How to:

Implement cover crops on your farm

November 2024 / version 1

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Summary:

A “how to” guide on implementing cover crops on your farm. This guide covers: planning, species selection, sowing rates, and maintenance. Also included are tips to help engage and educate your teams, record keeping, and some common pitfalls to avoid.

Introduction

Integrating cover crops into your farm management practices has the benefits of improving soil health and nutrition and also increasing the presence of beneficial insects and pollinators.

The aim of the cover crop is to enhance plant diversity across your fields, increasing the variety of natural enemies for effective pest management.

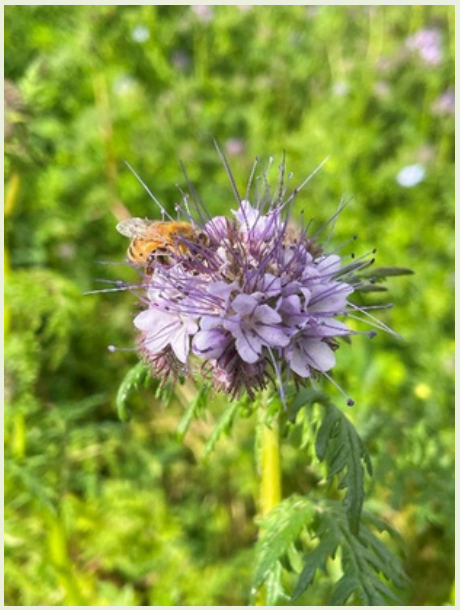
These crops provide significant floral resources, particularly during the cooler months, and can extend into warmer seasons if space allows. This helps ensure that natural enemies are available year-round.

Selecting the right mix of cover crops requires a tailored approach, considering your farm's specific conditions and needs. This might involve some trial and error to discover the most effective plant combinations for your soil health and beneficial arthropod populations.

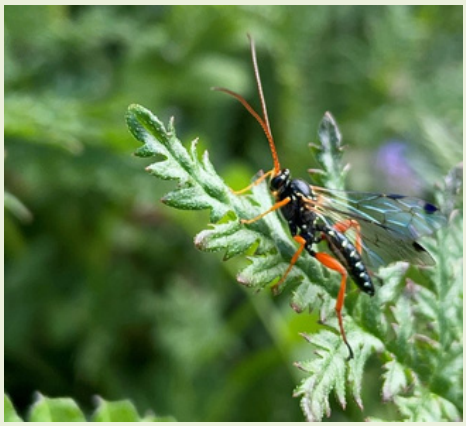
Planning your implementation

Begin by evaluating potential areas within your seasonal growing programme where cover crops could be beneficial.

Autumn through winter is often the most suitable time for planting cover crops, as this schedule aligns well with the agronomic calendar and weed ingress is lower than in spring.



A honey bee finds sustenance in a phacelia flower.

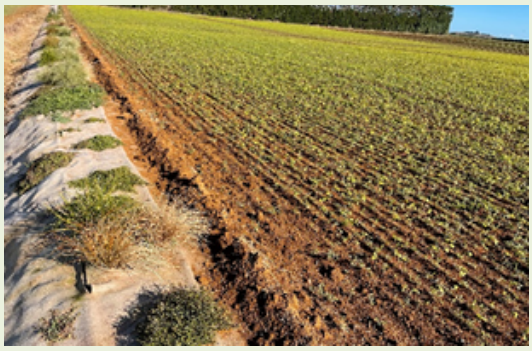


A whitespotted ichneumonid pauses on a phacelia leaf.

At the Pukekohe demonstration site, for instance, we planted cover crops on the 4th May 2023 and mulched them on the 1st November 2023. This timing was strategically chosen to maximize the ecological benefits: the cover crops provide significant floral resources during cooler months when other food sources are scarce, thus helping support a healthy population of natural enemies such as lacewings, hoverflies, and various pollinators while helping provide soil coverage from the winter rains and to help soil health for the following pumpkin crop.

To design your cover crop strategy effectively, consider both the soil health benefits and the ecological roles of the plants. Resources from specific cover crop supply companies can offer guidance on which species provide the best combination of these benefits. Furthermore, integrating additional floral resources such as native plants in permanent plantings or mobile insectaries across your farm can help enhance these ecological benefits.

For detailed guidance on implementing these strategies, please visit the A Lighter Touch website.



The beginning stages of our cover crop alongside the permanent native planting on the 25th May 2023.

It's crucial to have a diverse mix of species within your cover crops. This diversity allows the plants to naturally adapt to different soil and environmental conditions on your farm.

In optimal conditions, a broad spectrum of species will flourish, providing continuous support for beneficial organisms. In more challenging conditions, such as wetter areas, fewer species might dominate, but these will still perform essential functions by adapting to the environment and providing the desired ground cover. Plan your planting and mulching schedules with careful consideration of when beneficial arthropods are most needed in adjacent vegetable crops. The timing of mulching your cover crops should be aligned to allow mobile natural enemies to transition to your vegetable crops at critical times, thereby enhancing pest control without chemical intervention.

There are resources and projects such as that currently being run by LandWISE (Cover Crop Update - LandWISE - Promoting sustainable land management) exploring innovative approaches to timing and integration of cover crops within traditional farming systems. These insights can be invaluable in planning how to incorporate the bulk organic mass into the soil, allowing for adequate decomposition and ensuring the soil is prepared for subsequent planting cycles.

By adopting these practices, you can expect a range of benefits: improved soil health, enhanced microbial diversity, and a robust population of beneficial insects ready to protect your crops.

Selection of plant species

Choosing the right species for your cover crop involves no set rules.

When selecting species, consider the following factors:

- Leverage your own historical data and observations from past plantings to guide your choices.
- Choose species mixes that are readily available and suited to your local climate and soil conditions.
- Ensure the selected species complement the families of crops you grow to enhance your agricultural ecosystem and avoid creating pest and disease issues.
- Avoid species known to be invasive or troublesome in your area to minimise future management challenges.
- Be mindful to prevent cross-contamination with non-target seed crops in your area.
- Choose species that will improve the soil properties needed for your subsequent crops, such as nitrogen fixation or biomass production.

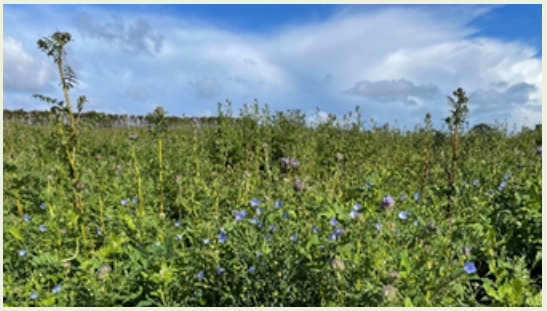
For detailed information on days to flowering, frost tolerance, and summer heat tolerance—which influence germination and survival rates—consult cover crop specialists.

This factsheet has mainly covered the biodiversity benefits of cover crops – other characteristics of cover crop species to consider include:biomass/C:N ratio, decomposition rate, root mass, adverse allelopathy effects, beneficial biofumigation effects, N-fixation, weed suppression, frost sensitivity, and volunteer weed risk.

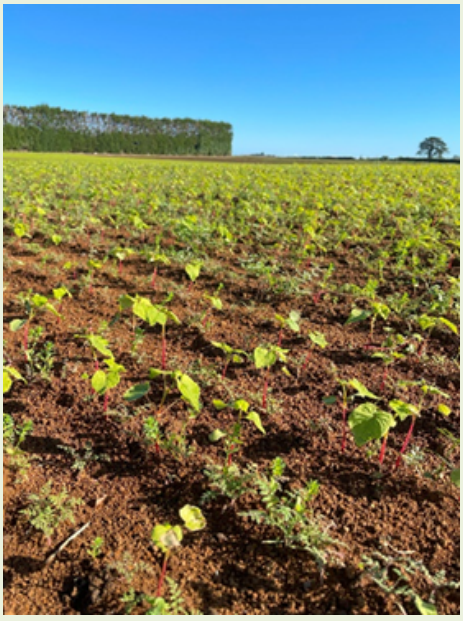
Though there are a large number of resources to draw on, a couple to start with include:

Cover Crops - Seeds & Mixes | Boost Soil Health

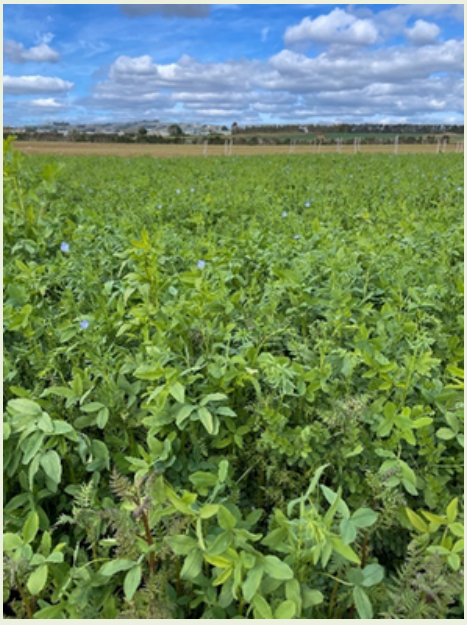
Symbiosis Agriculture – Regenerative Agriculture



Linseed flowering in the cover crop mix, 28th September 2023.



A fresh start with cover crop seedlings sprouting on the 25th May 2023.



Wetter part of the block where linseed and berseem clover were the main species that thrived.

Sowing rates

Determining the correct sowing rates is crucial for the success of your cover crops. Start with reliable sources such as cover crop suppliers, who offer detailed information on sowing rates and more. These suppliers often have expertise in both conventional and regenerative agricultural practices, and their advice can be tailored to your specific needs.

At the demonstration farm in Pukekohe, we utilised a commonly used summer cover crop mixture with the following sowing rates for each species:

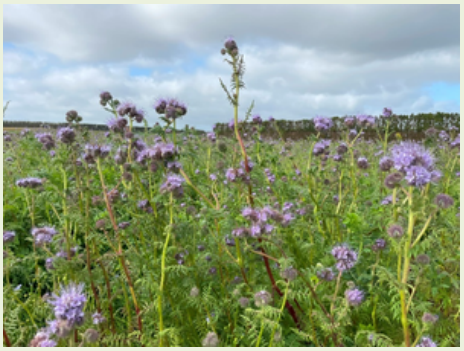
Cover Crop Annual Species	Rate – kg/ha
Buckwheat	20
Berseem Clover	5
Common Vetch	10
Linseed	5
Phacelia	10

These rates effectively suppressed weed growth while supporting the overall health of the ecosystem. It's important to note that these rates might need adjustment based on your local soil conditions, climate, and any specific requirements of your main crops.

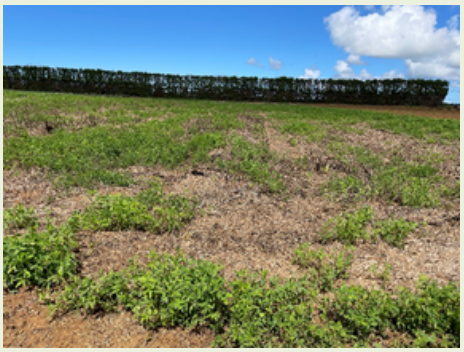
Maintenance

Effective weed management is crucial for successful cover cropping. Begin by ensuring that your planting beds are clear of weeds before sowing cover crops. This might involve mechanical cultivation or the application of herbicides, including pre-emergent herbicides to maintain a weed-free seedbed until the cover crops are established. Once the cover crops are in place, their rapid germination and growth should naturally suppress weed development by forming a dense canopy.

It is important to keep these crops free from direct applications of herbicides, insecticides, or fungicides. Care should also be taken to minimize drift from adjacent fields that are being treated with these chemicals. Determining the right timing to mulch and till the cover crop into the soil is essential. This should align with the needs for residue decomposition and the planting schedule of the subsequent crop. Ensure there is adequate time for the cover crop residue to break down before planting the next crop, as inadequately decomposed residue can impede planting and affect seedling development.



A drier part of the block where the phacelia grew well along with a mix of all the other species, 2nd October 2023.



6th November 2023, post-mulching, and some resilient cover crop survivors.

Educating your farm staff about the benefits of cover crops is essential from the outset.

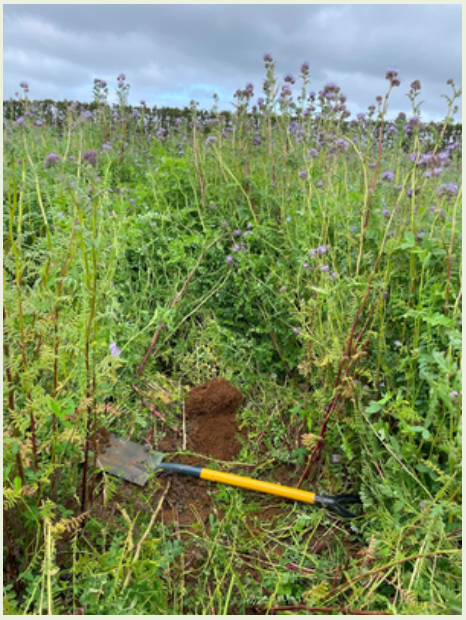
It's important that everyone involved in farm operations understands the location and significance of these floral areas.

Additionally, be mindful of the potential for some cover crop species to reseed themselves, which can complicate crop management due to their persistence into subsequent cropping cycles. Consider trialling new species on a smaller scale to evaluate their behaviour in your specific conditions. This approach helps assess how well the cover crops integrate with your cropping system and allows you to observe any unforeseen interactions or challenges.

For more detailed guidance on the timing of mulching, tilling, and other management practices, consult with cover crop specialists who can provide insights tailored to your local conditions.

Refinement and record-keeping

Maintaining detailed records is essential for the effective management of cover crops. Document key information such as sowing dates, species used, germination success, and flowering periods. This data is invaluable for refining your approach each year. Based on the performance observed and the varying environmental conditions, you may need to adjust sowing dates and species mixes to better suit your farm's needs.



Cover crop at full height as of 2nd October 2023.

Common pitfalls to avoid in cover crop implementation:

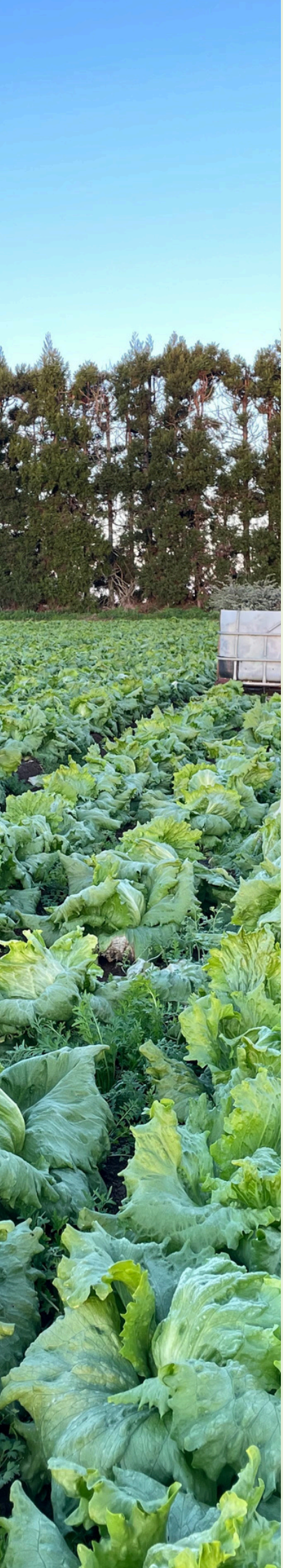
Wrong seed mix: Select a species mix that suits your farm's conditions.
Post cover crop issues: Trial various mixes to avoid issues in subsequent crops like cover crop residue breakdown being too slow to plant into or reseeding in your following crop.
Inadequate watering: Ensure seeds are consistently moist post-sowing to guarantee successful germination.
Exposing your seeds: Cover sown seeds to shield them from birds so you don't have reduced establishment levels.

Acknowledgements:

We extend our sincere thanks to Howe Young and Balle Bros Ltd for their invaluable assistance in sowing and maintaining the cover crops. We also wish to express our gratitude to Dean McMiken at Inta-Ag for his guidance in selecting the summer cover crop mix for our site. Their contributions were essential to the success of this project.

For more information:

Please visit the project page on the A Lighter Touch website by scanning the QR code or visiting https://a-lighter-touch.co.nz/our-projects/biodiverse-planting



Other ‘how to’ guides

The annual flower strips guide – here

A “how to” guide on implementing Annual Flower Strips to increase on-farm biodiversity. This guide covers: how to plan, select species, sowing considerations, and ongoing weed control and maintenance. Also included are tips to help engage and educate your teams, record keeping, and some common pitfalls to avoid.

The mobile insectaries guide – here

A “how to” guide on implementing mobile insectaries on your farm. This guide covers: planning, species selection and configuration, insectary construction, and monitoring and maintenance of insectary plantings. Also included are tips to help engage and educate your teams, record keeping, and some common pitfalls to avoid.

Other related resources

The plant species list – here

Planted to provide year round food sources, and shelter for the beneficial insects over winter. The species were also selected based on full growth size in order to avoid impeding machinery and minimise maintenance e.g., trimming.

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 other resources relating to this biodiversity project, including crop case studies sharing the crop protection approach taken in successfully harvesting vegetable crops using integrated pest management and biodiversity as key strategies.