

FOUNDATION FOR

ARABLE RESEARCH



# Maize Winter Workshops

24 June 2026, **Ongaonga**

29 June 2026, **Hamilton**

30 July 2026, **Canterbury**

ADDING VALUE TO THE BUSINESS OF CROPPING

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### FAR contacts:

<b>Megan Cushnahan:</b>	<b>0272521722</b>	<b>Eastern &amp; Southwest North Island Facilitator</b>
<b>Dirk Wallace:</b>	<b>020 4039 2522</b>	<b>North Island Manager &amp; Senior Researcher</b>
<b>Sam McDougall:</b>	<b>027 468 8803</b>	<b>Senior Field Research Officer</b>
<b>Rene van Tilburg:</b>	<b>027 344 9254</b>	<b>Senior Researcher - Maize</b>
<b>Steve Payne:</b>	<b>027 568 2635</b>	<b>Senior Field Research Officer</b>

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## External speakers

### **Maize markets: Khan Sayer – Senior Trader, NZ Grains, Bunge**

Khan is the Senior Trader for both domestic and imported grain in NZ.

Khan has over 15 years of experience in the grain industry. Khan first joined Viterra in 2010 managing execution of domestic grains before moving into a trading role.

As the Senior Trader, Khan oversees the pricing of all grain commodities, and managing relationships with local end users as well as offshore suppliers.

### **Maize markets: Dion Fleming – Grower**

Grew up on an Arable farm in Manawatu, Family operated one of the largest privately owned grain drying/handling operations in NZ, at time handling close to 10% of the national maize harvest volumes. More recently Dion and his wife have purchased an equivalent size grain complex from Wrightsons Grain & seed where over the last 18 months they have completely rebuilt the complex with new drying, storage, handling and feed manufacturing facilities.

Dion and his wife have two dedicated sales staff to manage their dairy and dry stock clients and also run a fleet of bulk and auger delivery trucks across the LNI.

Dion has spent numerous years in both regional and national arable roles for Federated Farmers along with Foundation for Arable Research (FAR).

### **“Controlling the controllables”: Mike Turner - Corson Maize**

Mike Turner is the National Research Manager for Corson Maize, where he leads Research, Product Development, Portfolio Management and data interpretation across the company’s maize trialling programme. His work centres on using nationwide trial data to improve hybrid selection, market fit and maize system performance throughout New Zealand.

Rather than focusing only on top-line yield, Mike looks closely at where hybrids perform well, where they fall short and what that means for growers in different environments. This critical approach helps ensure Corson Maize is selecting resilient and reliable hybrids that offer growers a practical and consistent pathway to high performance in maize growing systems

## Exploring profitable, sustainable, and diversified maize farming systems in the Waikato: The role of crop establishment and winter cover crops

*Rene van Tilburg, Sam McDougall, Steve Payne, Dirk Wallace and Abie Horrocks (FAR)*



### Take home messages

- Reduced tillage can work – but the soil must be suitable.
- Reduced tillage is not a one-size-fits-all system; soil type and paddock selection matter.
- The credible performance of no-till should give those in a full cultivation situation the confidence to reduce cultivation intensity
- Strip-till is the safest transition step for most growers.
- Crop establishment remains king – poor emergence is expensive.
- Measure nitrogen supply, don't guess it – PMN and mineral N testing can substantially reduce fertiliser requirements.
- The combination of reduced cultivation intensity and the use of mineral N and PMN testing has the potential to save \$300 or more per ha.

### Introduction to on-farm trials

Four on-farm trial sites were established in the Waikato to explore the role of crop establishment and winter cover crops in delivering profitable, sustainable, and diversified maize farming systems in the Waikato. Each host had different reasons for seeking alternatives to their standard practice, which in maize silage system comprised a cultivated system with a ryegrass winter crop for balage or grazing and in maize grain production consisted of cultivated maize with a winter fallow.

Two trial sites, the Corson Maize Grain site and the Jackson Silage site, have now been completed after five years of comparisons. We are starting to gain insights from five years of on farm data on Grain Yield, Gross Margin and Crop Performance over that period.

## Results of on-farm trials

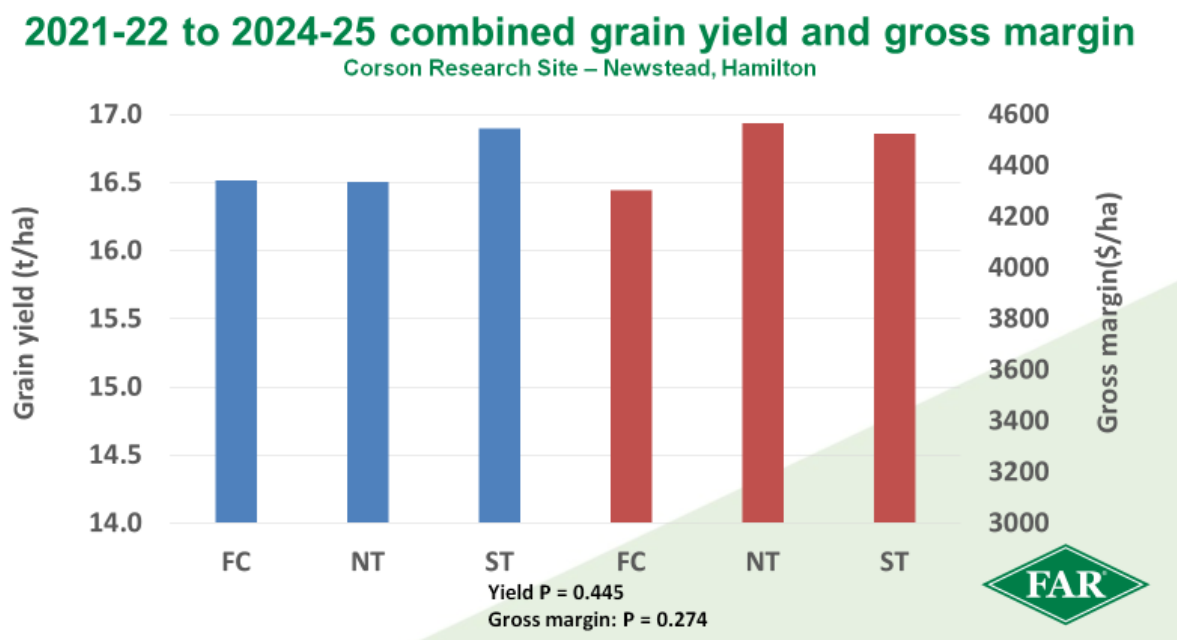
### Maize grain production at the Corson Research Site

#### Summary findings

- On a well-structured allophanic soil, strip-till and no-till produced grain yields and gross margins comparable to full cultivation.
- Large differences in soil N supply between winter cover crop treatments in 2024-25, resulting in side-dress N inputs ranging from 75 to 360 kg Sustain<sup>®</sup> ha<sup>-1</sup>.
- Similar grain yields were achieved despite these large differences in N inputs in 2024-25, demonstrating the value of matching N applications to crop demand and soil N supply.
- Thus, Mineral N and PMN testing can improve nitrogen use efficiency and reduce fertiliser costs.

#### The effect of crop establishment method on maize grain production

The Corson Research Site near Newstead was located on a Typic Orthic Allophanic Soil and represented a relatively favourable environment for maize establishment. Over four growing seasons (2021-22 to 2024-25), grain yield did not differ between full cultivation, strip-till, and no-till establishment systems (Figure 1). Average grain yields were approximately 16.5–16.9 t ha<sup>-1</sup>, demonstrating that reduced tillage systems are capable of producing grain yields comparable to those achieved under full cultivation.

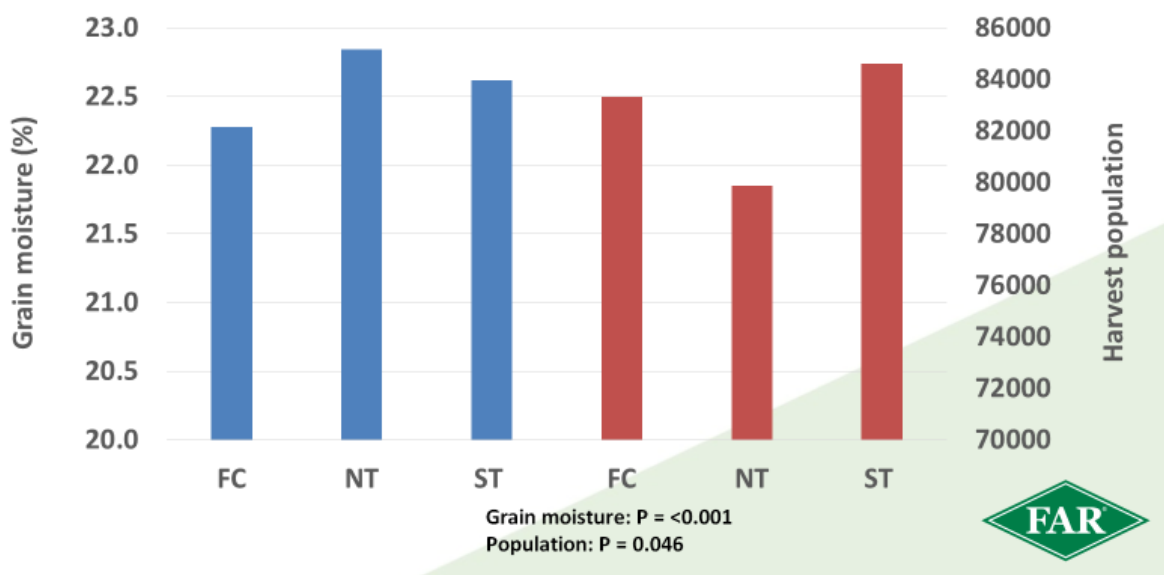


**Figure 1.** Combined grain yield and gross margin for full cultivation (FC), strip-till (ST), and no-till (NT) systems at the Corson Research Site, Newstead, Hamilton, from 2021-22 to 2024-25.

Gross margins also did not differ among establishment systems (Figure 1). This indicates that reduced tillage systems can maintain profitability on suitable soil types while potentially reducing cultivation intensity and associated establishment costs.

## 2021-22 to 2024-25 combined grain moisture & harvest population

Corson Research Site – Newstead, Hamilton



**Figure 2.** Combined grain moisture and harvest population for full cultivation (FC), strip-till (ST), and no-till (NT) systems at the Corson Research Site, Newstead, Hamilton, from 2021-22 to 2024-25 seasons.

Although grain yield was unaffected, some differences in crop establishment characteristics were observed. No-till plots had slightly lower harvest populations and higher grain moisture at harvest than full cultivation and strip-till treatments (Figure 2). However, these differences were insufficient to affect final grain yield or gross margin.

These results demonstrate that on well-structured allophanic soils, strip-till and no-till systems can perform similarly to full cultivation while maintaining both productivity and profitability.

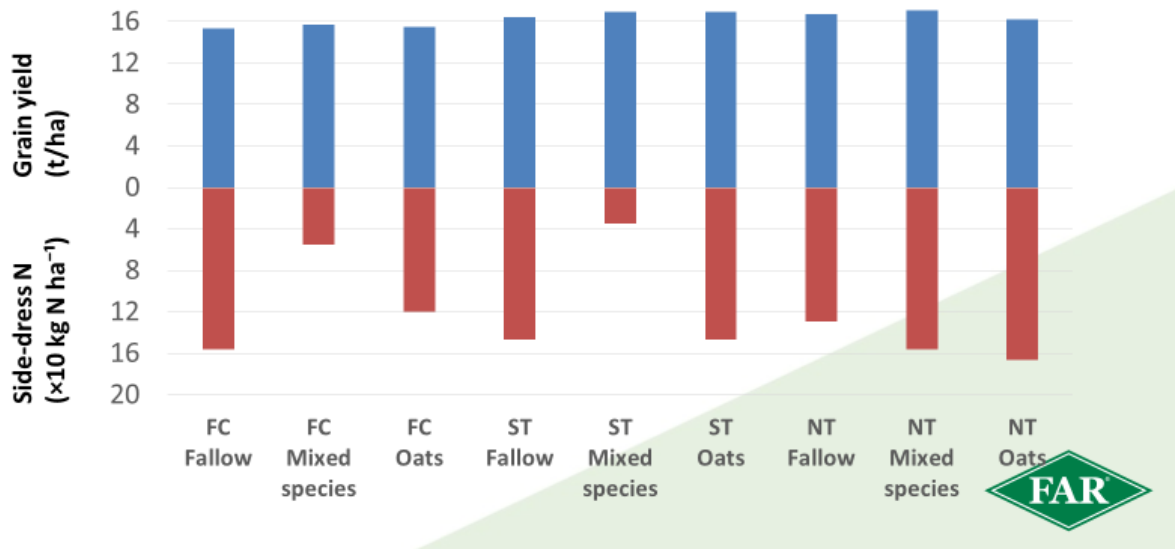
### The effect of winter cover crop on nitrogen management

Nitrogen requirements for the 2024-25 season were estimated using mineral N and potentially mineralisable nitrogen (PMN) soil tests. These measurements were used to calculate side-dress nitrogen requirements for each treatment, resulting in Sustain<sup>®</sup> application rates ranging from 75 to 360 kg product ha<sup>-1</sup>.

Despite these large differences in fertiliser application, grain yields remained remarkably similar across treatments, with all treatments producing approximately 16 t ha<sup>-1</sup> of grain (Figure 3). This demonstrates the value of measuring both mineral N and PMN when making side-dress nitrogen decisions. Soil N supply differed among treatments, resulting in substantially different fertiliser requirements, yet similar grain yields were achieved when fertiliser inputs were matched to the estimated nitrogen requirement of the crop.

## 2024-25 Side-dress N rates and grain yield

Corson Research Site – Newstead, Hamilton



**Figure 3.** Side-dress N rates and grain yield for establishment system and cover crop combinations at the Corson Research Site during the 2024-25 season.

Rather than applying a standard nitrogen rate across all paddocks, soil testing allows nitrogen inputs to be matched more closely to crop demand and soil nitrogen supply. The 2024-25 results highlight the potential for mineral N and PMN testing to improve nitrogen use efficiency, reduce fertiliser costs, and support more profitable nitrogen management decisions.

### Maize silage production at the Jackson Research Site

#### Summary findings

- On a heavier clay soil, maize silage yield and gross margin were highest under full cultivation, intermediate under strip-till, and lowest under no-till.
- Differences between establishment systems appeared to be driven largely by maize crop establishment, with no-till having greater plant spacing variability and lower harvest populations.
- Strip-till provided a practical middle ground between full cultivation and no-till, maintaining a plant establishment similar to full cultivation while reducing cultivation intensity.
- Winter cover crop choice influenced both side-dress nitrogen requirement and subsequent maize silage yield in 2023-24 where both Min N and PMN testing were used.
- A winter cover crop mix of Hairy vetch and faba bean produced the highest silage yields while requiring the lowest side-dress nitrogen inputs in 2023-24.
- Winter management decisions can influence not only winter feed production, but also nitrogen requirements, maize yield, and whole-system profitability.

#### The effect of crop establishment method on maize silage production

The Jackson Research Site near Te Mawhai, Waikato, provided a much more challenging test of reduced tillage systems than the Corson Research Site. The site was located on a Mottled Orthic Brown Soil with a clay texture and a long cropping history. Under these conditions, seedbed quality, soil moisture, and planter performance become increasingly important for successful crop establishment.

The trial was established to compare full cultivation, strip-till, and no-till maize establishment systems in combination with a range of winter cover crops. Unlike the Corson site, where establishment conditions were generally favourable, the Jackson site provided an opportunity to evaluate how reduced tillage systems perform when soil conditions are less forgiving.

The site (Figure 4) was monitored over three growing seasons (2021-22 to 2023-24), allowing both seasonal effects and longer-term system responses to be evaluated. This provided a realistic assessment of the opportunities and challenges associated with reduced tillage maize production on heavier Waikato soils.

## Aerial view of the Jackson Research Site



**Figure 4.** Aerial view of the Jackson Research Site near Te Mawhai, Waikato.

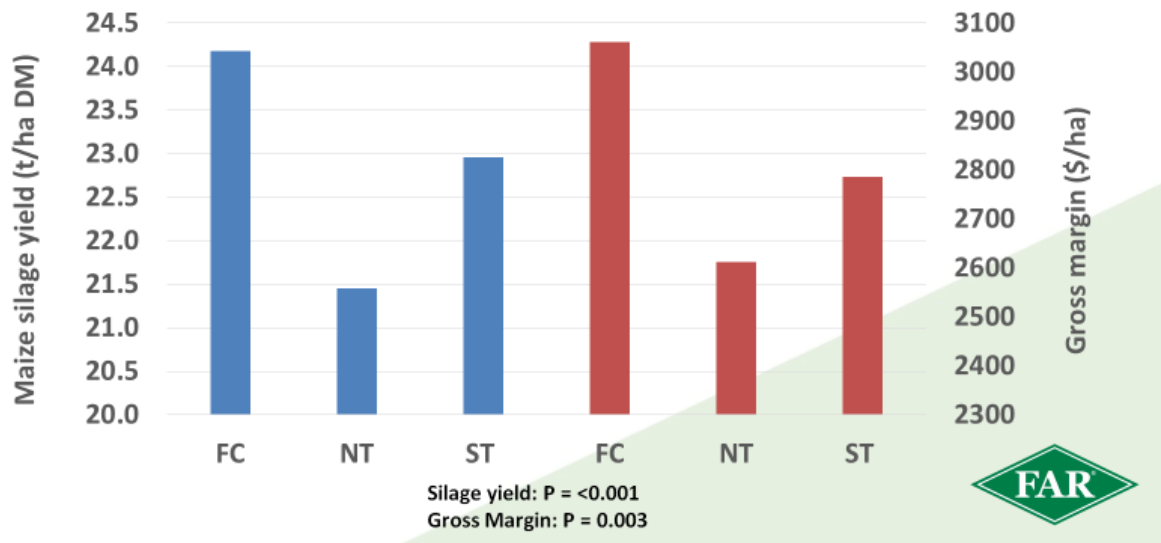
Across three growing seasons (2021-22 to 2023-24), maize silage yield and gross margin were highest under full cultivation, intermediate under strip-till, and lowest under no-till (Figure 5). However, the differences observed at Jackson were largely associated with crop establishment rather than an inherent inability of no-till systems to produce high yielding maize crops.

Plant spacing variability was greater under no-till than under either full cultivation or strip-till, while harvest populations were also lower (Figure 6). These results indicate that achieving consistent plant establishment was more challenging under no-till on this heavier clay soil. In contrast, strip-till produced plant populations and spacing uniformity comparable to full cultivation.

The Jackson results highlight the importance of matching establishment systems to soil type and management capability. While reduced tillage can be successfully implemented on more challenging soils, factors affecting plant establishment become more critical. The results also demonstrate that strip-till can provide many of the benefits associated with reduced tillage while maintaining establishment performance similar to full cultivation.

## 2021-22 to 2023-24 combined silage yield and gross margin

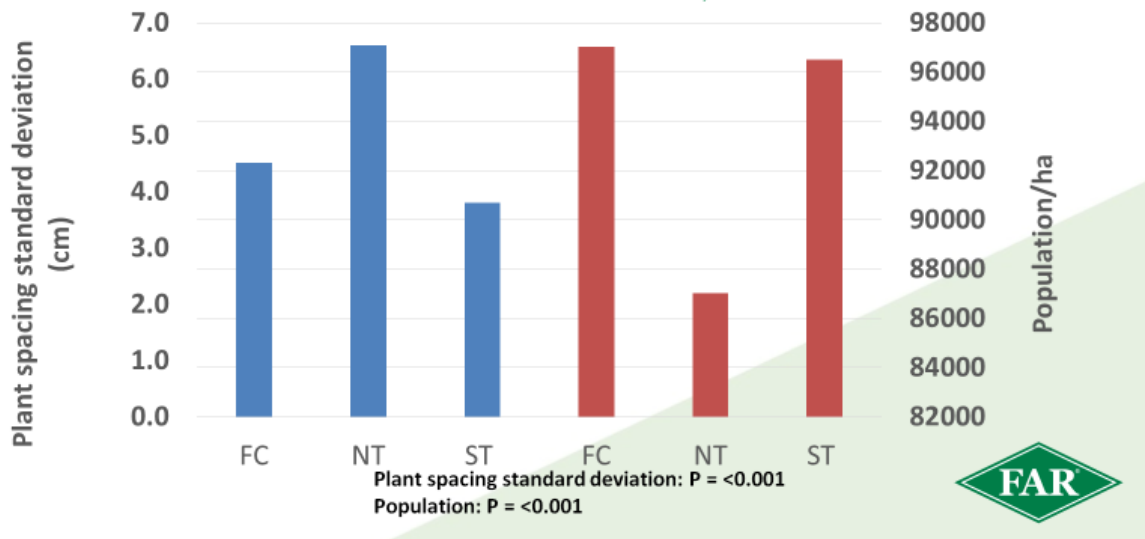
Jackson Research Site – Te Mawhai, Waikato



**Figure 5.** Combined maize silage yield and gross margin for full cultivation (FC), strip-till (ST), and no-till (NT) systems at the Jackson Research Site, Te Mawhai, Waikato, from 2021-22 to 2023-24.

## 2021-22 to 2023-24 combined plant spacing standard deviation & harvest population

Jackson Research Site – Te Mawhai, Waikato



**Figure 6.** Combined plant spacing standard deviation and harvest population for full cultivation (FC), strip-till (ST), and no-till (NT) systems at the Jackson Research Site, Te Mawhai, Waikato, from 2021-22 to 2023-24.

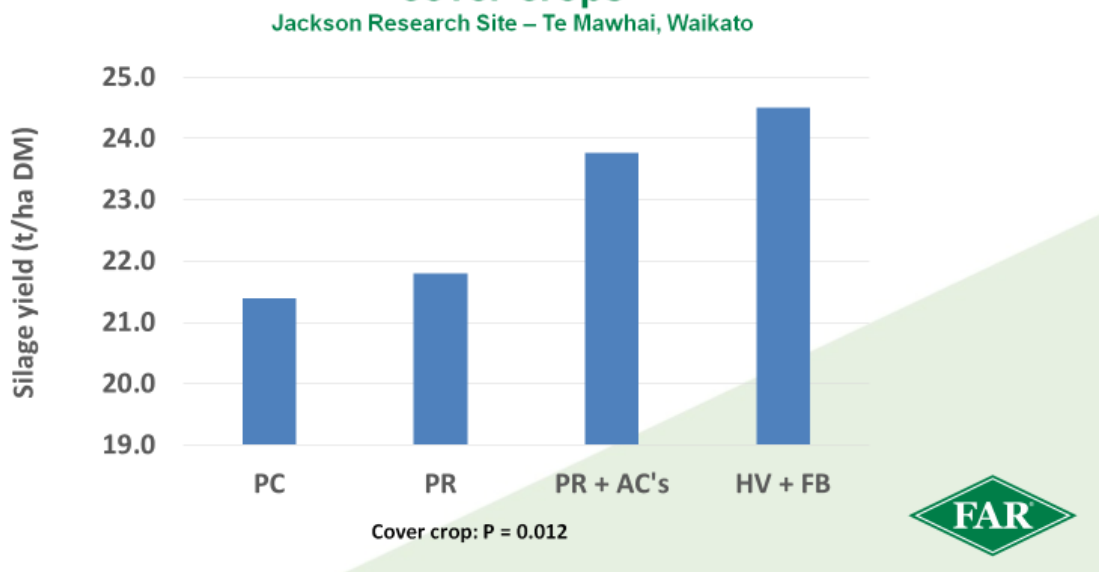
### Winter cover crop effects on maize silage production

Winter cover crop choice influenced subsequent maize silage yield and profitability at the Jackson Research Site (Figure 7). When results were combined across the three years of the trial, maize following a mix of hairy vetch and faba bean (HV + FB) and a mix of perennial ryegrass plus annual clovers (PR + AC's) generally produced greater silage yields and gross margins than maize following perennial ryegrass (PR) or perennial clover (PC).

Winter cover crop selection influenced the performance of the following maize crop, demonstrating that winter management decisions can have important implications for the profitability of the entire rotation. However, responses were not consistent across all years. In the first two seasons, cover crop effects on maize silage yield were relatively small, whereas in the third season maize following HV plus FB produced significantly greater silage yields than maize following PC and PR, with PR plus clovers intermediate.

Results from this trial indicate that growers should consider both the value of the winter cover crop itself, such as winter feed or silage production, and its effect on the subsequent maize crop. While HV plus FB and PR plus clovers produced some of the strongest overall system performance in this study, additional years of data would increase confidence in the consistency of these responses. Their fit within commercial dairy systems, including grazing management, feed demand, timing, and practicality, also requires further evaluation.

### 2021-22 to 2023-24 combined silage yield following different cover crops



**Figure 7.** Effect of winter cover crop treatment on subsequent maize silage yield at the Jackson Research Site, Te Mawhai, Waikato, averaged across three seasons (2021/22 to 2023/24).

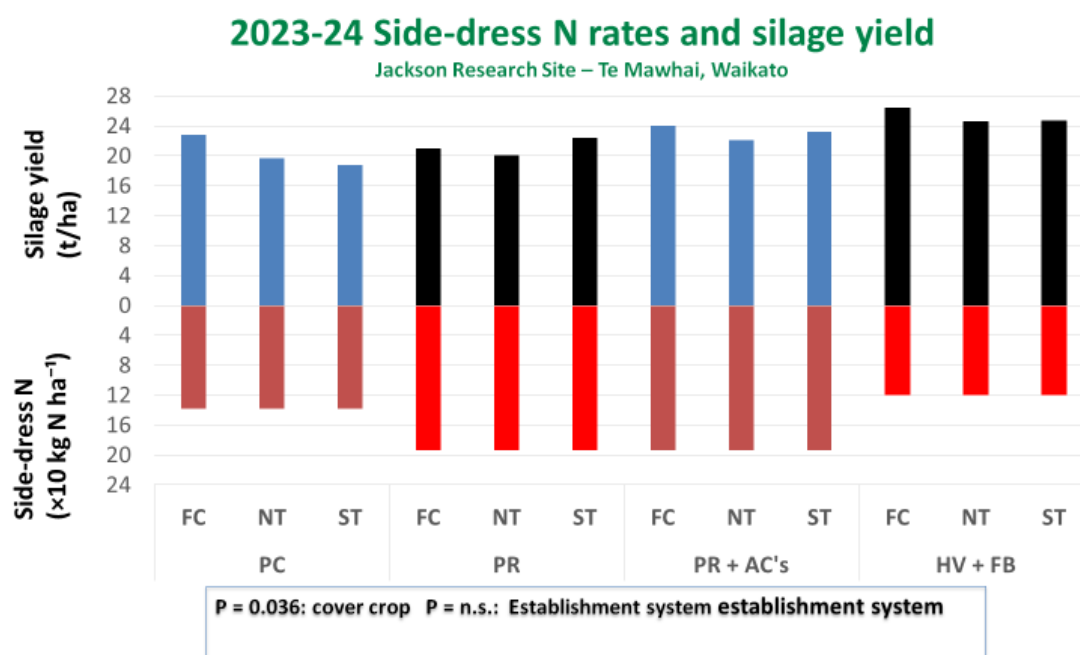
### Winter cover crops, nitrogen requirement and silage yield

Nitrogen requirements for the 2023-24 season were estimated using mineral N and potentially mineralisable nitrogen (PMN) soil tests. These measurements were used to calculate side-dress nitrogen requirements for each cover crop treatment.

Recommended side-dress nitrogen rates differed substantially among cover crop treatments (Figure 8). Hairy vetch plus faba bean (HV + FB) required the lowest nitrogen inputs, while perennial ryegrass (PR) and perennial ryegrass plus clovers (PR + clovers) required the greatest nitrogen inputs. Perennial clover (PC) was intermediate.

Differences in winter cover crop treatments were associated with both nitrogen requirement and subsequent maize silage yield. Hairy vetch plus faba bean (HV + FB) produced the highest silage yields while also requiring the lowest side-dress nitrogen inputs. In contrast, perennial ryegrass (PR) required greater nitrogen inputs but produced lower silage yields.

These results highlight the potential for cover crop selection to influence both nitrogen fertiliser requirements and maize crop performance. Consequently, winter cover crop decisions can affect not only winter feed production but also nitrogen management and the profitability of the following maize crop.



**Figure 8.** Maize silage yield and side-dress nitrogen rates following perennial clover (PC), perennial ryegrass (PR), perennial ryegrass plus clovers (PR + clovers), and hairy vetch plus faba bean (HV + FB) cover crops under full cultivation (FC), strip-till (ST), and no-till (NT) establishment systems at the Jackson Research Site, Te Mawhai, Waikato, during the 2023-24 season.

### Reduced Tillage Decision Support

Experience gained during this project highlighted the importance of paddock selection, planter setup, residue management, and crop monitoring when implementing reduced tillage systems. The decision tree presented in **Figure 9** was developed as a practical guide to assist growers in identifying factors that should be considered before transitioning to strip-till or no-till maize establishment systems.

**Decision Tree for Reduced Tillage Maize planting.**

**Is the paddock the right paddock?**

My paddock is a heavy clay soil type

No  Yes 

This soil type may not be suitable for reduced tillage.

My paddock has areas of compaction

No  Yes 

Remove areas of compaction before reducing tillage.

My paddock is poorly drained

No  Yes 

Fix the drainage problems before reducing tillage.

There are persistent perennial weeds, such as docks, convolvulus, couch grass

No  Yes 

Deal to persistent perennial weeds.

My paddock is covered with trash from the previous crop

No  Yes 

Mulch and spread crop trash at harvest.

**Is the planter set up for no-tillage establishment?**

**Does the planter have**

Residue removers  yes  no

Double disc openers  yes  no

Reduced inside diameter gauge wheels  yes  no

Press wheels modified with a spin tillers  yes  no

Chains  yes  no

Is the planter set-up for the soil type and paddock conditions on the day?

Am I prepared to monitor the crop during establishment for pest damage?  yes  no

**Figure 9.** A decision tree to assist growers in identifying factors that should be considered before transitioning to strip-till or no-till maize establishment systems.

### **Practical outcomes and conclusions**

Results from this project demonstrated that reduced tillage maize establishment systems can successfully be implemented in Waikato maize production systems; however, outcomes are strongly influenced by soil type, paddock conditions, and management.

At the Corson Research Site, grain yields and gross margins were similar under full cultivation, strip-till, and no-till, demonstrating that reduced tillage systems can perform well on suitable soils. At the Jackson Research Site, reduced tillage systems were more challenging to implement, with no-till showing greater plant spacing variability, lower harvest populations, and lower average silage yields. Nevertheless, the performance achieved under no-till demonstrates that reduced tillage remains a credible option where growers are prepared to invest time in learning and refining management.

Strip-till consistently provided a lower-risk pathway to reducing cultivation intensity, combining many of the advantages of reduced tillage with crop establishment performance similar to full cultivation.

Cover crop selection influenced both maize yield and nitrogen requirements, highlighting the importance of considering the whole cropping system rather than individual crops in isolation. A mix of Hairy vetch plus faba bean and perennial ryegrass plus clovers generally provided some of the strongest overall system performance.

The use of mineral N and potentially mineralisable nitrogen (PMN) testing allowed side-dress nitrogen applications to be better matched to crop demand and soil nitrogen supply. Combined with reduced cultivation intensity, this approach has the potential to improve profitability while reducing fertiliser inputs.

### **Acknowledgements**

FAR acknowledges David Densley (former FAR maize manager) and the trial hosts Corson Grain and Colin Jackson for the establishment and ongoing management of these trial sites.

## Winter cover crop nitrogen supply to maize silage

Sam McDougall (FAR)

### Key points

- The three winter cover crops contained the same amount of nitrogen (N) in crown and root material worked into the soil before maize planting.
- Legumes supplied 37 kg N/ha more than Annual ryegrass to maize during the season. Fertiliser N can be reduced accordingly.
- Tick bean and Crimson clover fixed 232 and 139 kg N/ha respectively from the atmosphere
- The tick bean system (289 kg N/ha) supplied the greatest annual N, followed by Crimson clover (202 kg N/ha). Annual ryegrass supplied the least (55 kg N/ha).

### Background

Good nitrogen (N) management is critical for crop profitability. Nitrogen fertiliser is a significant input cost in maize silage cropping systems, with supply and prices often subject to volatility, while its use also poses environmental risks. Winter cover crops have the potential to supply substantial amounts of N to maize silage cropping systems, reducing fertiliser costs and minimising environmental nitrogen losses. Improving our understanding of how to effectively use winter cover crops as a nitrogen source would support their potential value.

A trial was undertaken to develop further understanding of the N value of winter cover crops to maize. The aims were to understand cover crop N accumulation and partitioning, and how much becomes available to a subsequent maize silage crop.

### Methods

The trial was established at FAR's Northern Crop Research Site near Hamilton in Waikato. Three winter cover crops were direct drill established along with a Fallow treatment on 27 March 2024 (Table 1).

The soil had an organic matter level of 3.3% in the top 30 cm. The summer of 2024-25 was dry, with the months of December, January and February producing less than 50% of the long-term mean rainfall.

The soil had low detectable quantities of mineral N ((Min N) 27 kg N/ha, 0-90 cm) at the time of winter treatment establishment. Low soil Min N conditions were used to enable assessment of N fixation, soil N scavenging and soil N mineralisation. No N fertiliser was applied to the winter treatments.

After cover crop assessments (9 September 2024) the shoot (above 7.5 cm) material was mown and bailed off from the trial area as is typical in a maize silage system. Following cover crop removal, the trial area was disked and power harrowed.

**Table 1.** *Winter cover crop treatment information.*

Winter treatments	Cultivar	Seeding rate (kg/ha)	Seed cost (\$/ha)	Seed treatment
Annual ryegrass	Jivet	23	127	nil
Crimson clover	unknown	12	162	Group C rhizobia
Tick bean	unknown	85	169	Group F rhizobia
Fallow (chemical)			0	

The maize (P9911) silage was planted on 16 October 2024, with 20 kg N/ha applied as starter fertiliser (170 kg/ha YaraMila Complex). Maize silage dry matter (DM) sampling was undertaken on 19 February 2025.

Soil mineral N (0-90 cm depth) and crop tissue C and N testing were undertaken at three points over the year; with a start (end of March 2024), middle (mid-September) and final assessment (mid-February).

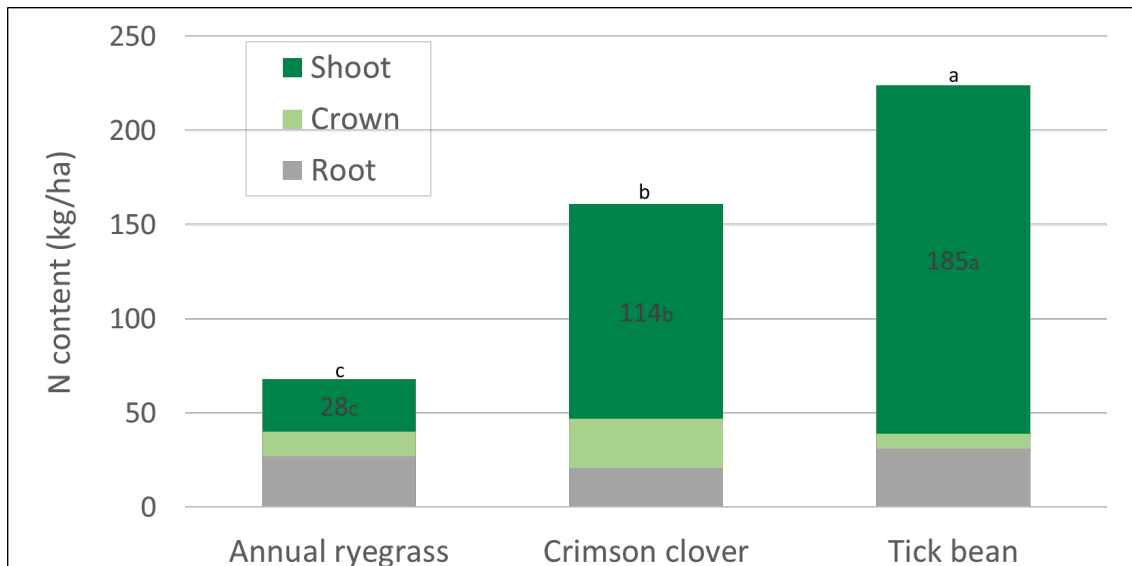
Desktop N supply calculations were made to determine legume N fixation. Cover crop total N and change in soil Min N were combined to determine N supply. These results were compared with the Fallow treatment to determine estimated N fixation.

## Results

### Winter cover crop DM and N partitioning

Tick Bean ((TB) 8.4 t/ha) produced the most shoot DM. Annual ryegrass ((AR) 2.4 t/ha) and Crimson clover ((CC) 3.4 t/ha) produced the same amount of shoot biomass statistically. The root and crown of AR produced twice the DM of the other two cover crops.

All three cover crops had the same crown and root N content,  $42 \pm 2.8$  kg N/ha (Figure 1). Tick bean had the greatest shoot N content.



**Figure 1.** Cover crop N content of shoot, crown and roots, assessed 9 September 2024.

#### Legume atmospheric N fixation

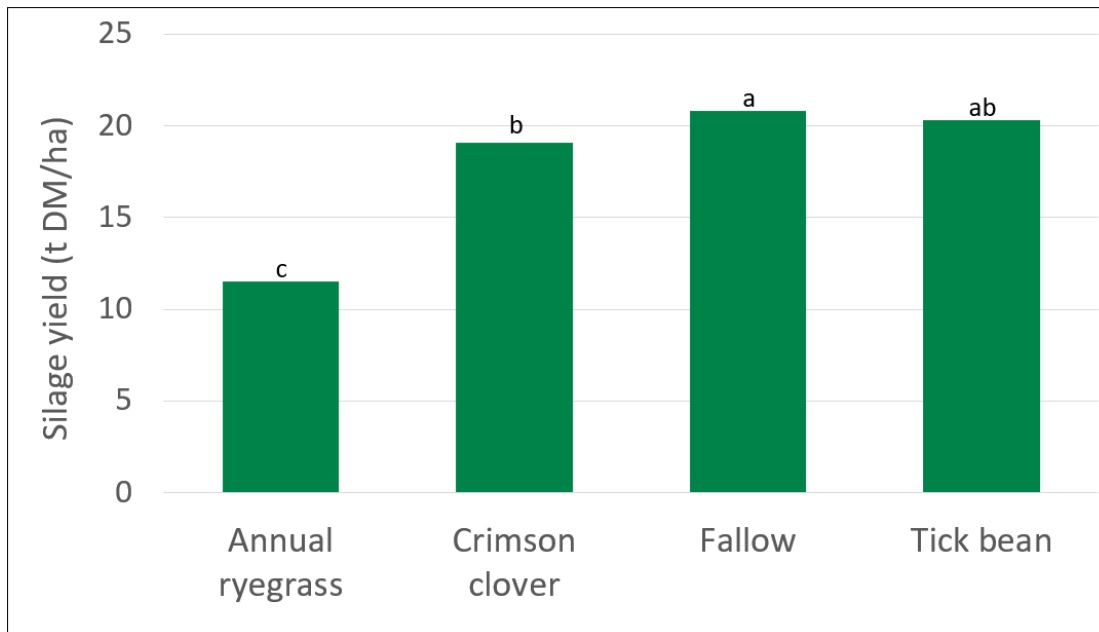
Using the N test results, atmospheric N fixation was estimated to be 232 kg N/ha by TB and 139 kg N/ha by CC.

#### How cover crops affected N supply to subsequent maize

Available soil N: Pre-maize soil Min N in treatment plots was different ( $P < 0.001$ ) quantities. Fallow had the greatest soil N (67 kg N/ha), followed by TB (51 kg N/ha), next CC (37 kg N/ha). AR (12 kg N/ha) had the least. It is thought the main driver was differences in cover crop N scavenging rates. Annual ryegrass prioritises N scavenging while the legumes switch some of their resources into N fixation as soil N becomes less available.

Crown and root residue N availability: Winter cover crop crown and root biomass remained in the paddock providing a potential source of N to subsequent maize. As all three cover crops had the same crown + root N content one might think the residue N supply to maize would be the same. However, the legumes released more N than AR. This is thought to be due to residue C/N ratio.

Maize after Fallow and TB produced the greatest biomass ( $20,555 \pm 362$  kg DM/ha) (Figure 2). Further, Maize after Fallow (20,830 kg DM/ha) produced more DM than after CC (19,055 kg DM/ha). Maize after AR accumulated the least (11,480 kg DM/ha).



**Figure 2.** Maize silage dry matter yield following four winter treatments.

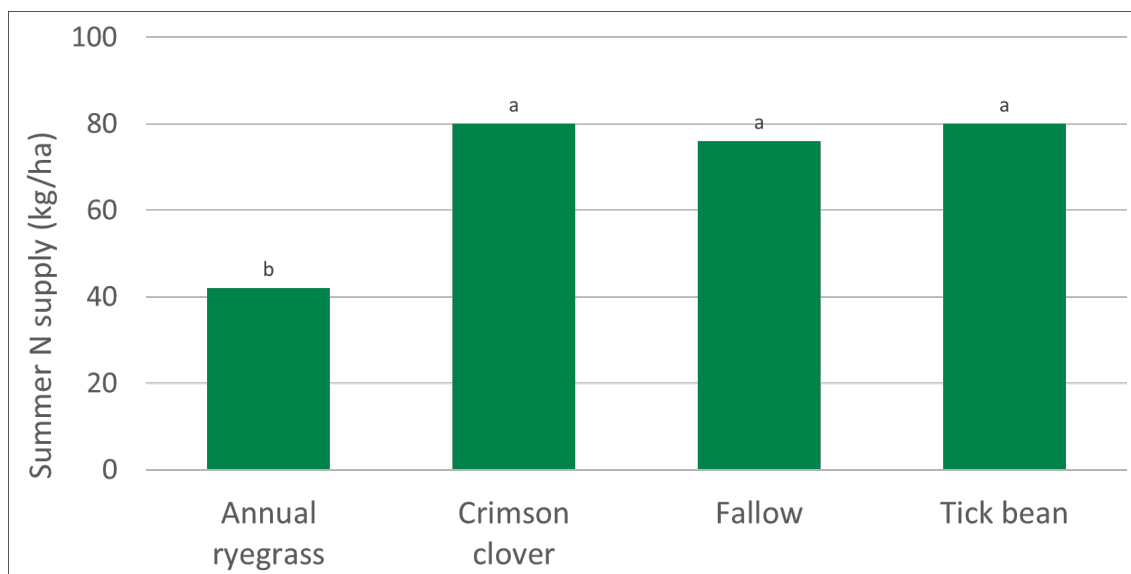
**How did Fallow yield so well?**

Fallow yielded more than 20 t/ha with just 20 kg N/ha applied to the maize. Basically, this shows how much N became available from the soil in one year. Leaching appears to have been minimal in this trial, so the majority of N made available through winter was also available to the maize.

**What’s going on with Annual ryegrass?**

It appears C:N ratio is the key. Relatively high C/N ratio (56) of AR crown + root material reduced N availability. Residues with C/N ratios of 20-25 are moderate and may or may not result in N tie up. The AR residue was more than double the 20-25 figure, this led to N tie up and reduced N availability to the maize. The CC and TB crown + root C/N ratios were both between 20-25, therefore, they are thought to have moderate effects on N tie up.

Less N was supplied to maize silage following AR (42 kg N/ha) compared with the other three treatments (79 ± 5.51 kg N/ha) (Figure 3). This difference of 37 kg N/ha represents the additional N supplied by legumes compared with AR, and is the amount maize silage N fertiliser applications could be reduced by.



**Figure 3.** Nitrogen supply (accounts for maize silage N, change in soil Min N and fertiliser N (20 kg/ha)) over the maize season following four winter treatments.

### The value proposition of winter cover crops in a baled winter crop system

The cover crop and maize phases of the trial can be combined to provide a trial N supply. Tick bean (289 kg N/ha) supplied the greatest annual N, followed by CC (202 kg N/ha) and AR (55 kg N/ha) the least. Using urea prices from May 2026, these are values of \$740, \$517 and \$141/ha respectively, providing a strong value proposition.

### Cover crop properties

An overview of cover crop properties from this study are outlined below.

*Table 2. Cover crop properties overview.*

Cover crop	Winter DM production	N fixation	Soil N Scavenging	Pre-maize soil Min N	Summer N supply	Annual N supply
Annual ryegrass	Medium	Nil	High	Low	Low	Low
Crimson clover	Medium	High	Medium	Medium	Medium	Medium
Tick bean	High	Very high	Medium	Med/high	Medium	High

### A warning about growing tick bean

Growing annual ryegrass around maize silage is more of a known quantity compared with legumes. Growing the legumes in this trial while maintaining good feed values is a further challenge. In particular, maintaining feed quality in TB is difficult. In this trial, by harvest the feed quality was moderate largely due to the long woody stems. Another challenge was chocolate spot (*Botrytis fabae*); in this trial a fungicide was applied for control which adds to input costs.

**Would the results be different in higher soil Min N situations?**

Under higher soil Min N conditions, typical of maize silage systems it is expected there would be some differences. Legume N fixation could be less, as they utilise the available soil N, and AR root systems may not be as large as it is thought roots are increased to improve N scavenging in low N conditions. These changes would have impacts on N supply. This trial work has been useful to understand N availability in more controlled low soil Min N conditions.

## Fall armyworm and volunteer maize: a winter risk worth monitoring

Ashley Mills (FAR)

As winter begins, an important question for maize and sweetcorn growers is whether fall armyworm (FAW) can survive locally and contribute to infestations the following spring.

Unlike many temperate insect pests, FAW does not enter a true diapause, or hibernation stage. Survival depends on access to suitable host plants and environmental conditions that allow continued development. This means green host plants present through winter may help support local populations.

During the 2025–26 season, high numbers of adult moths have been detected in pheromone traps after maize harvest. While trap catches do not confirm overwintering, they indicate substantial late-season activity and highlight the need to better understand where FAW may persist during winter.

### Volunteer maize as a green bridge

Volunteer maize is one of the most likely hosts to support FAW between cropping seasons. It is a preferred host and can remain green for extended periods following harvest, particularly where grain losses occur or winter conditions are mild.

One challenge is that FAW infestations are not always obvious. Small volunteer plants can appear healthy despite harbouring larvae within the whorl. For this reason, destructive sampling is important. Pulling plants apart and inspecting the growing point and leaf whorl is often the best way to detect FAW activity.

Volunteer maize is unlikely to support the entire overwintering population. Other hosts, including kikuyu, ryegrass and other grasses, may also contribute. However, volunteer maize is easy to identify and provides a useful indicator of local FAW activity.

### Reducing risk

Reducing grain losses at harvest is one of the most effective ways to minimise volunteer maize populations. Early control of volunteer plants can reduce the availability of suitable hosts through autumn and winter.

Where cultivation is used, soil disturbance may also reduce the survival of FAW pupae by exposing them to weather and natural enemies.

### Scouting is key

Regular scouting remains the most important management tool. Monitoring volunteer maize throughout winter, particularly in warmer regions, can provide an early indication of local FAW survival.

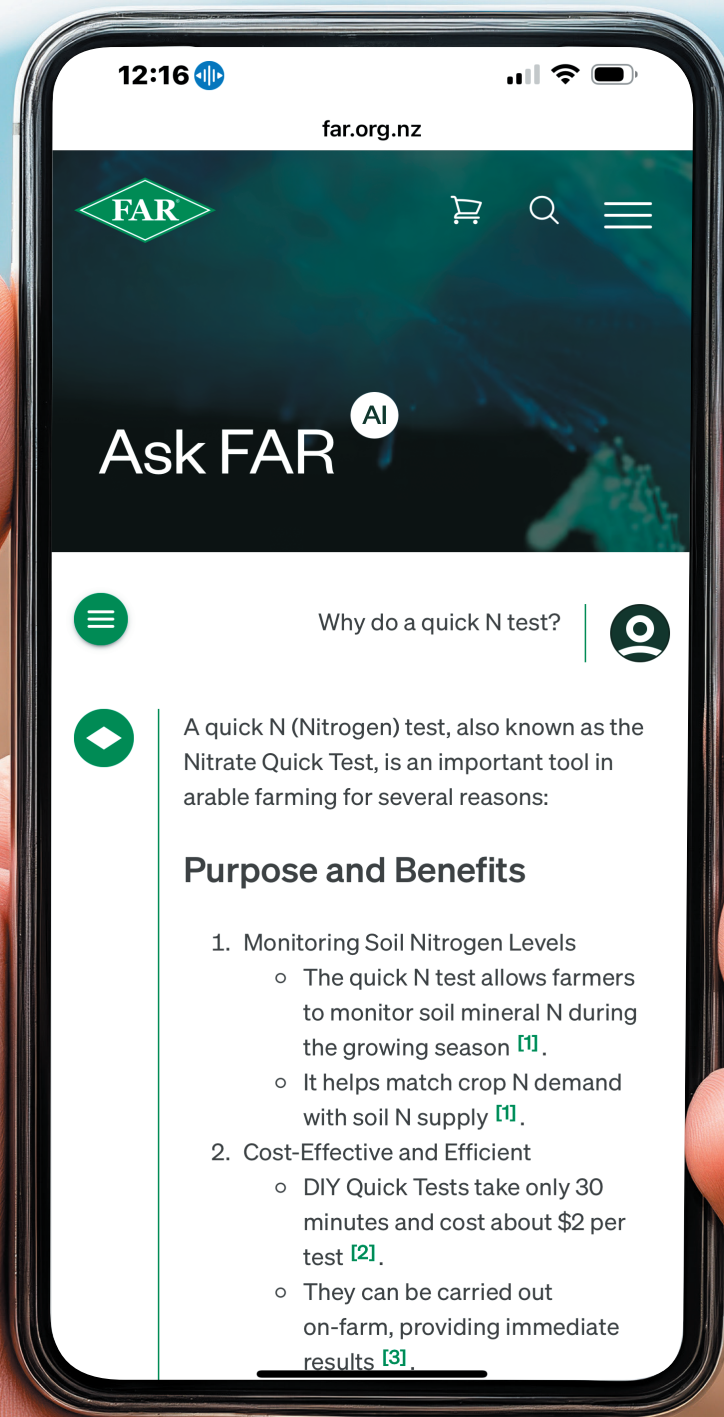
This is especially relevant for sweetcorn growers. In some regions, planting begins as early as August, and FAW has previously been detected under sweetcorn cloches during late August and early September.

As research continues, volunteer maize should be viewed as an important indicator host. Winter scouting may provide valuable insight into the level of FAW pressure growers might expect in the coming season.



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**Notes:**

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Foundation for Arable Research  
PO Box 23133, Hornby  
Christchurch 8441

Phone: 03 345 5783  
Email: [far@far.org.nz](mailto:far@far.org.nz)

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