Case study:

Trap cropping in sweet corn, Spring 2025

August 2026 / version 1

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Summary:

This case study shares the integrated pest management approach (IPM) taken in successfully harvesting a sweet corn crop using trap crops as a control strategy for green vegetable bug (GVB).

Introduction

This report presents the spring 2025 sweet corn trial, in which trap cropping was used as the primary component of an Integrated Pest Management (IPM) strategy for green vegetable bug (GVB), *Nezara viridula*. The approach aimed to reduce GVB pressure within the sweet corn by using a more attractive sacrificial host to intercept and draw adult bugs away from the crop. As there are currently no chemical options available in New Zealand that provide adequate control of GVB, the trial assessed whether trap cropping could provide sufficient control as a stand-alone management strategy. The spring 2025 trial builds on the previous season's work, with the system refined using the observations and outcomes from the earlier planting.

Crop overview

This section summarises crop development and the seasonal conditions experienced during the spring 2025 sweet corn planting. The crop was established in an early sowing window and developed under generally favourable growing conditions. Overall insect pressure was moderate, with caterpillar species accounting for most of the pest activity observed. Green vegetable bug pressure remained very low throughout this early production period.

Despite the low level of green vegetable bug pressure, the trap crop appeared to contribute to management of the pest, indicating that the approach may still provide value in lower-risk planting windows. The sweet corn crop was harvested successfully, with expected yield and market quality achieved across the block.



Trial layout showing the trap crop beginning to flower around the perimeter, the bare-soil buffer, and the sweet corn crop in the centre (10 December 2025).



Annual flower strip adjacent to the trap crop, showing the different floral species present within the two planting mixes (18 December 2025).

Crop details

The sweet corn variety *Cumberland* was sown on November 1, 2025. Seeds were treated with a standard fungicide and insecticide coating: fludioxonil, metalaxyl-M, carboxin, thiram, imazalil , and imidacloprid. Harvesting began on February 7, 2026 and was completed over three days.

Trap crop design and purpose

The trap crop was designed to attract adult green vegetable bugs into a flowering and seed-forming plant mix established around the perimeter of the sweet corn block. The intention was for adult bugs to settle and feed within the trap crop rather than continuing into the sweet corn. Green vegetable bug adults are particularly attracted to trap plants while seed tissue is forming and filling, which coincides with the kernel development stage when feeding damage to sweet corn is most significant.

This was the second season in which the trap-cropping system had been used. Although the spring 2025 crop was planted in an earlier production window than the previous trial, a mixed-species trap crop was again selected to extend the overall flowering and seed-filling period. The aim was to maintain attractive host material through the key sweet corn kernel development period and into harvest.

The exact flowering and seed development timing of each species within the new sowing window was not fully known. Using a mixture of species therefore provided broader coverage and reduced the risk of the trap crop completing its attractive growth stages either before or after the period of greatest crop susceptibility.

Soybean (Glycine max) was removed from the mixture this season. During the previous trial, soybean growth was insufficient and the plants failed to develop enough well-filled pods to make a meaningful contribution to the trap crop. The remaining species were considered capable of providing adequate flowering and seed-forming material without its inclusion.

Adult green vegetable bugs will often enter a crop predominantly from one direction, depending on the location of surrounding host plants and other landscape features. However, the low GVB pressure recorded during the previous season did not provide a clear indication of the main direction of movement into this block. The trap crop was therefore again established around the entire perimeter of the sweet corn planting.



Trap crop in full flower, with striped sunflowers beginning to flower at the same time as the sweet corn. Weeds were beginning to establish within the bare-ground buffer, but no continuous green bridge had formed between the trap crop and the sweet corn (14 January 2026).

The purpose of the trap crop was to attract adult GVB into a flowering and seeding plant mix around the outside of the sweet corn crop, where they would settle and feed, rather than entering the crop itself.



Trap crop and sweet corn showing patchy emergence resulting from wet conditions around the time of sowing (10 December 2025).

Green vegetable bug eggs are laid onto host plants by adult females. The juvenile nymphs that emerge are wingless and initially remain close to the area in which they hatch. Their movement is largely restricted to walking, commonly through direct plant-to-plant contact where neighbouring canopies meet. Monitoring during this trial therefore focused on adult GVB, as adults are the life stage capable of flying into the block from surrounding areas and responding to the trap crop.

Movement of juvenile GVB from the trap crop into the sweet corn was further restricted by maintaining a bare-ground buffer between the two plantings. This prevented the development of a green bridge through which nymphs could move directly from connected trap-crop foliage into the sweet corn canopy.

The trap crop was direct-drilled on 31 October 2025, one day before the sweet corn was planted. It was established as a 3 metre wide strip around the full perimeter of the block, with the strip width determined by the available drilling equipment. A 1.65 metre bare-ground gap, equivalent to one formed bed width, was maintained between the inner edge of the trap crop and the first row of sweet corn.

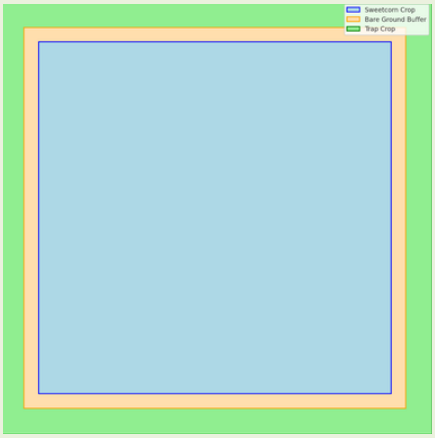
The trap-crop mixture was refined using observations from the previous season and contained:

- **Salad white mustard** (*Sinapis alba*)
- **Sunflower 'Skyscraper'** (*Helianthus annuus)*
- **Pea** (*Pisum sativum*)
- **Sorghum**
- **Striped sunflower** (*Helianthus annuus*, striped seed variety)

Monitoring details

Crop monitoring was initially scheduled on a 7-day cycle, with frequency increased when pest thresholds were triggered. At each session, 10 plants were scouted in a diagonal transect across the crop block, following standard industry practice. Spray thresholds were based on established guidelines but were refined through in-field observations to support more adaptive decision-making.

Trap crop monitoring began at early sweet corn silking and was conducted once per week. A 1 m^2 quadrat was placed in the middle on each side of the sweet corn block, positioned to include a representative mix of trap crop species. Species composition and density varied slightly between quadrats due to natural variation in seed placement during drilling.



Field layout: Sweet corn crop (in blue), with trap crop (in green) and buffer (in yellow).

Crop monitoring was initially scheduled on a 7-day cycle, with frequency increased when pest thresholds were triggered.



Quadrat setup within the trap crop used for counting adult green vegetable bugs (3 February 2026).



Howe Young with the planter preparing to sow the trap crop seed (1 October 2025).

Pest overview

Following the very low green vegetable bug numbers recorded during the previous season, the trial was moved into a spring production window to increase the likelihood of GVB activity within the block. Despite this change in timing, pest monitoring again recorded very low numbers of adult green vegetable bugs in both the trap crop and the sweet corn.

The greatest pest pressure during the season came from caterpillar species. Fall armyworm (*Spodoptera frugiperda*), tomato fruitworm (*Helicoverpa armigera*), and looper species (*Chrysodeixis* spp.) were all present within the crop. Although caterpillar pressure was more significant than GVB pressure, it remained manageable through targeted insecticide applications focused on caterpillar, and not efficacious to GVB.

Natural enemies overview

Natural enemy numbers remained low throughout the season in both the sweet corn and the trap crop. The small number recorded during scheduled scouting included several key predator groups, including Pacific damsel bugs (*Nabis kinbergii*), Tasmanian brown lacewings (*Micromus tasmaniae*), and spiders.

Additional natural enemies were occasionally observed outside the formal monitoring counts. Ladybirds were the most commonly seen of these, particularly within the trap crop.

Overall, both natural enemy abundance and diversity remained low during the season. However, natural enemies appeared to be present in slightly greater numbers within the sweet corn crop than in the trap crop. No evidence of parasitism was observed within the caterpillar population during crop monitoring.

Disease update

The crop exhibited minimal disease pressure throughout the season.

Thresholds

During this crop cycle, pest thresholds were based on two sources: *The Sweet Corn Toolkit Manual, V1 (June 2007)* and the guidelines from the FAR website for fall armyworm control in maize (*FAR Research | Fall armyworm update and management thresholds*).

Thresholds used for fall armyworm were:

- **Seedling stage**: Spray if more than 5% of plants are cut.
- **Early whorl stage (knee-high)**: Spray if more than 20% of plants are infested.
- **Late whorl stage (shoulder-high)**: Spray if more than 40% of plants are damaged and live larvae are present.
- **Tasselling/early silking stage**: In sweet corn, spray if more than 5% of plants are infested; in maize, the threshold is 20%.

No fall armyworm thresholds were triggered during the season. However, as mixed caterpillar numbers began to increase close to harvest, an insecticide application was made following advice from the grower to ensure the crop remained in harvestable condition.

Monitoring results

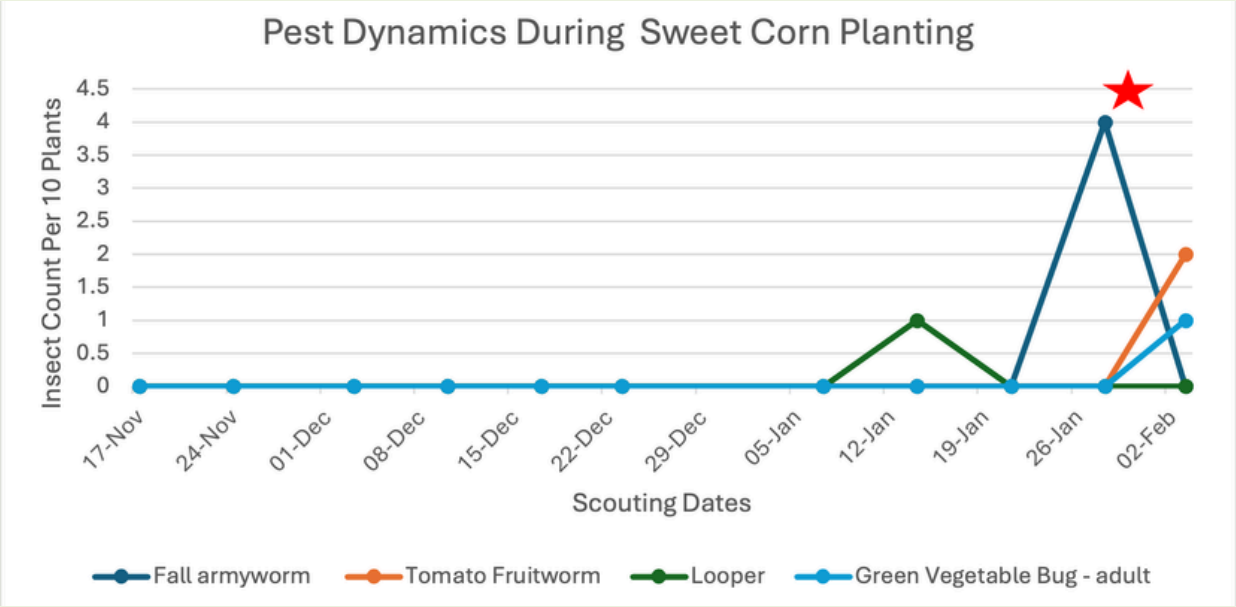
Pest and beneficial insect populations were monitored throughout the season within the sweet corn crop. Counts focused on pest and natural enemy populations in the sweet corn, together with adult green vegetable bug numbers in both the trap crop and the sweet corn rows.

Insect population dynamics in sweet corn crop

The graph shows seasonal trends in pest and beneficial insect numbers based on ten-plant scouting samples. Overall pest pressure remained very low until approximately four weeks before harvest, when fall armyworm, tomato fruitworm, and looper caterpillars began to appear and numbers increased. Beneficial insect numbers remained very low throughout the entire monitoring period.

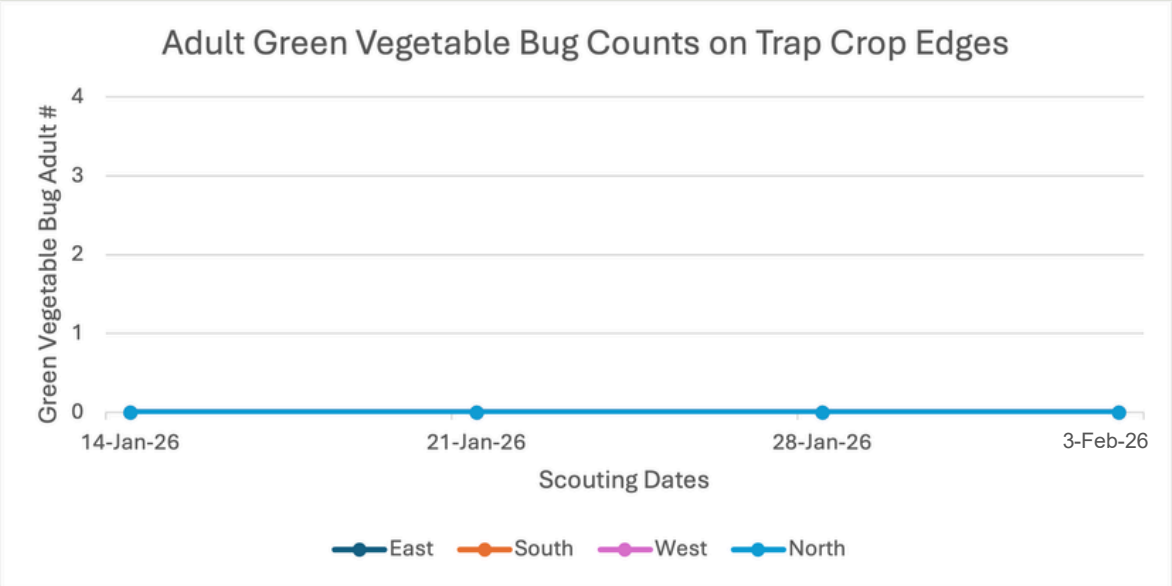
Key points are marked with symbols:

- Red stars indicate when spray thresholds were reached and scouting was intensified.



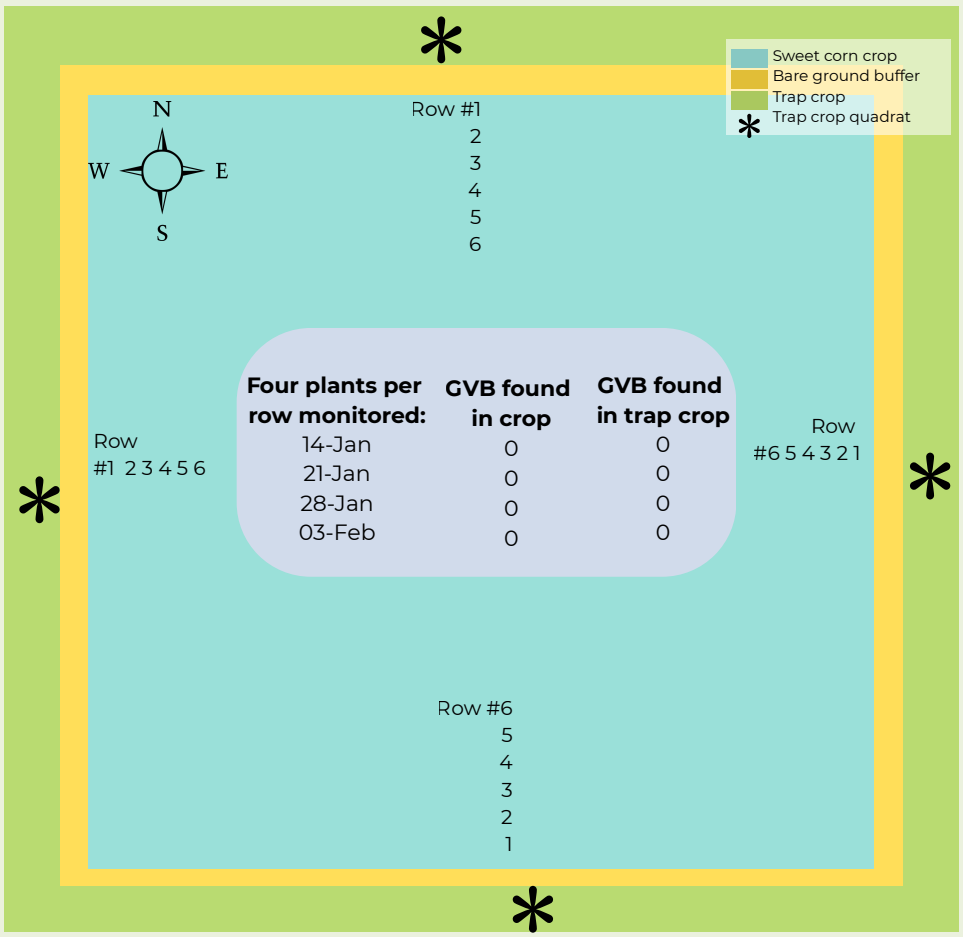
Green vegetable bug counts in trap crop quadrats

This graph tracks adult GVB found in the 1 m² trap crop quadrats placed on each side of the sweet corn block. This season there were no GVB adults found in the trap crop quadrats during the monitoring period. Due to the low overall GVB pressure, it was not possible to determine a clear directional pattern of movement into the crop.



Green vegetable bug counts in sweet corn rows behind trap crop

To determine whether GVBs were entering the main crop, six rows of sweet corn directly behind each trap crop quadrat were checked weekly. This provided a total sample of 24 plants per monitoring date. No adult GVB were recorded in these samples throughout the monitoring period.



Additional monitoring observations

No juvenile GVB were detected in the crop during any scouting session.

Although a bare-ground buffer was established to restrict juvenile movement from the trap crop into the sweet corn, field observations showed that the buffer did not remain completely clear throughout the season. Low-growing weeds were present across much of the buffer.

On January 21, 2026, the side containing the largest weeds was mown because the vegetation was beginning to develop the potential to form a green bridge between the trap crop and the sweet corn.



Sorghum, one of the trap crop species in flower.

Diversity of insect species in the sweet corn and trap crop

In addition to the core pest and beneficial species formally monitored, a wider range of insect species was recorded across both the sweet corn and trap crop areas.

These included both pest species and natural enemies, some counted during structured scouting and others observed incidentally. The following table summarises the insect diversity noted over the season, grouped by crop location and observation type.

Diversity of insect species observed in the sweet corn and trap crop:

	Pest		**Beneficial**
Monitoring	Fall armyworm	Monitoring	Lacewing - adults
Crop	Tomato fruitworm	Crop	Pacific damsel bug
	Looper		Spiders
Observed	Green vegetable bug - adult	Observed	Ladybird - adult
Trap Crop		Trap Crop	

Trap crop flowering and food resource timing

The species mix used in the trap crop provided a staggered flowering and seeding pattern, as intended. This ensured a continuous supply of floral and seed-based food resources for GVB throughout the crop's vulnerable period.

The following table summarises the flowering timeline of each species in the trap crop.

- ✿ indicates the species had flowers beginning to open or nearing completion, present but not at peak.
- ❀ indicates peak flowering.
- Seed resources remained available beyond flowering for all species listed.

Flowering periods of species used in trap crop

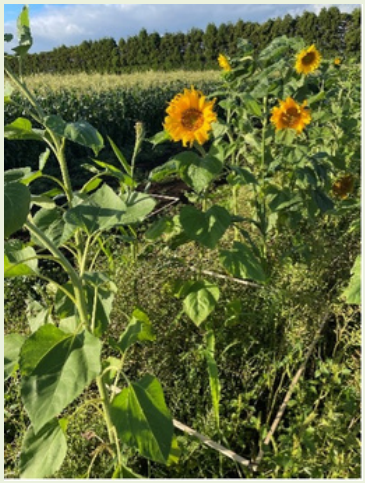
	Flowering weeks												
Plant Species	Nov	Nov	Nov	Nov	Dec	Dec	Dec	Dec	Jan	Jan	Jan	Jan	Feb
White Salad Mustard						✿	❀	❀	❀	❀	✿		
Pea							✿	❀	❀	✿			
Striped Sunflower										✿	❀	❀	✿
Sunflower (skyscraper)											✿	❀	✿
Sorghum											✿	❀	❀
Sweetcorn									✿	❀	❀	❀	❀

All species within the trap crop mix established and worked well together during the season. Given the wetter soil conditions at sowing, the mixed-species approach proved useful, as individual species performed differently across the variable ground conditions. This resulted in noticeable changes in species composition around the perimeter of the block, with white mustard becoming more dominant in the wetter, more compacted areas.

Pea, one of the trap crop species in flower.



Striped sunflower flowering in the trap crop.



Biodiversity planting impact

While the trap crop provided targeted support at the crop edge, the broader on-farm biodiversity plantings may also have contributed to reducing green vegetable bug pressure during the season.

For this crop, the biodiversity planting included an annual floral strip established along the northern side of the block on 1 October 2025. The mixture contained alyssum, buckwheat, calendula, cornflower, marigold, and crimson clover. Alyssum, buckwheat, and calendula were flowering during the sweet corn growing period.

It was difficult to determine whether the biodiversity planting had a direct effect on pest pressure within the crop, as natural enemy numbers recorded during crop monitoring remained low. However, it cannot be ruled out that the wider biodiversity plantings influenced GVB populations before the sweet corn was established, either by supporting natural enemies or affecting pest population development across the surrounding farm environment.

The contribution of the biodiversity planting therefore remains uncertain within this trial, particularly because overall GVB pressure was very low.

While trap cropping provided targeted control at the crop edge, the broader on-farm biodiversity may also have played a role in reducing green vegetable bug pressure this season.

Whole-crop summary: Pest and beneficial insect totals

Insect counts recorded within the sweet corn crop across the season included:

- Pests: 10 individuals, across five species.
- Natural enemies: three individuals, across three species.

Overall pest abundance remained low throughout the season. Natural enemy populations also remained low and did not increase substantially during the monitoring period.

Harvest

The crop was successfully harvested over three rounds, spaced approximately two days apart. No green vegetable bug damage was observed during any harvest round, and the crop met expected market quality standards.

Reducing insecticides

The sweet corn crop was grown using trap cropping as the main IPM strategy for reducing cob damage caused by green vegetable bug. Green vegetable bug pressure was extremely low throughout the season, while mixed caterpillar pressure also remained relatively low and manageable. As a result, insecticide use within the crop was minimal.

The table below outlines the schedule of fungicide and insecticide applications used on our demonstration farm crop, compared to a nearby crop treatment.

This comparison highlights our use of softer chemistry where possible, aiming to minimise disruption to the trap crop and reduce potential negative effects on natural enemies within the IPM and biodiversity framework.

Our Crop Treatment			**Nearby Crop Treatment**		
Date	Fungicide	Insecticide	Date	Fungicide	Insecticide
			22/12/2025		Tal-ken
			29/12/2025		Tal-ken
			06/01/2026		Uphold
			13/01/2026		Uphold
			20/01/2026		Tal-ken
27/01/2026		Sparta + Coda K	27/01/2026		Uphold

Conclusion

This was the second consecutive season in which green vegetable bug pressure remained very low, despite moving the trial into an earlier spring sowing window. Because so few GVB were present in either the trap crop or the sweet corn, it was not possible to determine whether the trap crop directly reduced GVB numbers or prevented movement into the crop.

The trap crop itself established and functioned well across the variable soil conditions, with no obvious changes required to the species mixture. The same trap crop mix will therefore be retained for the next season. It will also continue to be planted around all four sides of the sweet corn block, as two seasons of low GVB pressure have not provided enough information to identify a consistent direction of movement into the crop.

The current layout will also be retained. Lodging and weed growth were successfully managed, and no continuous green bridge developed between the trap crop and the sweet corn. The bare-ground buffer therefore remained functionally effective, despite some low-growing weeds being present during the season.

Pressure from fall armyworm, tomato fruitworm, loopers, and other caterpillar pests was also relatively low and remained manageable within the crop.

It was not possible to determine whether the other biodiversity plantings across the demonstration farm contributed to the low GVB pressure recorded during the season.

However, their potential influence on GVB population development before the crop was established, or through support of natural enemies elsewhere within the farm system, cannot be ruled out.

Further monitoring during seasons with greater GVB pressure will be needed to assess the contribution of both the trap crop and the wider biodiversity plantings more clearly.



Adult green vegetable bug (GVB) observed in the previous trap crop trial held during summer 2024/25. .

Acknowledgements:

Special thanks go to Tom Young and Co. Ltd for their invaluable contribution to the successful production of the crop. We also thank Howe Young of Balle Bros Ltd for his pivotal role in coordinating and supporting the operational aspects of the project, and Olivia Prouse of Cropping Services Ltd for providing technical oversight and reporting. Thank you to Balle Brothers for providing the land for this project.

Other resources

Case study: IPM and biodiversity in lettuce, Winter 2024 - here

This case study shares the crop protection approach taken in successfully harvesting a marketable winter lettuce crop using integrated pest management and biodiversity as key strategies.

Biodiverse planting on vegetables farms project - here

This project is designed to show manipulation of plant diversity on a farm can increase beneficial insect numbers and reduce the pests in a crop, meaning less use of insecticides is required.

Linked on this page are many grower resources relating to this biodiversity project, including how to guides and monitoring sheet templates.