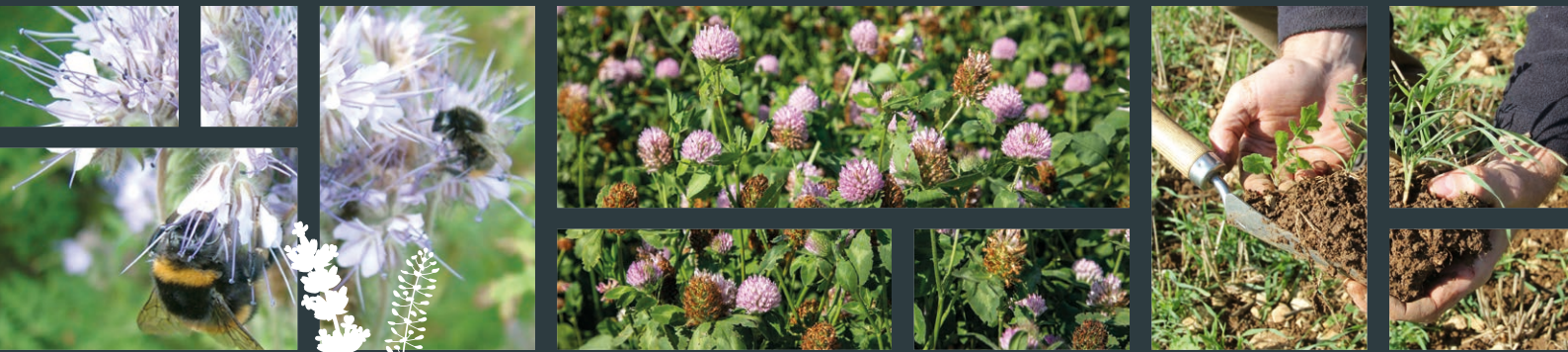
GREEN HORIZONS

EnviroMaster

Agri intelligence

# Cover Crops & Environmental Guide 2025



www.agrii.co.uk

Agrii

# Welcome to your copy of the Agrii Cover Crops & Environmental Guide 2025.

## The information within the guide is based on the results and experiences of the Agrii R&D trials into all aspects of the use of cover crops since the trials program started in 2014.

The interest in utilising catch, cover and companion crops as part of a sustainable farming system continues to increase as growers look towards minimal tillage and **improving Nitrogen Use Efficiency** (NUE) as methods to reduce establishment and input costs, also their carbon footprint whilst improving soil health and productivity in the longer term. However, the move to minimal tillage needs to be planned and managed to reduce the potential negative effect on crop yield, which remains the key driver of profitability.

The **Environmental Land Management scheme** (ELMs) and the **Sustainable Farming Incentive** (SFI) options within it offer an opportunity for growers to be supported on this journey.

Examples of supportive SFI options:

- **SAM2, CSAM2** Multi species winter cover crops – £129/ha
- **SOH2, SOH3** Multi species spring & summer catch crops – £163/ha
- **SOH4** Winter cover crop following maize – £203/ha
- **IPM3, CIPM3** Companion crops – £55/ha
- **NUM3, CNUM3** Legume fallow – £593/ha.

Within the guide you will find information on the potential benefits of catch and cover cropping, details of species and varieties, a range of summer catch, winter cover and SFI mixtures, also guidance on establishment and termination of covers and options for OSR companion crops.

**We continue with the Agrii R&D trials** to evaluate new species and varieties, establishment techniques, companion cropping, rotational SFI mixtures and soil health changes across a range of soil types to enable us to offer you the benefit of the knowledge gained.

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# What cover crops can do

## Cover crops used correctly as part of your soil management strategy can deliver the following benefits:

- **Capture and recycle nutrients** left over from the previous crop, rather than being leached away.
- **Fix** nutrients from the atmosphere in association with soil bacteria.
- **Improve soil structure** through root penetration at different depths – subject to the species used. Channels created by the roots open up the soil allowing free movement of air and water through the soil profile, even breaking up compacted layers at depth.
- **Protect the soil from erosion** by water and wind, by holding soil in place with root and foliage growth.
- **Help to suppress weed growth** either by direct competition and/or by allelopathic effect.
- **Create a large biomass of fresh organic matter** which, when returned to the soil, will release nutrients over time to the following crops through the action of the soil biota. This helps to build organic matter levels and improve soil structure, particularly in low soil disturbance establishment systems.
- **Increase the quantity of the biota** (bacteria, earthworms, fungi, insects) in the soil over time by having a growing crop and increased organic matter available for more of the year to feed them consistently. The increase in soil biota will then speed up the breakdown of organic matter, bring the carbon:nitrogen ratio into balance and make nutrients readily available to the cash crop.
- **Growing the appropriate species** and varieties of cover and companion crops for your farm rotation can help reduce pest problems, particularly soil nematodes and cabbage stem flea beetle.
- **Potential to save on cultivation costs** by direct drilling following a cover crop that has improved or maintained soil structure.
- **Encourage farmland wildlife and beneficial insects** by creating cover and a food source over an extended period.
- **Improve overall soil health**, which is the foundation for helping to promote good crop health, enhancing crop yields and farm sustainability.

- In the longer term, cover crops used as an integral part of the farming strategy will improve farm incomes and sustainability by increasing soil fertility and productivity whilst reducing input costs.
- In our own trials work we have already seen some of these benefits from the use of cover crops compared to fallowing land between cash crops.
- The key element in improving soil health and productivity in the long term, is to increase its organic matter content and maintain living roots in the soil for as much of the year as possible. This can be done by selecting the correct cover crops for your farming operation.

- **Carbon sequestration:** cover crops can have a positive long-term effect on reducing greenhouse gases through the interaction between a diverse living cover and the soil biota, which are capable of storing the carbon element within the soil structure.
- **Financial support:** by utilising the appropriate SFI scheme options to receive payments to offset the costs of cover crops.

# Why Soil Health is Important

Soil is fundamental for crop production, supporting delivery of 95% of the UK's food, and storing around 80 years' worth of GHG emissions in the form of carbon.# Soil health can be defined as the continued capacity of a soil to function as a vital living ecosystem that sustains plants, animals and humans. Healthy soils grow healthy crops that are better able to withstand disease and compete against grassweeds.

## Soil is an ecosystem that can be managed:

- A healthy soil provides a habitat for soil microbes to flourish and diversify – providing the nutrients that crops need to grow and prosper.
- Soils store two thirds of the fresh water on the planet* and this function is determined by the level of organic matter in the soil. The loss of soil biodiversity reduces its water infiltration capacity, as well as its capacity to store water, lowering food production and worsening the impact of drought.
- The carbon contained within soil organic matter represents one of the largest carbon stocks on Earth and plays a major role in mitigating climate change. In the UK our soils hold an estimated 9.8 billion tonnes of carbon.** When soil is eroded, the carbon stored in soils is lost in the form of greenhouse gases. Globally it is estimated that 26% of the carbon stored in the top one metre of soil has been lost since pre-historic times (FAO 2015).

**The 'One Health' concept** Shows the relationship between ecosystems – soils, plants, animals and human health as being closely intertwined.
(Adapted from: The soil- human health nexus. Edited by Rattan Lal, 2021.)


Harper Adams University

Agrii was one of founding partners of the Harper Adams Soil and Water Management Centre.

- A well structured soil anchors crops and plants – allowing root systems to extend downward through the soil and in turn stabilise plants so that they can grow efficiently.
- A well structured soil allows less erosion by wind or rain and reduces the likelihood of flooding due to improved porosity.
- The minerals and microbes in soils help to filter, buffer, degrade and detoxify potential pollutants – including industrial by-products and atmospheric pollution.
- Soil isn't an inert growing medium. Rather, a healthy soil is home for billions of organisms, including bacteria, fungi, insect larvae and earthworms that are the foundation of an intricate below-ground ecosystem.
- Most of these organisms – big and small – are an essential part of enhancing the nutrients that stimulate plant growth.

#Environment Agency 2019
* IUCN - www.iucn.org/resources/issues-briefs/conserving-healthy-soils
**Soil Association figures

## Further information View these documents using the links, or go to **www.agrii.co.uk/greenhorizons**, or ask your agronomist for a copy.


More information on the potential benefits of cover crops to soil health and organic matter levels can be found in **Green Horizons Insight Report 1: Improving Soil Resilience.**


The **Soil Resilience Strategy (SRS)** is Agrii's R&D-based soil strategy. Find out more in our SRS brochure.

# DEFRA – "The Sustainable Farming Incentive (SFI) offers a reliable income which supports food production and the environment."

The 2023 and 2024 SFI schemes offer a wide range of options to support farmers transition to a more sustainable farming future, some of the options include support to utilise companion, cover and nutrient building crops within farm rotations, see examples below.

IPM3, CIPM3 – Companion crops: £55/ha to establish a companion crop with the commercial crop to support an IPM approach to pest and weed management, provide habit for wildlife, manage nutrients and protect soil and improve its condition.

An example of this, which are widely used, are OSR companion crops for the reduction of CSFB damage, nutrient management and soil structure improvement. Various companion crops for cereals are under evaluation to assess their management issues and impact on cereal crop yields.

Examples of OSR companions can be found on **page 23** of this guide.

SAM2, CSAM2 – Over Winter cover crops: £129/ha to have a well established multi species cover crop in place over the winter period to protect the soil surface, reduce erosion, nutrient leaching and support soil health.

The winter cover crop mixtures within this guide on **pages 18-19** will fulfil the requirements and aims of the SAM2 option if managed appropriately.

SOH2 – Spring cover crops: £163/ha to have a well established spring sown (March-May) 4 species cover crop in place to protect the soil and improve soil health until the next cash or cover crop is sown.

SOH3 – Summer cover crops: £163/ha to have a well established summer sown (June- August) 4 species cover crop in place to protect the soil and improve soil health until the next cash or cover crop is sown.

The spring and summer cover crop mixtures can be found on **pages 15-17** of this guide with supporting information.

SOH4 – Winter cover crop following maize: £203/ha to establish a winter cover crop following maize harvest (before mid October) to protect against soil erosion, reduce water pollution and improve soil health.

The after maize cover crop mixtures can be found on **page 18** of this guide with supporting information.

NUM3 – Rotational legume fallow: £593/ha to establish a spring or late summer sown legume fallow to provide flowering plants from late spring and over the summer months to manage nutrient efficiency and improve soil health, provide food for farmland wildlife and support an IPM farming approach.

The NUM3 rotational option mixtures can be found on **pages 24-25** of this guide with supporting information.

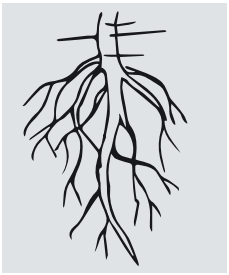
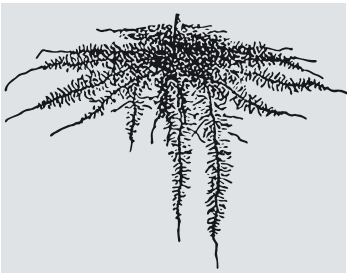
AHL2, CAHL2 – Winter bird food: £853/ha to establish a winter bird food mixture that will flower during the summer and set small seeds to provide food for birds until late winter.

The Agrii winter bird food mixtures can be found on **pages 26-27** of this guide with supporting information.

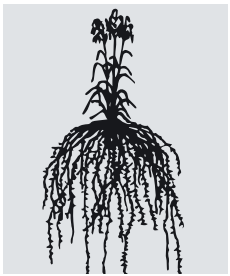
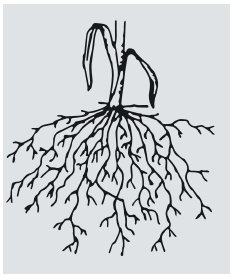
Agrii offers a comprehensive range of mixtures that meet the guidance of all the current SFI options and will add to them as new options become available. Please contact your Agrii Contact for further help and information.

Full details of SFI scheme current and future options and guidance are available from the DEFRA website.

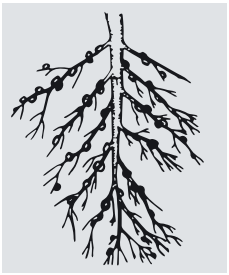
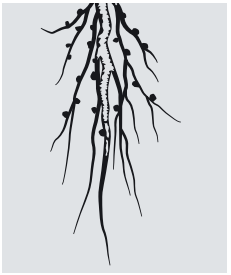
# Cover Crop varieties in detail

| | WHITE MUSTARD – CABRI | PHACELIA – STALA |
|---|---|---|
| |   |   |
| USE | NCAP EB | NCAP EB |
| DRILLING | Late summer, mid September latest. Full seed rate drilled at 12 kg/ha. Typical TGW 8 g. | Late summer drilled crops need to go in before the end of August. Full seed rate drilled at 10 kg/ha. Typical TGW 2 g. |
| HOW TO DESTROY | If late summer sown, a strong frost should destroy the crop, although root and stems will remain. In the south it may need spraying off or rolling before it sets seed. | If late summer sown a hard frost will destroy the crop, in milder conditions rolling or spraying before seed set may be required. |
| OTHER INFORMATION | + C:N ratio 30.<br>+ Reliable, very fast establishment.<br>+ Good at extracting moisture and nutrients from the upper soil profile.<br>+ Lower seed cost. | + C:N ratio 20.<br>+ Reliable, fast establishment.<br>+ Very fibrous root system down to 8 cm creating a very good soil structure in drilling zone.<br>+ Good surface nutrient capture and mobilisation, strong mycorrhizal association. |

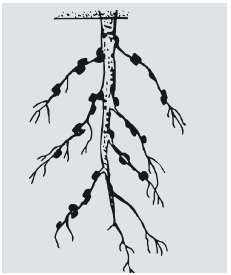
**KEY:** Soil Structure | Nematode Reduction | Weed Control | NCAP Nutrient Capture | N PROD Nutrient Production | Frost Susceptible | Grazing/ Silage | EB Environmental Benefits

| | BLACK OATS – OCEANE/LUXURIAL | FORAGE RYE – HUMBOLT/PROTECTOR |
|---|---|---|
| |   |   |
| USE |  |  |
| DRILLING | Best sown late summer, before end of August.<br>Full seed rate drilled at 30 kg/ha. Typical TGW 20 g. | Best sown from mid August until early October.<br>Full seed rate drilled at 160 kg/ha. Typical TGW 38 g. |
| HOW TO DESTROY | Black oats are frost sensitive and can die back naturally during prolonged cold periods. | Spray off in the spring or graze or silage. |
| OTHER INFORMATION | + C:N ratio 25.<br>+ Good establishment.<br>+ Large fibrous root system creates good soil structure.<br>+ Resistant to diseases, take all and good tolerance to BYDV.<br>+ Reduction of root knot and root lesion nematodes. | + C:N ratio 35.<br>+ Reliable, quick ground cover.<br>+ Extensive root system, good scavenger of nutrients, will continue to grow even in cold conditions. |

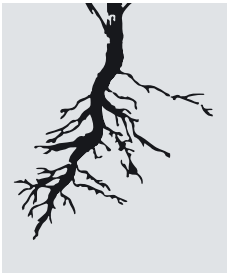
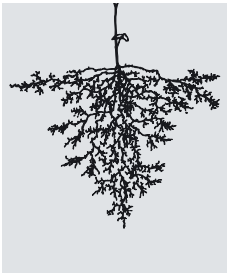
# Cover Crop varieties in detail

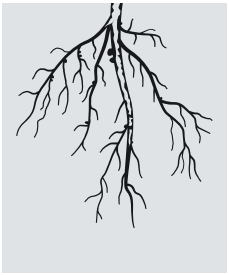
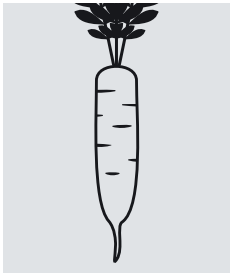
| | PURPLE SPRING VETCH – BINGO/TITANE | COMMON VETCH – AMELIA/CANDY |
|---|---|---|
| |   |   |
| USE | NCAP, N PROD, EB | NCAP, N PROD, EB |
| DRILLING | Drill before the end of August.<br>Full seed rate 30 kg/ha. Typical TGW 39 g. | Drill before the end of August<br>Full seed rate 50 kgs/ha. Typical TGW 55 g. |
| HOW TO DESTROY | Late summer sown, a strong frost should destroy the crop. | Late summer sown, a hard frost will stop growth. |
| OTHER INFORMATION | + C:N ratio 12.<br>+ Purple vetch are the fastest growing of the vetch species, which enables them to catch and fix the maximum amount of nitrogen in the limited time available.<br>+ Useful as a companion crop for OSR. | + C:N ratio 12.<br>+ Common vetch are a reliable element in mixtures capable of fixing nitrogen with medium fast establishment.<br>+ Very good strong root system to improve soil structure. |

**KEY:** Soil Structure | Nematode Reduction | Weed Control | NCAP Nutrient Capture | N PROD Nutrient Production | Frost Susceptible | Grazing/ Silage | EB Environmental Benefits

| | CRIMSON CLOVER – CEGALO | BERSEEM CLOVER – TABOR |
|---|---|---|
| |   |   |
| USE | NCAP, N PROD, EB | NCAP, N PROD |
| DRILLING | Full drill rate 15 kg/ha before the end of August. Typical TGW 5 g. | Drill before the end of August at 10-15 kg/ha. Typical TGW 3 g. |
| HOW TO DESTROY | Spray off, if not killed by frost. | Late summer sown, a strong frost should destroy the crop. |
| OTHER INFORMATION | + C:N ratio 16.<br>+ Faster establishment and good biomass.<br>+ Strong tap root and lateral roots. | + C:N ratio 14.<br>+ Tabor is a single cut variety that will not regrow if topped.<br>+ Very quick growing with a long tap root.<br>+ Useful as a companion crop for OSR. |

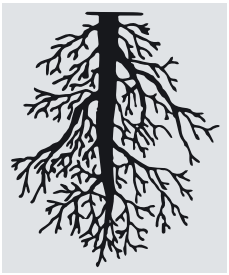
# Cover Crop varieties in detail

| | BUCKWHEAT *(FAGOPYRUM TATARICUM)* – LIFAGO | COMMON BUCKWHEAT *(FAGOPYRUM ESCULENTUM)* |
|---|---|---|
| |   |   |
| USE | NCAP EB | NCAP EB |
| DRILLING | Best sown before the end of August.<br>Full seed rate 30 kg/ha. Typical TGW 18 g. | Best sown before the end of August.<br>Full seed rate 50 kg/ha. Typical TGW 26 g. |
| HOW TO DESTROY | Will be killed by a light frost. | Will be killed by a light frost. |
| OTHER INFORMATION | + C:N ratio 28.<br>+ Fast establishment and good ground cover due to greater leaf area.<br>+ Fibrous shallow root system capable of mobilising phosphate in the soil.<br>+ First choice companion variety for OSR. | + C:N ratio 28.<br>+ Fast establishment and moderate ground cover.<br>+ Earlier and more prolific flowering habit.<br>+ Fibrous shallow root system capable of mobilising phosphate in the soil.<br>+ More attractive to beneficial insects. |

| | HAIRY VETCH – HUNGVILLOSA/LATIGO | ASIAN/DAIKON RADISH |
|---|---|---|
| |   |   |
| USE | NCAP, N PROD, EB | NCAP |
| DRILLING | Drill before the end of August.<br>Full seed rate 40 kgs/ha. Typical TGW 40 g. | Best sown before the end of August.<br>Full seed rate 12 kg/ha. Typical TGW 20 g. |
| HOW TO DESTROY | Spray off in the spring. Very cold tolerant. | Will be destroyed by a hard frost. |
| OTHER INFORMATION | + C:N ratio 12.<br>+ Hairy vetch are a reliable element in mixtures capable of fixing nitrogen with medium fast establishment.<br>+ Very good strong root system to improve soil structure.<br>+ Winter hardy. | + C:N ratio 35.<br>+ Very large, strong tap root, good for soil structure improvement.<br>+ Large root scavenges and holds more nutrients. |

# Cover Crop varieties in detail

## OIL RADISH – BRUTUS/IRIS



| | |
|---|---|
| USE |   |
| DRILLING | Sow from late July to mid September. Full seed rate 12-20 kg/ha depending on use. Typical TGW 11 g. |
| HOW TO DESTROY | Spray off in early spring, unless destroyed by several hard frosts (-5°C). |
| OTHER INFORMATION | + C:N ratio 30.<br>+ Very strong tap root will break through compacted soil.<br>+ Good scavenging and holding of nutrients within high biomass crop.<br>+ Non-host to clubroot. |

## NEMATODE REDUCING VARIETIES

### GROUP 1: Reduction of Beet Cyst Nematodes by over 90%

**REBELLION**

+ Highest level of reduction of BCN.
+ Non host to other free living nematodes including SRN and CCN.
+ Good early vigour.
+ Medium biomass.
+ Extensive strong root system.
+ Very late maturity.
+ Frost hardy to -5°C.

### GROUP 2: Reduction of Beet Cyst Nematode of 70-90%

**TERRANOVA**

+ Multi resistance to beet cyst and root knot nematode. (Meloidogyne chitwoodi).
+ Reduction of stubby root nematode and TRV.
+ Vigorous early growth.
+ Extensive strong root system.
+ Late maturity.
+ Frost hardy to -8C.

**SMART RADISH**

+ New from Norwest Seeds NZ.
+ Improved radish for cover cropping and forage.
+ Fast establishment and early growth.
+ Large tap root with fibrous lateral roots.
+ High leaf to stem ratio for better ground cover and forage quality.

# Which Cover Crop to grow? What do you want to achieve?

## Which soil issue is most important to resolve?

Soil structure, nutrient capture and fixation, erosion control, low organic matter/carbon capture, weed suppression, a reduction in harmful nematodes or a requirement to increase the number of beneficial insects.

## What positive effects are you looking to achieve?

Reduce cultivation/establishment costs, improve soil fertility, raise organic matter levels, reduce input costs and in the longer term improve overall soil health and farm sustainability.

## Key considerations:

- **What is your crop rotation?** Avoid cover crops that may increase disease and pest pressure in close rotations.
- **When will you be able to drill the cover crop?** Generally best growth/ results come from early August sowings, choice of species should change if September sown.
- **How long do you want the cover to last?** Do you require a short term cover prior to late autumn sowing, a longer term frost-susceptible mix which may save on destruction costs, or a full cover until the spring to maintain soil protection?
- **Will the catch/cover crop be used for livestock grazing** to produce additional income?
- **What type of drill** will you use to establish the following crop?
- **What soil type do you have and is it well structured?** Heavier or poorly structured soils will require extra attention and careful species selection to maximise the benefit of a cover crop.
- **What is the likely Carbon:Nitrogen ratio of the cover crop?** The C:N ratio of a species/mixture gives an indication of the speed of breakdown and release of nutrients. This is important to understand as you may need to adjust your nutritional inputs to the following crop depending on when this occurs.
- **High C:N ratio covers crops** will take nitrogen from the soil reserves as the soil biota starts the process of breaking down the carbon in the cover crop, which can restrict the amount of nitrogen freely available in the early stages of the following crop.
- **Low C:N ratio cover crops** will conversely break down much more quickly, making nutrients available earlier, and returning a greater percentage of the total within the life-cycle of the following crop.

# What do you want to achieve with your Catch/Cover Crop?

## Quick guide to selection of Agrii catch and cover crop mixtures.

Full mixture details, benefits and advice are shown in the following pages.

**CATCH CROPS** – DURATION MARCH TO OCTOBER

**COVER CROPS** – DURATION JULY TO FEBRUARY

### MAIN OBJECTIVE / TASK REQUIRED OF MIXTURE

| SOIL STRUCTURE<br>Improvement / Maintenance | | NUTRIENT BUILDING<br>Fixation & Mobilisation | | SOIL HEALTH IMPROVEMENT<br>Flora & Fauna Increase | | SOIL PROTECTION<br>Erosion & Leaching Reduction | |
|---|---|---|---|---|---|---|---|
| **CATCH** | **COVER** | **CATCH** | **COVER** | **CATCH** | **COVER** | **CATCH** | **COVER** |
| + N-Truster<br>+ N-Forcer | + Structurator<br>+ Forage Cover | + N-Richer<br>+ N-Veloper | + N Capture and Fix<br>+ Spring Cereal Soil Fertility Builder | + N-Veloper | + Regenerative<br>+ Spring Cereal Soil Fertility Builder | + N-Truster<br>+ Last and Fast | + Eco Soil Protector<br>+ Spring Cereal Soil Fertility Builder |

Additionally the following DIY base mixtures are available for those customers wanting to create their own variation on the above.

| | | | |
|---|---|---|---|
| + DIY Base Mix 1 | + DIY Base Mix 2 | + DIY Base Mix 2 | + DIY Base Mix 1 |

The above **Cover crop mixtures** comply with the SFI scheme requirements for options SAM2 & CSAM2 winter cover.
The above **Catch crop mixtures** comply with the SFI scheme requirements for options SOH2 & SOH3 spring & summer cover.

# Spring & Summer Cover Crop mixtures

## N-TRUSTER: MIX 1

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Winter rye | 50 | 15 | 40 |
| Black oats | 20 | 6 | 30 |
| Spring vetch | 20 | 6 | 10 |
| Purple vetch | 10 | 3 | 8 |
| | 100 | 30 | 88 |
| Seed rate: 30 kg/ha | | | |
| Drill depth: 10-15 mm | | | |

A reliable cereal and legume combination for use before OSR.

- Sow from April to June.
- Medium biomass cover.
- Nutrient holding and nitrogen fixation.
- Soil structure maintenance.

## N-RICHER: MIX 2

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Crimson clover | 30 | 2.4 | 68 |
| Buckwheat | 30 | 2.4 | 12 |
| Berseem clover | 25 | 2 | 55 |
| Phacelia | 15 | 1.2 | 70 |
| | 100 | 8 | 205 |
| Seed rate: 8 kg/ha | | | |
| Drill depth: 5-10 mm | | | |

A fast establishing mix of clovers, buckwheat and phacelia for use before OSR or cereals.

- Sow from late April to mid June.
- Low C:N ratio allows fast release of nutrients.
- Roots provide a good friable tilth for direct drilling.
- Attractive to beneficial insects.

# Spring & Summer Cover Crop mixtures

## SFI options SOH2 & SOH3 mixtures

### N-VELOPER: MIX 3

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Purple vetch | 40 | 4.8 | 13 |
| Buckwheat | 35 | 4.2 | 20 |
| Phacelia | 15 | 1.8 | 105 |
| Berseem clover | 10 | 1.2 | 34 |
| | 100 | 12 | 172 |
| Seed rate: 12 kg/ha | | | |
| Drill depth: 5-10 mm | | | |

A combination of tried and tested species for use before OSR or Cereals.

- Sow from late April to mid July.
- Purple vetch included for maximum nitrogen fixation.
- Creates a friable soil structure enabling direct drilling.
- Boosts soil health and beneficial insect populations.

### N-FORCER: MIX 4

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Oil radish | 30 | 3 | 27 |
| Crimson clover | 15 | 2.5 | 72 |
| Daikon radish | 25 | 2.5 | 14 |
| Berseem clover | 20 | 2 | 55 |
| | 100 | 10 | 168 |
| Seed rate: 10 kg/ha | | | |
| Drill depth: 5-10 mm | | | |

A combination of deeper rooting radish species and clover for use before cereals on lighter soils.

- Sow from mid June to early August.
- High biomass potential and nutrient capture.
- Soil conditioning.
- Forage option.

# Spring & Summer Cover Crop mixtures

## LAST AND FAST: MIX 5

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Buckwheat | 48 | 4.8 | 18 |
| Phacelia | 32 | 3.2 | 188 |
| Oil radish | 15 | 1.5 | 14 |
| White mustard | 5 | 0.5 | 7 |
| | 100 | 10 | 227 |

Seed rate: 10 kg/ha

Drill depth: 5-10 mm

**Sown as the last catch crop of the summer ahead of autumn cereals, this mix includes species that are relatively fast to establish.**

- Sow from July to early September.
- Medium biomass production for easy management.
- Diverse root structures for enhanced soil conditioning.

### Termination guidance:

- The termination of these covers should be managed according to the planned drilling technique for the subsequent cereal crop.
- Where direct drill machinery that can cope with standing biomass is to be used, mixtures such as these can be terminated within a few days of drilling to provide a certain amount of evapotranspiration until the main crop is ready to sow.
- Where more traditional 'min-till' cultivation methods are to be employed ensure timely termination takes place to minimise difficulties of biomass with cultivation and drilling equipment.

## PHAB: PRE-HARVEST AGRII BROADCASTING MIX WITH SAS FLY TECHNOLOGY

S.A.S FLY

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Hairy vetch | 30 | 6 | 21 |
| Purple vetch | 25 | 5 | 12 |
| Oil radish – coated | 25 | 5 | 18 |
| Daikon radish – coated | 20 | 4 | 16 |
| | 100 | 20 | 67 |

Seed rate: 20 kg/ha

Broadcast between 10 and 20 days before harvest, subject to soil conditions.

**PHAB mix is a new product developed in cooperation with Cérience.**

The SAS fly seed coating technology allows even distribution and improved establishment of the mix up to 36 meters. Contains OSYR organic bio stimulant within the seed coat on the smaller seeds to aid establishment. The coating also attracts and retains soil moisture to enhance germination. Spreader calibration settings for the mix are available for Amazon, Kuhn, Bogballe, Sulky (Sky) and Lemken machines. Practical mix for those taking up the **SFI SOH3** summer cover crop option.

**Advantages of broadcasting pre harvest**

- Allows sowing up to 3 weeks before harvest helping to spread the workload.
- Early sowing and establishment date makes most of better growing conditions.
- Allows timely establishment in later harvest areas of the UK.
- Even distribution of seed up to 36 meters with a fertilizer spreader.
- Faster time saving sowing operation.

**Cost saving application of up to £50/ha in establishment cost compared to direct drilling after harvest. (NAAC costings).**

# Autumn/Winter Cover Crop mixtures

## SFI options SAM2, CSAM2 & SOH4 mixtures

### STRUCTURATOR – SAM2, CSAM2 & SOH4

**Use in OSR-free or extended rotations on medium/ heavy soils.**

- Strong, diverse root systems.
- Helps to create a structured soil profile.
- Reduces diffuse pollution.
- High biomass.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Winter rye | 35 | 7 | 19 |
| Black oats | 25 | 5 | 25 |
| Oil radish | 15 | 3 | 26 |
| Linseed | 10 | 2 | 25 |
| Phacelia | 10 | 2 | 98 |
| Daikon radish | 5 | 1 | 7 |
| Seed rate 20 kg/ha | | | 200 |
| Cover crop C:N ratio 36 | | | |

### REGENERATIVE MIX – SAM2 & CSAM2

**Designed to intercept the maximum amount of sunlight in order to enhance carbon capture and boost soil health.**

- Multi-species mix for maximum diversity.
- Nutrient capture and fixation.
- Varied root types to stimulate soil biology and improve structure.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring vetch | 30 | 6.9 | 12 |
| Black oats | 20 | 4.6 | 23 |
| Linseed | 10 | 2.3 | 29 |
| Crimson clover | 12 | 2.8 | 56 |
| Sunflower | 10 | 2.3 | 4 |
| Buckwheat | 7 | 1.6 | 10 |
| Oil radish | 6 | 1.4 | 11 |
| Phacelia | 5 | 1.1 | 57 |
| Seed rate 23 kg/ha | | | 202 |
| Cover crop C:N ratio 24 | | | |

**All of the cover crop mixtures on these pages should provide the following benefits to the grower, in addition to their specific uses:**

- Mop up, hold and fix nutrients.
- Reduce leaching.
- Increase levels of organic matter and soil biota.
- Improve soil structure.
- Suppress weeds.
- Provide habitat for farmland wildlife and improve farm sustainability and income.

### N CAPTURE – SAM2 & CSAM2

**Use in all rotations on light/medium soils.**

- High inclusion of leguminous species.
- Capable of fixing high N levels.
- Medium biomass.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Black oats | 48 | 8.7 | 44 |
| Spring vetch | 28 | 5.1 | 9 |
| Crimson clover | 8 | 1.4 | 30 |
| Berseem clover | 8 | 1.4 | 48 |
| Phacelia | 8 | 1.4 | 74 |
| Seed rate 18 kg/ha | | | 205 |
| Cover crop C:N ratio 23 | | | |

### ECO SOIL PROTECTOR – SAM2, CSAM2 & SOH4

**Economic cover crop for all rotations.**

- Fast establishing nutrient capture and fix.
- Full season cover.
- Medium biomass.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Winter rye | 80 | 28 | 76 |
| Vetch | 20 | 7 | 12 |
| Seed rate 35 kg/ha | | | 88 |
| Cover crop C:N ratio 35 | | | |

**The species and varieties used within the mixtures** have been specially selected to meet UK conditions, with particular emphasis on speed of establishment, maturity date and field performance.

**Seed size – thousand grain weight (TGW) is also an important** consideration in species/variety selection, with the aim to reduce variability which aids drilling and helps target the optimum plant numbers per square metre.

# Autumn/Winter Cover Crop mixtures

## SPRING CEREAL SOIL FERTILITY BUILDER – SAM2 & CSAM2

**Cereal-free mix for light/ medium soil types.**

- Nutrient capture and fix.
- Lower C:N ratio.
- Medium/high biomass.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring vetch | 42 | 8.4 | 14 |
| Oil radish | 20 | 4 | 34 |
| Crimson clover | 15 | 3 | 60 |
| Buckwheat | 15 | 3 | 17 |
| Phacelia | 8 | 1.6 | 80 |
| Seed rate 20 kg/ha | | | 205 |
| Cover crop C:N ratio 20 | | | |

## FORAGE COVER CROP MIX – SAM2 & CSAM2

**Dual purpose mix for cover and forage on all soil types.**

- Soil conditioning and forage production.
- High biomass.
- Nutrient capture and fix.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Winter rye | 55 | 13.75 | 38 |
| Spring vetch | 20 | 5 | 9 |
| Leafy turnip | 10 | 2.5 | 60 |
| Smart radish | 10 | 2.5 | 21 |
| Phacelia | 5 | 1.25 | 62 |
| Seed rate 25 kg/ha | | | 190 |
| Cover crop C:N ratio 38 | | | |

The following two cover crop mixtures have been developed to provide a balanced base mixture for farmers who want to design their own mixture to target a specific issue by utilising on-farm seed or bought-in straight species.

## DIY COVER CROP BASE MIXTURE 1

- Combination of three reliable species.
- Suited to all soil types.
- Suitable for all rotations.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Buckwheat | 52 | 4.1 | 17 |
| Linseed | 32 | 2.6 | 33 |
| Phacelia | 16 | 1.3 | 64 |
| Seed rate 8 kg/ha | | | 114 |

## DIY COVER CROP BASE MIXTURE 2 – SAM2 & SOH3

- High legume content to target nitrogen fixation.
- Boost soil health and beneficial insects.
- Suited to medium/ lighter soils.

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring vetch | 48 | 5.75 | 10 |
| Buckwheat | 26 | 3.15 | 13 |
| Crimson clover | 16 | 1.9 | 38 |
| Phacelia | 10 | 1.2 | 60 |
| Seed rate 12 kg/ha | | | 121 |

## ADDITIONAL SPECIES TO ADD TO TARGET SPECIFIC ISSUES:

**Soil structure on heavier soil types:**
- Radish species – smart, daikon and oil types.

**Diffuse pollution reduction/nutrient capture:**
- Cereals – rye and black oats.
- Radish – high biomass types.
- White mustard.

**Nitrogen fixation and soil health:**
- Vetch species – common, hairy and purple.
- Clovers – berseem and crimson.

Bespoke custom mixtures are available from our Agrii Lincoln seed production facility, please enquire.

**Seed should be drilled before the end of August** to ensure good establishment and maximise biomass.

**Adjust seed rates** to account for soil conditions and drilling date.

# Establishing the Cover Crop

## Key considerations:

### TIME OF DRILLING

Many of the species require reasonable soil temperatures and day length. Drill immediately after harvest, ideally most cover/ catch crops should be drilled by the end of August to give sufficient biomass and rooting.

### DRILLING RATES

The quantity of seed required for a good cover will vary with the types of species included within the mix in relation to seed size, plant architecture and drilling date. The target seed number for a diverse species mix drilled in early August would be 150-200 seeds per $m^2$. Higher seed rates, 250-350 seeds per $m^2$ with a diverse mix within an established cover cropping system have shown to provide greater soil health benefits.

### SOIL MOISTURE LEVELS

Good seed/soil/moisture contact is required to get quick emergence of the mixtures. Soil moisture needs to be conserved and ideally minimal soil disturbance should be considered during the sowing period.

### SOIL NUTRIENTS

To achieve a well grown cover crop, early nutrition in the form of nitrogen is required, depending on previous cropping soil N reserves and if there is a high level of straw residue, approx. 20-30 kg of N/ha will be required to aid establishment.

**Note:** the SFI SAM2 option prohibits the use of mechanically applied fertilisers and manures to cover crops.

### PREVIOUS CROP

An important consideration particularly if there are high levels of straw residues; cover crops could be held back and overall level of establishment will be disappointing.

If following winter barley, then removal of the barley straw would be useful, if not the straw and chaff residues need to be evenly distributed prior to drilling.

Very good establishment of cover crops has been achieved behind pea and bean crops, also after a fallow situation.

### PESTS

Slug pressure needs to be assessed following the previous crop. If the pressure is high then slugs need controlling before establishing the cover crop.

Pea and bean weevil can cause serious problems for the vetches and clover species, if the pressure is high and insect activity is causing damage, the appropriate insecticide should be used.

### ESTABLISHMENT TECHNIQUE

Cover crops need good soil structure and a workable soil to achieve maximum growth. Soil compaction needs to be addressed both for the cover and also for the following crop, therefore subsoiling should be completed if required.

A subsoiler with a tine that stops large amounts of surface disturbance should be considered; again loss of soil moisture is an important consideration.

Broadcasting seed 10-15 days before harvest is an option to achieve earlier establishment and spread work load, but only if the soil structure is good, the correct species mix is used and an even spread pattern can be achieved.

To maximise the benefit of the cover crop within the farm rotation, the following areas need to be considered before establishing the following crop.

## Key considerations:

### TARGET DRILLING DATE

Have a target drilling date on which to base your planning and operations.

### DESTRUCTION OF COVER CROP

If the cover crop has not been destroyed by frost or grazed, you will need to consider the soil type and density of the cover to determine when to spray off the cover in order to allow time for the soil surface to dry to aid drilling.

This could be up to 8 weeks on heavy soils with a dense cover crop.

### PESTS

Assess the slug pest pressure before crop establishment, treat if necessary.

### CROP NUTRITION

The nutrient requirement of the following crop may differ to normal practice in respect to application timing and amount used depending on the cover crop species within the mix.

The C:N ratio of a particular mix will determine the time it will take and how much nitrogen will be required from the soil N reserve to decompose the cover crop residue and release nutrients to the following crop. This is because the soil micro-organisms require a C:N ratio of 24:1 to work efficiently and maintain a healthy balanced soil.

Cover crop residues with a higher C:N ratio will require more N from the soil and therefore less is initially available to the following crop, inhibiting growth.

Low C:N ratio residues including N fixing species will release excess N quickly boosting early crop growth and reducing the overall N requirement.

The target is to maintain a crop residue covering the soil surface with a C:N ratio of between 25 and 30 to help maintain a healthy living soil that will release nutrients at a uniform rate.

### DRILLING

Whichever type of drill you use to establish the next crop, the aim is to move only the minimum amount of soil required to create good seed to soil contact.

Excessive soil movement will stimulate unwanted weed germination and undo some of the benefits gained from the cover crop.

# Oilseed Rape Companion Crops

- **Agrii has been trialling a range of companion crops for use with oilseed rape** to assess their ability to reduce the damage done by Cabbage Stem Flea Beetle (CSFB) and their larvae as one part of the strategy to grow OSR successfully.
- Agrii trials have shown the use of buckwheat, when established well, reduced the damage to oilseed rape plants by the adult CSFB during the establishment phase and continued to do so through the autumn until the first cold nights when the buckwheat died back. This extended period of protection reduced the number of CSFB eggs laid on the OSR and importantly resulted in lower larvae numbers per plant in the spring.
- It has also been noted in trials that OSR plots that had a buckwheat companion crop appeared to be more vigorous and with an even growth habit in the spring. This may be a consequence of reduced larvae damage or a benefit of its phosphorus scavenging and release properties boosting the OSR.
- Having identified buckwheat as the best companion crop option for OSR CSFB defence, we tested the species of buckwheat available, *Fagopyrum Esculentum* and *Fagopyrum Tataricum*, to identify the one with the best attributes and performance. Lifago (*Fagopyrum Tataricum*) proved to be the best option (see information opposite), although both types are effective.
- In areas with low CSFB pressure and where soil structure and nutrient building are more important then Tabor berseem clover and Bingo purple vetch will help enhance establishment and crop growth.
- Companion crops should be used as part of the oilseed rape establishment strategy, but not relied upon solely as the only defence against CSFB. **Scan the QR code for more information on the Agrii 8 Point Plan for cultural control of cabbage stem flea beetle.**

## Lifago buckwheat

**Lifago (F. Tataricum) gave the best results in field trials, although both types were effective. Lifago has a unique combination of traits:**

- Seed tgw, size and shape – allowing easier mixing, better seed flow and lower seed rates.
- Plant development and structure – fast emergence, large leaf area and later flowering habit giving the OSR seedling more protection for longer.
- Cold susceptibility and phosphorus release – readily dies back and breaks down in low temperatures releasing nutrients to the established OSR crop.

### Comparison of *Esculentum* and *Tataricum* buckwheat


### Comparison of buckwheat seed


Typical TGW 28 g


Typical TGW 16 g

The lower TGW and shape of Lifago allows easier mixing with the OSR seed. Recommended sowing rate 10 kg/ha with oilseed rape seed.

# Oilseed Rape Companion Crops

## Companion crop options

We have seen very positive results from the use of companion crops with oilseed rape from improved establishment, reduced CSFB larvae numbers, to higher biomass and better crop health and yield, when used as part of the Agrii 8 Point Plan for success with OSR crops.

The companion crop mixtures below have been designed not only to help protect against CSFB but also to enhance crop establishment and improve growth during the season.

### LIFAGO BUCKWHEAT 100%

**SEED RATE:**
10 kg/ha = 60 seeds/m$^2$

- Maximum cover to deter CSFB.
- Root exudates mobilise soil phosphate.

### PROTECT AND FIX

LIFAGO BUCKWHEAT 65%
TABOR BERSEEM CLOVER 35%

**SEED RATE:**
10 kg/ha = 150 seeds/m$^2$

- CSFB deterrent.
- Phosphate mobilisation and nitrogen fixation.
- Pivotal tap root of Tabor helps OSR rooting.

### DEFENDER

LIFAGO BUCKWHEAT 50%
TABOR BERSEEM CLOVER 25%
FENUGREEK 25%

**SEED RATE:**
10 kg/ha = 130 seeds/m$^2$

- CSFB deterred by Lifago cover.
- Fenugreek odour helps deter CSFB.
- Fenugreek and Tabor fix nitrogen and improve soil structure.

### FIX AND DETER

TITANE PURPLE VETCH 50%
LIFAGO BUCKWHEAT 50%

**SEED RATE:**
12 kg/ha = 50 seeds/m$^2$

- CSFB deterred by Lifago cover.
- Titane purple vetch provides nitrogen fixation and longer term cover after the buckwheat dies back.

# SFI NUM3 Legume fallow rotational mixtures

## NUM3A – SPRING SOWN ROTATIONAL MIX

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Common vetch | 25 | 5 | 7 |
| Common buckwheat | 25 | 5 | 20 |
| Purple vetch | 15 | 3 | 7 |
| Crimson clover | 10 | 2 | 57 |
| Spring linseed | 10 | 2 | 25 |
| Phacelia | 8 | 1.6 | 94 |
| Berseem clover | 7 | 1.4 | 46 |
| Seed rate: 20 kg/ha | | | 256 |

- Contains 57% legumes.
- Mix suited to Light/Medium soils.
- Broadcast or shallow drill and roll.
- Establish in April.

## NUM3B – SPRING SOWN ROTATIONAL MIX

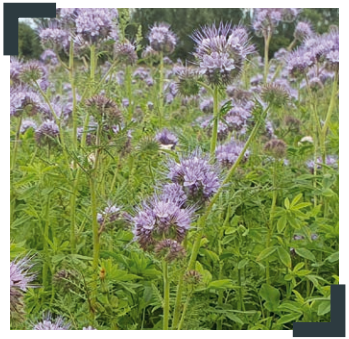
| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Common buckwheat | 35 | 7 | 28 |
| Linseed | 20 | 4 | 50 |
| Common vetch | 15 | 3 | 4 |
| Purple vetch | 10 | 2 | 5 |
| Crimson clover | 8 | 1.6 | 45 |
| Phacelia | 7 | 1.4 | 82 |
| Berseem clover | 5 | 1 | 33 |
| Seed rate: 20 kg/ha | | | 247 |

- Contains 38% legumes.
- Mix suited to Medium/ Heavy soils.
- Broadcast or shallow drill and roll.
- Establish in April.

## NUM3C – SPRING SOWN ROTATIONAL MIX

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Forage peas | 40 | 8 | 4 |
| Common buckwheat | 18 | 3.6 | 15 |
| Purple vetch | 12 | 2.4 | 6 |
| Crimson clover | 10 | 2 | 57 |
| Berseem clover | 8 | 1.6 | 45 |
| Spring linseed | 6 | 1.2 | 19 |
| Phacelia | 6 | 1.2 | 70 |
| **Seed rate: 20 kg/ha** | | | **216** |

- Contains 70% legumes.
- Mix suited to Medium soils.
- Shallow drill and roll.
- Establish in April.



## NUM3AUT – LATE SUMMER SOWN ROTATIONAL MIX

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Common vetch | 30 | 5.4 | 9 |
| Hairy vetch | 20 | 3.6 | 11 |
| Winter linseed | 20 | 3.6 | 45 |
| Crimson clover | 14 | 2.52 | 72 |
| Phacelia | 10 | 1.8 | 100 |
| Red clover | 5 | 0.9 | 50 |
| Black medic | 1 | 0.18 | 28 |
| **Seed rate: 18 kg/ha** | | | **315** |

- Contains 70% legumes.
- Winter hardy species.
- Broadcast or shallow drill and roll.
- Establish August or early September.
- Suitable for NUM3 and CNUM3 rotational option.

# SFI options AHL2 & CAHL2 winter bird feed

## WILD1: SINGLE BARREL
## 1 YEAR WILD BIRD SEED MIX – SFI AHL2 & CAHL2

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring triticale | 48 | 24 | 40 |
| Spring barley | 30 | 15 | 25 |
| Sunflower | 6 | 3 | 4 |
| White millet | 5 | 2.5 | 34 |
| Red millet | 5 | 2.5 | 34 |
| Spring linseed | 4 | 2 | 25 |
| Quinoa | 2 | 1 | 30 |
| Seed rate: 40-50 kg/ha | | | 192 |

- Attractive to finches and buntings.
- Mix suited to all soil types.
- Drill depth 5-15 mm.
- Establish April to May.

## WILD2: DOUBLE BARREL
## 2 YEAR WILD BIRD SEED MIX – SFI AHL2 & CAHL2

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring triticale | 45 | 22.5 | 38 |
| Spring barley | 28 | 14 | 23 |
| Oil radish | 8 | 4 | 28 |
| White millet | 7 | 3.5 | 46 |
| Spring linseed | 6 | 3 | 38 |
| Kale | 4 | 2 | 50 |
| Red millet | 2 | 1 | 14 |
| Seed rate: 40-50 kg/ha | | | 237 |

- Attractive to Grey Partridge.
- Mix suited to all soil types.
- Drill depth 5-15 mm.
- Establish March to May

## WILD3: PURDEY
## 1 YEAR WILD BIRD SEED MIX – SFI AHL2 & CAHL2

| | % | Kgs/ha | Seeds/m² |
|---|---|---|---|
| Spring triticale | 60 | 30 | 50 |
| Sunflower | 12 | 6 | 7 |
| Red millet | 9 | 4.5 | 60 |
| White millet | 9 | 4.5 | 60 |
| Dwarf grain sorghum | 6 | 3 | 6 |
| Spring linseed | 3 | 1.5 | 19 |
| Oil radish | 1 | 0.5 | 4 |
| Seed rate: 40-50 kg/ha | | | 206 |

- Attractive to sparrows and finches.
- Mix suited to all soil types.
- Drill depth 5-15 mm.
- Establish April to June.
- Herbicide tolerant mixture, consult your agronomist for a herbicide recommendation.

# Your local **contacts**

For further information please contact your local Agrii seed contact:

| | | |
|---|---|---|
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Please note that the content within this document does not represent advice, which should always be tailored to local situations. Please speak to your adviser for more detailed information on any of the topics covered.