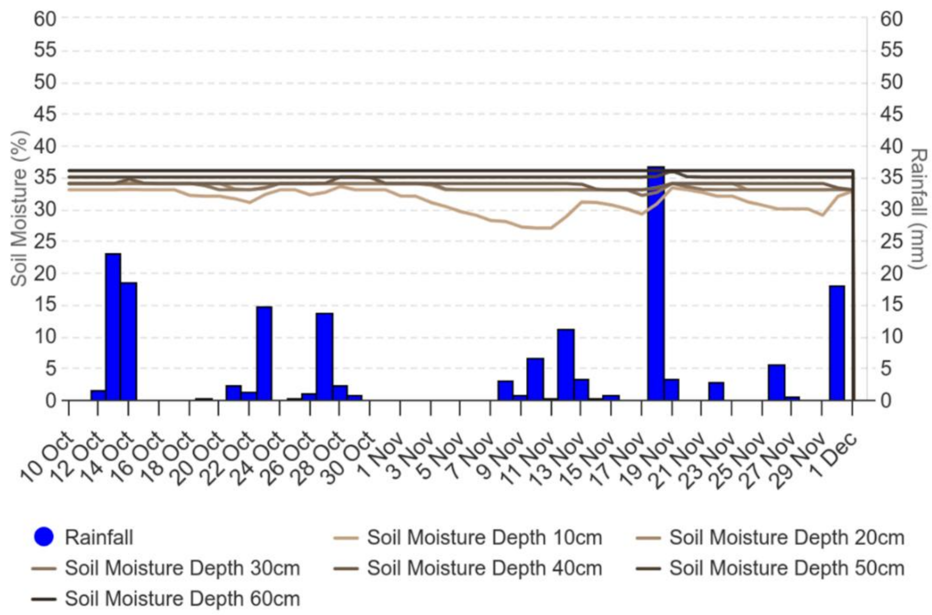
- 82 Oaklea Lane, Tamahere 3283, New Zealand

Programme

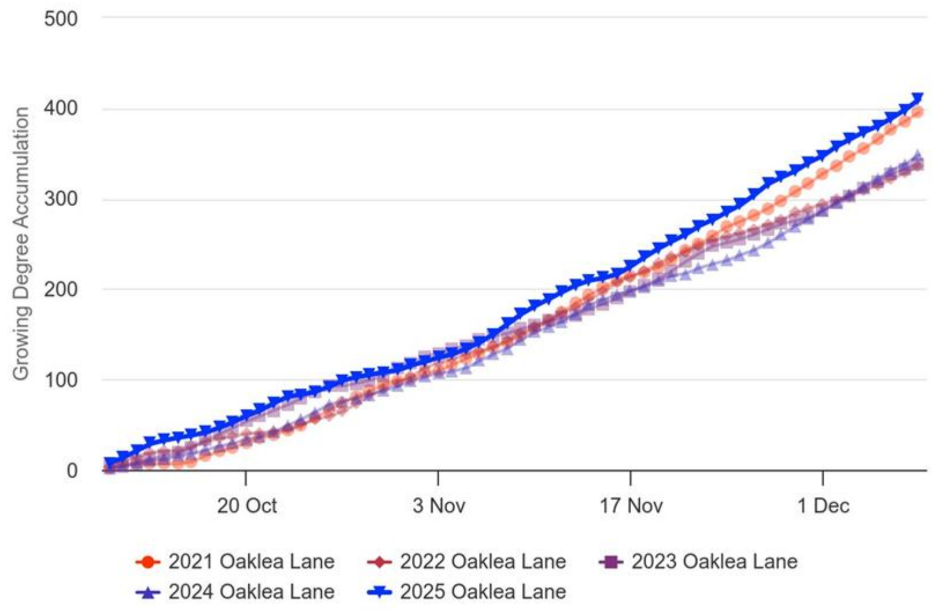
2:00 pm	Welcome and season update	Dirk Wallace
2:15 pm	Herbicide screening and future of weed research	Zachary Ngow (BSI - AgResearch), Ben Harvey (FAR), Steve Payne (FAR)
3:00 pm	Alternative nitrogen products	Dirk Wallace (FAR)
3:40 pm	Crop scouting for caterpillars	Ash Mills (FAR) and Rene van Tilburg (FAR)
4:00	Finish	

Research site background and seasonal update

Site area: 19 Ha effective, 24 Ha total
Soil type: Allophanic and Gley soils
Rainfall: Annual average: 1201 mm, Growing season (October – March) = 450 mm
Typical planting date: Early October
CRM/Population: CRM 97-109/Population 100k/ha
Maize end use: Maize silage
Maize yield range: 18 – 28 t DM/ha. Maize yield average: 23 t DM/ha
24/25 Winter crop: Nui perennial ryegrass
Spring/summer weeds: Oxalis (Oxalis acetosella), Summer grass (*Digitaria sanguinalis*), Fat hen (*Chenopodium album*), Dock (*Rumex obtusifolius*)



Rainfall and soil moisture since 10/10/25



Growing degree accumulation since 10/10/25

Maize herbicide efficacy demonstration

Zachary Ngow (AgResearch), Steve Payne (FAR), Ben Harvey (FAR) and Matilda Gunnarsson (FAR)

Key points

- Increasing herbicide resistance and uncertainty of availability of products calls for more focus on understanding the efficacy of different herbicide options in maize.
- Most of the pre-emergent treatments were effective on grass and broadleaf weeds with <15% weed cover forty days after application. Products with group 15 herbicides controlled summer grass well.
- Two of the post-emergent herbicide treatments had <15% weed cover twenty-one days after application, and four had >50% weed cover. This may be because several of those treatments do not control summer grass well.
- Oxalis was a problematic weed though some treatments appeared effective on it.
- Understanding the problem weeds on a site and utilizing a variety of herbicide options over successive years will drive weed numbers down and slow herbicide resistance evolving.

Background

Winter crop: Perennial ryegrass (cv. Nui)
Establishment: Two passes discs, two passes power harrow
Hybrid/Population: P9911 (CRM 99) at 100 k seeds/ha
Planting date: 15 October 2025

What are we doing?

This demonstration is part of FAR's four-year project Integrated Weed Management in a World of Herbicide Resistance (2025–2029), funded by MPI's Primary Sector Growth Fund (PSGF). The 4-year programme aims to provide growers with reliable and up-to-date information, tools, and strategies to effectively and confidently manage weeds through an integrated weed management approach (IWM).

This demonstration evaluates a range of commercial and pre-commercial herbicides—applied both pre- and post-emergence—for use in maize. The aim is to build on this work in the future by taking a more integrated weed management approach, including but not limited to options such as mechanical weed control.

Vegetable RESEARCH+ INNOVATION

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Table 1. Herbicide treatments selected for evaluation in the PSGF-funded demonstration at NCRS, Waikato in the 2025-26 season and results of weed cover following assessment where days after treatment = DAT.

Treatment	**Application**	**Product**	**Active Ingredient**	**HRAC Group**	**Label Rate**	**Adjuvant**	0 DAT	21 DAT		40 DAT	
							Untreated (%)	Untreated (%)	Treated (%)	Untreated (%)	Treated (%)
1	pre-	Stomp® Xtra	pendimethalin	3	5 L/ha	none	-	12	2	75	14
2	pre-	Roustabout® 840	acetochlor	15	2.8 L/ha	none	-	5	0	93	8
3	pre-	Flowable Atrazine 500	atrazine	5	3 L/ha	none	-	2	4	90	80
4	pre-	Corral™	alachlor	15	7 L/ha	none	-	8	0	73	15
5	pre-	Primiera® 480SC	mesotrione	27	450 mL/ha	none	-	8	5	93	80
6	pre-	Roustabout® 840 + Sharpen®	acetachlor + saflufenacil	15 + 14	2800 L/ha + 150 g/ha	none	-	3	0	43	0
7	pre-	Primiera® 480SC + Roustabout® 840	mesotrione + acetochlor	27 + 15	450 mL/ha + 2.8 L/ha	none	-	0	0	47	14
8	pre-	FAR 25-01	*	*	*	none	-	50	48	100	100
9	post-	Latro® WG	nicosulfuron	2	110 g/ha	yes	11	73	11	*	*
10	post-	Bromotril®	bromoxynil	6	1 L/ha	none	22	90	68	*	*
11	post-	Kamba® 750	dicamba	4	600 mL/ha	none	38	92	92	*	*
12	post-	Arietta®	topramezone	27	200 mL/ha	none	14	77	52	*	*
13	post-	FAR 25-02	*	*	*	yes	29	95	25	*	*
14	post-	FAR 25-03	*	*	*	yes	32	67	14	*	*
15	post-	Bromotril® + Latro® WG	bromoxynil + nicosulfuron	6 + 2	1 L/ha + 110 g/ha	yes	46	57	32	*	*
16	post- (two applications)	FAR 25-04	*	*	*	none	78	100	100	*	*

Table 2. Herbicide treatments selected for evaluation in the PSGF-funded demonstration at NCRS, Waikato in the 2025-26 season and results following assessment where days after treatment = DAT, Untreated = UT and Treated = T.

Treatment	Application	Product	Active Ingredient	HRAC Group	Fathen (%)		Oxalis (%)		Summer grass (%)		Total Weed Cover (%)	
					UT	*Td*	*UT*	*T*	*UT*	*T*	*UT*	*T*
1	pre-	Stomp® Xtra	pendimethalin	3	7	0	15	9	62	5	75	14
2	pre-	Roustabout® 840	acetochlor	15	0	0	27	2	68	3	93	8
3	pre-	Flowable Atrazine 500	atrazine	5	7	2	7	0	85	69	90	80
4	pre-	Corral™	alachlor	15	27	2	0	11	58	2	73	15
5	pre-	Primiera® 480SC	mesotrione	27	18	5	28	28	52	54	93	80
6	pre-	Roustabout® 840 + Sharpen®	acetachlor + saflufenacil	15 + 14	23	0	0	0	23	0	43	0
7	pre-	Primiera® 480SC + Roustabout® 840	mesotrione + acetochlor	27 + 15	17	0	22	9	17	2	47	14
8	pre-	FAR 25-01	*	*	5	0	73	100	17	2	100	100
9	post-	Latro® WG	nicosulfuron	2	0	0	5	2	62	11	73	11
10	post-	Bromotril®	bromoxynil	6	3	0	0	2	68	57	90	68
11	post-	Kamba® 750	dicamba	4	7	0	0	0	80	92	92	92
12	post-	Arietta®	topramezone	27	7	2	3	2	58	34	77	52
13	post-	FAR 25-02	*	*	17	0	25	18	78	2	95	25
14	post-	FAR 25-03	*	*	43	0	10	2	37	8	67	14
15	post-	Bromotril® + Latro® WG	bromoxynil + nicosulfuron	6 + 2	28	6	23	5	35	9	57	32
16	post- (two applications)	FAR 25-04	*	*	32	49	83	98	33	66	100	100

Efficacy of treatments on grass weeds

- Untreated areas of plots had weed coverage of between 47 and 100%. The main grass weed present on the site was summer grass, with yellow bristle grass, barnyard grass, smooth witchgrass, poa and ryegrass were present at low densities (mostly ≤5% cover). Ryegrass is not a typical weed of maize though following a winter cover crop there can be survivors not killed off at sowing.

- There were no grass weeds recorded in pre-emergent treatments 2, 4, 6, 7 and 8 twenty-one days after application. At forty days after application grass weeds were recorded in all pre-emergent plots except for treatment 6. All pre-emergent plots except 3 and 5 recorded densities of grass weeds ≤5%.

- Treatment 3 and 5 were not effective on summer grass which was recorded at 4% and 1.5% cover twenty-one days after application, and then 69% and 54% at forty days after application. Barnyard grass and poa were also recorded in Treatment 5.

- Post-emergent treatments at twenty-one days after application varied in their efficacy on summer grass. Many of the treatments are not expected to have strong activity on summer grass, especially treatments 10 and 11, which had 57% and 92% summer grass cover. Treatment 13 and 16 were also ineffective on summer grass.

- Treatments 9, 13, 14 and 15 appeared to be effective on summergrass, with <15% cover.
  Summer grass is resistant to nicosulfuron (HRAC Group 2) in Bay of Plenty and Waikato populations. There are no other known cases of resistance in grass weeds in maize in New Zealand. However, resistance has not been tested for pre-emergent herbicides and this are at risk of developing resistance.

Efficacy of treatments on broadleaf weeds

- The main broadleaf weeds present on the site were oxalis and fathen. Less frequent broadleaf weeds included purple amaranth, bitter cress, dock, speedwell, twin cress, redroot and chickweed (most ≤7% cover). Oxalis was highly abundant in treated and untreated areas of plots 8 and 16 and less abundant in other plots.

- Pre-emergent treatments were effective on broadleaf weeds (except oxalis) with very few observed 21 days after application in treated areas of Treatments 1-8. At forty days after treatment, many of the plots (all except 3 and 5) still had few broadleaf weeds with ≤5% cover. Fathen was well controlled by most treatments, found at 0% cover in ten treatments, and only recorded with high abundance in treatment 16.

- Post-emergent treatments twenty-one days after application were mostly effective on broadleaf weeds (except oxalis) with all except 15 and 16 having fewer than 15% broadleaf weed (except oxalis) cover. Treatment 9 and 13 had no broadleaf weeds (except oxalis) present twenty-one days after treatment.

- Oxalis proved difficult to control with most treatments. Pre-emergent treatments 4, 5 and 8 appear to be ineffective on oxalis. Treatment 1, 2, 3 and 7 cause some damage to oxalis, with lower cover recorded in treated than untreated areas, and herbicide symptoms observed. Post-emergent treatments 9, 13, 14 and 15 appear to have some efficacy on oxalis, and treatment 16 appears to be ineffective.

- Fat hen is resistant to atrazine (HRAC Group 5) in most maize sites across the Bay of Plenty and Waikato, and has been recorded as dicamba (HRAC Group 4) resistant in parts of eastern Waikato, though this was not detected in the recent maize survey.

  Table 3: Estimate of weed cover for fathen, oxalis, summer grass and all weeds for pre- and post-emergent herbicide treatments. Results presented are from the 9th of December (40 days after treatment for pre-emergent herbicides 1-8 and 21 days after treatment for post-emergent herbicides 9-16).

Alternative nitrogen products

Dirk Wallace (FAR), Steve Payne (FAR), Emmanuel Chakwizira (FAR)

Key points

- FAR has a strategic goal to deliver maize nitrogen guidelines by 2028.
- This season we aim to build on our collaboration with UK Maize Growers Association by assessing alternative N products.
- Alternative N products such as biological N fixing microbes are on the shelf and need to be included in future nitrogen guidelines.

Background

Winter crop: Perennial ryegrass (cv Nui)
Establishment: Two passes with discs and two passes of power harrow
Hybrid/Population: PAC295 (CRM 97)/ 100 k seeds/ha
Planting Date: 16th October 2025

What are we doing?

FAR has a strategic goal to develop a Nitrogen (N) management strategy for maize which will detail how the **Right rate** of fertiliser, in the **Right place**, applied at the **Right time** and in the **Right form** will benefit the bottom line for growers.

This season we are assessing three alternative nitrogen products (Right form) which each have a different reported mode of action. We've worked with colleagues at the UK Maize Growers Association to determine which international products have a measured yield response in their maize silage growing environment and where our best chance of success is. We've also looked at what is in the market locally and worked to include that.

Why are we doing this?

Biological agricultural products are a rapidly expanding area. Growers are asking for advice on these products as alternatives to synthetic N. By focusing on how these products can be included in a traditional maize silage programme we can build understanding of 1) their value and 2) where they are best placed in the system.

The alternative products being assessed are:

1) A foliar slow release foliar urea polymer with biostimulant applied at V8-V10 (Ureic N and Polymer forms - Monomethylene urea, methylene dilurea and triazone polymers) with Magnesium, Sulfur and Pidolic acid. Trade name: NutrinoPro from IntraCrop UK
2) A foliar applied biological N fixing microbe applied at V4-V8. Tradename withheld.
3) A seed applied biological N fixing microbe applied as a seed treatment. Trade name: Always N® BioConsortia and H&T

What are the questions we are aiming to answer?

1) How much N can biological N fixing products supply to maize?
2) Can novel foliar products produce more dry matter per kg of nitrogen applied than traditional granular fertilizer?
3) What is economic optimum N rate and what is the range of N rates that can get you 99% of the way there?

Trt	Description	Initial soil Min N* (kg N/ha)	Estimated soil mineralisation * (kg N/ha)	Starter (kg N/ha)	Side dress (kg N/ha)	V8 Foliar (kg N/ha)
T1	Slow release Foliar N, Mg + biostimulant – Nutrino pro	17	91	41	34	6
T2	Foliar Biological	17	91	41	34	Applied
T3	Seed Biological (AlwaysN ® H&T and BioConsortia + H&T Optimised ®)	17	91	41	34	0
T4	210 kg N/ha (as SustaiN)	17	91	41	169	0
T5	75 kg N/ha (as SustaiN)	17	91	41	34	0
T6	300 kg N/ha (as SustaiN)	17	91	41	259	0
T7	Control 0 kg N/ha	17	91	0	0	0

*Initial soil mineral N measured pre planting to 30 cm depth, estimate of mineralisation calculated with a 0-30 cm potentially mineralisable N test (PMN test). Interpretation performed using the FAR soil N supply calculator

You are here

	8 rows	8 rows	8 rows	8 rows	8 rows		8 rows	8 rows
12 m	T1	T3	T5	T2	T7		T4	T6
12 m	T6	T1	T3	T7	T5		T2	T4
12 m	T7	T2	T4	T1	T6		T3	T5
12 m	T5	T7	T2	T6	T4		T1	T3
12 m	T4	T6	T1	T5	T3		T7	T2

Crop scouting for caterpillars

Ash Mills (FAR), Rene van Tilburg (FAR)

We are increasingly receiving calls about caterpillar pests. This information will help you find and identify caterpillars and work out what action to take.

1. Identify the crop stage and plan the scouting. Start by walking the headland areas, then move into the crop.

2. Walk the field. Ideally follow a zig zag (Figure 2) or w shaped pattern (Figure 1), at a minimum just walk the crop

3. Inspect the plants check several plants at each site for FAW signs:

- Damage on leaves of multiple adjacent plants
- Frass (insect droppings)
- Larvae feeding in the whorl or on leaves
- Identify and record the presence of other pest species.
- Observe and record any beneficial species, especially Cotesia ruficrus – aka parasitic wasp (<5 mm)

4. If there's damage – Collect information to make decision

- Record the total number of plants checked.
- Record the number of plants with FAW damage or larvae.
- Record the size of FAW larvae.
- Record sightings of other pests or beneficial insects.
- Record any other signs of plant health deficiencies

5. Repeat scout crops as often as possible, ideally once a week at a minimum, following a different path each time. **Note:** Checking more sites within a crop gives a far better picture than checking more plants per site. The key is spatial coverage—aim for around **50 sites** (more for large paddocks, fewer for small ones)

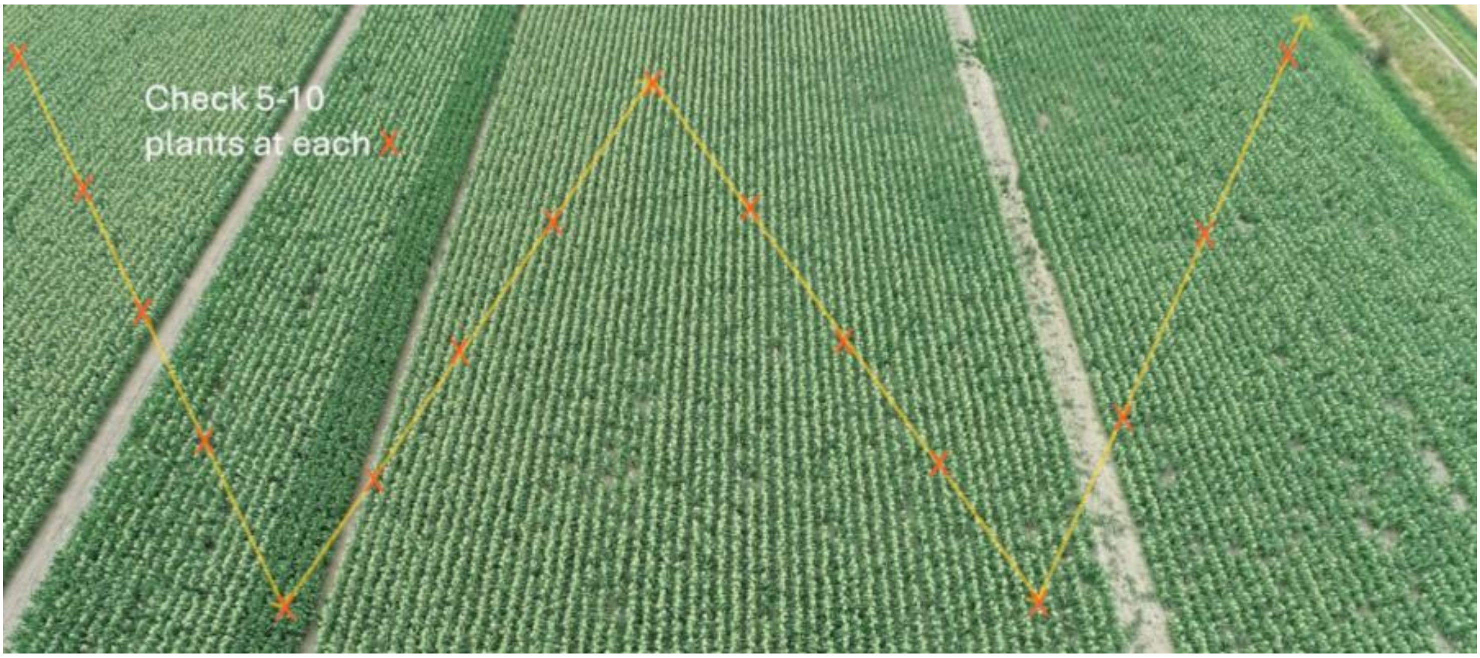

Figure 1 A "W" shape scouting pattern, ideal for crops at VE to V8 stage

Figure 2 A zig-zag shaped scouting pattern, ideal for crops from V8 onwards

Found a caterpillar and don't know what it is? Open phone camera and point it here to go to fallarmyworm.nz

1. **Identify the size** of the caterpillars – chemical treatments target the ones that are 10 mm or less (finger nail length)
2. **Identify the type** of caterpillar – fallarmyworm.nz has photos of all common maize caterpillars
3. **Calculate the amount of crop damage** like this

- (Number of damaged plants ÷ Total plants checked) × 100
- Example: (24÷150) ×100=16%

4. **Compare to the threshold** to guide appropriate action:

Knee high maize ≥20% of plants infested

Shoulder high maize ≥40% of plants are damaged AND larvae are present

Tassle to silking ≥20% of plants are infeste

Contact details for FAR staff:

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