Case study: IPM and biodiversity in lettuce, Autumn 2026

November 2026 / version 1

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Summary:
This case study shares use of Integrated Pest Management (IPM) and biodiversity to support pest management throughout the growing season of an autumn lettuce crop.

Introduction

This report details the autumn 2026 lettuce crop and the integration of Integrated Pest Management (IPM) and biodiversity into its management. The primary objective was to manage pest populations through natural control mechanisms, using increased on-farm biodiversity to reduce reliance on chemical sprays while maintaining crop health and productivity. This case study examines the effectiveness of this approach under commercial growing conditions.

Crop overview

This section provides an overview of the lettuce crop's growth and the environmental challenges it faced during the autumn 2026 season.

The autumn 2026 lettuce crop experienced a particularly difficult start, with very wet conditions at planting resulting in poor soil preparation. Planting was delayed by a week in the hope that ground conditions would improve. However, conditions remained unfavourable, and the wettest front quarter of the block could not be planted due to the planter tractor becoming bogged down. A cover crop mix was subsequently sown into this unplanted area once weather and soil conditions were suitable for cultivation and sowing.

Although conditions improved for the remainder of the crop, further rainfall events occurred throughout the growing period. Due to the poor soil conditions at planting, water remained in the lowest parts of the block for longer than would normally be expected, contributing to increased disease pressure in these areas.



The autumn-planted lettuce crop approaching harvest, with a cover crop establishing in the wet area that could not be planted in lettuce (9 June 2026).

Towards the end of the growing period, several frost events required the use of diesel burners to protect the crop from frost damage. Despite these measures, some light frost burning occurred, which may have further contributed to disease development during the final weeks of crop growth.

In spite of these challenges, the crop was successfully harvested, meeting expectations for both quality and yield.

Crop details

The lettuce variety 'Ice Helio' was transplanted on 21 April 2026. Harvesting commenced on 20 July 2026, concluding the growing cycle for the autumn 2026 crop.

Monitoring details

Crop monitoring was initially scheduled on a seven-day cycle, adjusted to more frequent intervals when scouting thresholds were triggered. During each session, 10 plants were systematically scouted in a diagonal pattern across the cultivation block, following industry guidelines. Spray thresholds were set according to these guidelines and were further refined by field experience to enhance our decision-making processes.



The lettuce crop approaching harvest, with frost protection burners positioned throughout the field (15 July 2026).

Pest overview

Very few pests were observed throughout the crop, possibly due to the wet weather conditions, despite temperatures being relatively mild for winter. There was one period when looper caterpillar populations began to increase, which was also observed in other crops in the surrounding area.

Natural enemies overview

Natural enemy populations were also very low throughout the growing period.

Disease update

The crop experienced some disease pressure from *Botrytis* and *Sclerotinia*, which was to be expected given the wet conditions at planting and the prolonged periods of water sitting in the rows. Some bacterial disease also developed towards the end of the growing period, particularly in areas where light frost damage had occurred. Despite these challenging conditions, overall disease pressure was lower than expected.

Thresholds

During this crop cycle, we utilized threshold guidelines from the Information Guide for IPM in Outdoor Lettuce (August 2007), focusing particularly on the aphid-to-predator and caterpillar thresholds. Monitoring primarily targeted the aphid threshold where the ratio of aphids to predators (excluding spiders) is calculated as follows:

Aphid/Predator Ratio =	**Total Number of Aphids / Total Number of Predators**

Based on this calculated ratio, the following actions were prescribed:

Less than 10: No action required; schedule the next scouting in 7 days.

Close to 10: No immediate action; increase scouting frequency to every 3-4 days.

Greater than 10: Apply a selective insecticide and scout again in 7 days.

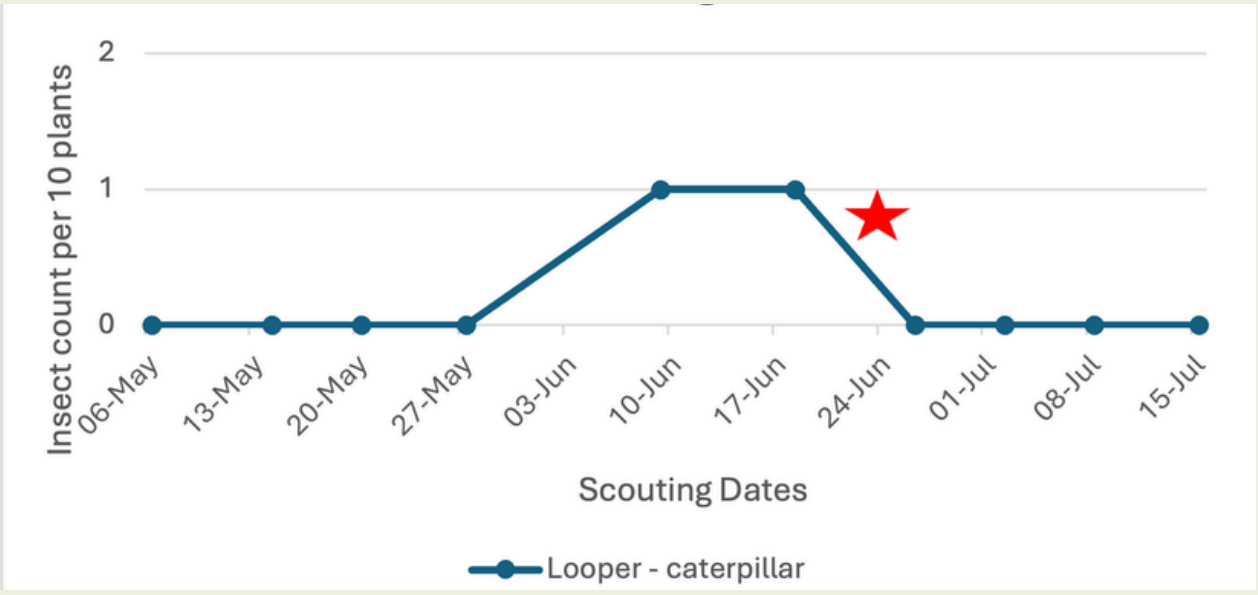
Growers' thresholds for looper caterpillars, based on market acceptability, were used for this crop.

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

Monitoring results

Throughout the growing season, we closely monitored pest and beneficial insect populations to assess the effectiveness of the IPM strategies and biodiversity enhancements. The graph below provides a visual representation of the main pests and beneficial insects observed during the two primary planting periods. Key moments when spray thresholds were reached are marked with a red star.

Pest insect dynamics during autumn lettuce planting



The accompanying table details the diversity of pest and beneficial species observed throughout the crop. This includes species recorded during routine monitoring as well as those observed incidentally. These observations provide a broader picture of the pest and beneficial populations present in the crop and help assess the biodiversity associated with the growing system.

Diversity of insect species observed in the lettuce crop

	Pest		**Beneficial**
Monitoring	Aphid	Monitoring	Spider - egg mass
	Lepidoptera eggs		
	Looper caterpillar		
	Thrips		

Biodiversity planting impact

For this crop, it was difficult to determine whether the biodiversity plantings provided any benefit. There was no annual flower mix alongside the crop, as the ground had been worked up. The permanent native planting along the front driveway had also been damaged following a herbicide spray in October, leaving very little native habitat remaining in this section. As a result, there was effectively no established biodiversity planting adjacent to the crop. No mobile pods were used during this crop cycle, as they were undergoing maintenance.

However, a cover crop was sown on 29 May 2026 in the front quarter of the block, where conditions had been too wet to transplant lettuce seedlings. This provided ground cover and protection for the otherwise bare soil. The cover crop had not begun to flower by the end of the lettuce crop, so its contribution to SNAP resources for natural enemies, particularly nectar and pollen, would have been limited.

To quantify the impact of our biodiversity efforts, the following data presents a breakdown of total insect counts and the diversity of species observed within the lettuce crop:

Pests	12 individuals across 4 species
Natural enemies	1 individuals across 1 species

These results highlight the very low pest and natural enemy populations recorded throughout the crop. With the biodiversity plantings largely absent or not yet established, it was not possible to determine whether they contributed to natural pest control during this growing period.



The young annual flower biodiversity strip beginning to establish as the lettuce crop approaches harvest (15 July 2026).

Harvest

Despite the challenging growing conditions experienced throughout the season, the lettuce crop was successfully harvested, with the final quality and yield meeting the grower's expectations.

Reducing insecticides

An aphid drench was applied at planting, and was also used in the conventional crop.

One additional insecticide treatment was applied during the crop for caterpillar control, when pest numbers began to increase.

The grower requested this application to ensure the crop remained free of pests approaching harvest, particularly as caterpillars were still being found in other crops in the surrounding area due to the relatively mild winter conditions.

The crop was successfully harvested, meeting the grower's expectations for both quality and yield.

The table below outlines the schedule of fungicide and insecticide applications made during the crop cycle, comparing the IPM-managed crop with a similar conventional crop nearby. This comparison provides an indication of the differences in chemical inputs between the two management approaches and the potential for IPM strategies to reduce insecticide use.

Demonstration crop treatment			**Nearby crop treatment**		
Date	Fungicide	Insecticide	Date	Fungicide	Insecticide
		Imidacloprid drench @ transplant			Imidacloprid drench @ transplant
07/05/2026	Intuity +Mancozeb		05/05/2026	Chief +Mancozeb	
14/05/2026	Bravo		11/05/2026	Intuity +Mancozeb	
20/05/2026	Intuity +Integralis		19/05/2026	Cavalry	
			26/05/2026	Intuity +Integralis +Champ Ion	
			03/06/2026	Cavalry +Incursus Field +Integralis	
11/06/2026	Intuity +Incursus Field +Integralis		10/06/2026	Cavalry +Incursus Field +Integralis	
18/06/2026	Incursus Field +Integralis	Sparta	16/06/2026	Sumisclex + Integralis	
			24/06/2026	Sumisclex +Incursus Field +Integralis	
			30/06/2026	Incursus Field +Integralis	

This schedule provides a comprehensive overview of the treatments applied and highlights the contrast in chemical usage between the biodiverse and conventional farming approaches.

Conclusion

Despite the very wet conditions at planting, periods of prolonged soil saturation and frost events towards the end of the growing cycle, the lettuce crop was successfully harvested, meeting expectations for both quality and yield.

The contribution of biodiversity plantings to natural pest control was likely minimal during this crop, as the established habitat was largely absent and the newly sown plantings had not developed sufficiently to provide significant resources for natural enemies.

Pest pressure remained low throughout most of the growing period, with an aphid drench applied at planting and one additional insecticide treatment required during the crop. Although the conventional crop did not require this additional treatment, the decision to apply it was influenced by increasing caterpillar numbers and the grower's requirement to ensure a clean crop at harvest.

Overall, the crop demonstrated that regular pest monitoring and an IPM approach could be maintained under challenging growing conditions, although a reduction in insecticide use was not achieved in this particular crop.

Acknowledgements:

We extend our sincere thanks to Keith Paterson and Joe Balle at JJB Produce Ltd for their contributions to the growing and management of the crop. We also thank Howe Young for his coordination and support throughout the project, and Olivia Prouse of Cropping Services Ltd for providing technical support and agronomic advice.

Other resources

Case study: Trap cropping in sweet corn, Spring 2025 - here

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

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.