Program for Cover and Forage Crops 2023

High Performance with cover crops.

MORE INFO: WWW.ZWISCHENFRUCHT.DE
P. H. PETERSEN is the European market leader for cover crops, specialising in organic nematode control. Practice-orientated varieties and above-average seed quality come first.

In northern Schleswig-Holstein, P. H. PETERSEN develops cover crops, cereals, legumes and special varieties as well as seed blends with the highest-quality seeds. By registering the world’s first nematode-resistant varieties, P. H. PETERSEN redefined a completely new scope for cover crops. Extensive contact with research institutes, specialist consultants and forward-thinking farmers ensures the efficiency and actuality of variety development and practically applicable solutions. Today, this multi-faceted family company is run by Matz Petersen, the third generation. P. H. PETERSEN is the right place for excellent-quality, innovative and reliable cover crops.

Today, the P. H. PETERSEN breeding facility boasts around 50 hectares of land for nurseries, performance testing and the cultivation of preliminary crops. Climate-controlled greenhouses are available all year round for resistance testing and cultivation tests. Samples are prepared and tested at in-house laboratories.

At over 18,000m² each, the storage and processing facilities in Lundsgaard, Schleswig-Holstein and Sárboğárd, Hungary, use state-of-the-art cleaning and processing systems as well as high-performance packaging systems. In all areas, motivated employees apply their experience to produce high-quality seeds.

Over 40 cultivated species are sold across Germany, Europe and the world in collaboration with SAATEN-UNION GmbH. Together, we have long been representatives of diverse and sustainable cover crops. We are well-versed in the aims of the green deal transformations for diversity in agriculture with more focus on environmental conservation. As active farmers, family business owners and wholesalers, we understand the challenges you are facing, and are happy to support you with our recommendations and products to ensure your business is future-proof.

You can find out more about us at www.phpetersen.com.
Contents

The benefits of cover crops ........................................................................................................ From page 4
Our top recommendations for your cover crops ................................................................. From page 8
Biological nematode control ................................................................................................. From page 10
Nematode-resistant white mustard ................................................................................ From page 12
Nematode-resistant oilseed radish .................................................................................. From page 14
Multi-resistant oilseed radish .......................................................................................... Page 16
The effectiveness of cover crops against nematodes and disease ..................................... Page 17
Additional nematodes and diseases .................................................................................. From page 18
Oilseed radish against viral internal rust spot ................................................................ Page 21
Sticky nightshade ............................................................................................................... Page 21
Saia oat ............................................................................................................................... Page 22
Structure for the soil - root profile .................................................................................... Page 23
Crucifers for green manure ............................................................................................... From page 24
Phacelia, linseed ................................................................................................................ Page 27
Buckwheat ........................................................................................................................ Page 28
Legumes as cover crops ................................................................................................... From page 28
Forage rye .......................................................................................................................... Page 32
Perennial rye, summer forage rye and ryegrass ................................................................. Page 33
Sowing and use at a glance ................................................................................................. From page 34
How many components does a cover crop blend need? ................................................ Page 36
Overview of cover crop blends ........................................................................................ From page 38
  • viterra® soil fertility blends ........................................................................................ From page 40
  • SortenGreening® ........................................................................................................ From page 50
  • viterra® special blends ............................................................................................... From page 52
  • V-Max® fodder and biomass blends .......................................................................... From page 55
  • Organic blends ......................................................................................................... From page 60
  • viterra® nature and environmental blends ................................................................ From page 63
Using cover crops strategically .......................................................................................... Page 67
Recommendations for cover crop cultivation ..................................................................... From page 68
Optimal nutrient use with cover crops ............................................................................. Page 70
Cover crops and the Fertilisation Act .............................................................................. Page 71
Climate conservation and carbon farming ....................................................................... Page 72
Win with biodiversity ........................................................................................................ Page 73
Funding programmes ......................................................................................................... Page 74
Additional product information and knowledge ............................................................. Page 75
The targeted use of cover crops improves the main crop’s yield and quality, retaining and improving soil fertility in the long term. Let us introduce you to the countless positive properties of cover crops that contribute to this effect. You’ll also find the symbols throughout this whole document.

Cover crops can grow through compacted soil thanks to intense root penetration. They can also line the loosened soil with plenty of root mass through mechanical soil processing, ensuring long-term stabilisation. When the roots rot in spring, hollows are created for better ventilation and heating. Water absorption capacity is increased and frost wedging creates additional tilth. Various root types complement each other: oilseed radish, broad bean and lupins form deep taproots, while saia oat forms a network of roots in the topsoil. The cover crop roots therefore stabilise the topsoil and increase the soil’s load-bearing capacity. Tillage radish STINGER is a one-off, as it perforates the topsoil with its strong taproots. The latest research is intensely concerned with the role of roots in humus production, nutrient management and supporting soil biology.

Cover crops deliver additional organic material to your soil as green manure. This means you can make the most of extra sunlight and heat for photosynthesis. In general, one kilo of plant biomass fixes 2kg of CO₂ and generates 1.5kg of O₂. In the soil, the plant mass feeds soil life and supports the formation of humus.

As well as the amount of biomass from the cover crop, the ratio of carbon to nitrogen in the plant debris is important. Legumes and young plants have a close C/N ratio, so their biomass is easily digestible for soil life. Maturing plants and fast-developing species such as early sown white mustard, linseed and saia oat have a higher C/N ratio, so are more resistant to degradation. This effectively contributes to the formation of long-lasting humus. Roots have a different C/N ratio than leaves and stems. So, species with lots of underground biomass (such as oilseed radish and grasses) contribute greatly to lasting humus. The addition of sufficient organic substance is essential for the composition and maintenance of soil fertility, as humus plays a key role in nutrient release, soil structure and the soil’s resistance to soil-borne diseases as well as weather damage.

When used purposefully, cover crops improve field hygiene. As species and varieties are chosen to suit the subsequent crop, incidences of disease are reduced while the main crop’s health, quality and yield are increased. Find out more from page 10.
Contains legumes that convert atmospheric nitrogen into nitrogen available to plants

Thanks to their symbiosis with rhizobia, legumes can fix nitrogen from the atmosphere and use it for plant growth. This means that legumes provide any subsequent crops with additional nitrogen. Properly used, this reduces the need for mineral fertiliser and its energy-intensive production as well as increasing the cover crop blend’s N-elasticity. From this year, each viterra® blend will state its N-profit for the subsequent crop. This varies depending on the type of legume and the proportion used in the cover crop blend. Find out more on page 70.

Nitrogen conservation in the soil and nitrogen fixing over winter to prevent erosion into groundwater

Cover crops can effectively collect nutrients in the autumn, store them in biomass and keep them in the top layer of soil. The nutrients remaining in the soil after harvest and that are mineralised from crop residue may be lost over winter as they are leaching or run off with the surface water. Alongside easily displaceable nitrogen, further key nutrients such as potassium, magnesium and sulphur may be washed away with leachate, depending on soil type and pH value.

Some cover crops also have the ability to bind nutrients and making them available for the following main crop. For example, phacelia binds organic phosphorous and buckwheat binds inorganic phosphorous, while linseed mobilises silicon. Some plants enter into symbiosis with fungus to ensure an effective phosphate supply. These mycorrhiza fungi release phosphates from organic compounds, in return using the root exudates (organic carbon compounds) produced by plants. Other cover crops, such as oilseed radish and white mustard, don’t need symbiotic fungi as they are able to produce enzymes to digest phosphates (phosphatases) themselves.

When working in green manure in the following spring, the nutrients stored in the cover crops are re-mineralised and can be made available to a main crop such as corn during peak growing season.

Freezes off for easier soil preparation in spring

Cover crops that freeze off are easy to incorporate into the soil in spring, leaving optimal conditions to sow the summer crop. Mulch and direct sowing are uncomplicated with cover crops that freeze off. Species such as white mustard, saia oat and phacelia generally freeze off in light frosts when sown at the right time. The choice of variety also has an impact. Oilseed radish COMPASS is more sensitive to frost than similar oilseed radishes. Find out more on page 68.

Winter-hardy for long-lasting protection of soil and soil life

Winter-hardy cover crops protect the soil and any fixed nutrients until spring. Even soil life is provided with constant nutrition. Depending on the system and cultivation process being used, soil protection and biomass production can be combined. V-Max® blends LUNDSGAARDER GEMENGE and WICKROGEN promote soil biology with their legume contents. Winter-hardy undersowing blends such as viterra® UNTERSaat GRAS and viterra® UNTERSaat GRAS FRÜH are ideal for regenerative farming methods as they facilitate green-in-green cultivation methods to activate and strengthen the soil life associated with humus enrichment.

What’s more, winter-hardy cover crops are generally very tolerant to late sowing thanks to their long growth phases. So, the viterra® WINTERGRÜN and viterra® WASSERSCHUTZ blends are ideal for productive greening after a late maize harvest.
Closes fodder gaps

Cover crops offer you the opportunity to close cattle fodder gaps and produce more fresh fodder rations. Forage rape, rye grasses, legumes and cereals are suitable for this purpose. When grown as a secondary crop, our V-Max® blends facilitate two biomass harvests in one year, and harvests can be staggered. To ensure solid planning of in-house fodder production, all V-Max® blends come with expected dry mass yields. Find out more on pages 32 and 55.

Ensures biodiversity

Cover crops offer the farmer an additional opportunity to expand diversity in subsequent crops. As well as diverse varieties especially developed for particular purposes and conditions, there are also old varieties that are increasingly valued for their benefits. Depending on the subsequent crop, soil type and cultivation period, purposefully greened cover crop fields not only contribute to a high-yield main crop, but also improve soil fertility through managing and encouraging healthy soil life. Find out more from page 24.

Encourages useful soil life e.g. earthworms

A handful of topsoil is home to more soil organisms than there are humans on Earth. Soil life is incredibly diverse in terms of variety and forms. It includes bacteria, fungus, worms, arachnids, countless insects and more. Most of these soil dwellers feed on organic substances, so are the driving force behind all nutrient cycles. They ensure the soil is balanced and retains its buffer capacity.

Cover crops contribute to continuously supplying these small beings with sufficient nutrition. An easily visible example is the earthworm: it takes in plant residue as well as mineral soil elements, sticking them together and excreting highly stable particles.

Earthworm castings contain

- 5 x more nitrogen
- 7 x more phosphorous
- 11 x more potassium

than the surrounding soil.

Worm farms make it very easy to see the clay-humus complexes and earthworm secretions within soil composition. Castings are 1mm to 5mm thick and are extremely water-resistant.

Can be used as biomass

Many cover crops produce biomass that can be used in biogas generators. Forage rye (e.g. PROTECTOR and LUNATOR) in particular grows over winter and can be cut in spring (find out more on page 32). Fast-growing blends of summer grains such as V-Max® GRANOLEG and V-Max® GRANOPUR can also be cultivated after early harvested cereals, facilitating another biomass harvest. Find out more on page 56.
Good ground coverage to reduce weeds and erosion protection for beneficial topsoil

A dense cover crop layer shades the soil and suppresses weeds. It also offers protection from abiotic stress: the topsoil is protected from overheating, and wind/water erosion is reduced. Cover crops not only take on this role when green, but also protect the ground as a dead mulch layer in preparation for the following main crop and facilitate mulch or direct sowing as well as regenerative farming methods.

Provides a habitat and grazing for wild animals

Local big and small game will also benefit from cover crop cultivation. Wild forage blends vitera® HORRIDO and vitera® HOCHWILD have been especially designed for this purpose. They offer local wildlife cover, suitable grazing and protection from predators. Find out more on page 66.

Improves the soil’s ability to hold water and increases rain permeation

While the introduction of organic substances increases the soil’s buffer capacity and water retention in the long term, cover crops also have a direct value as preceding crops. Root penetration of the soil increases the proportion of large and medium pores, which raise the soil’s rain absorption and infiltration rate. This means that less rainwater flows off the surface without being used. The soil can then provide moisture for longer during dry spells. Half a percent more humus in the soil corresponds to a weight of around 22.5 tonnes more humus per hectare, increasing water storage capacity by 7 - 11 mm!

Plenty of flowers to provide honey bees and other insects with nectar

Honey and wild bees have great ecological benefits and significance in society. Field greening with flowering cover crops can support bees and other insects by closing any gaps with crop cover. Farmers can have some of their additional expenses reimbursed by programmes to encourage flowered land. People also appreciate flowering species such as phacelia, sunflowers, Persian clover and more, resulting in an image boost for agriculture. Find out more on page 73.

Climate-friendly carbon storage and carbon farming

Carbon farming is a term describing agricultural methods that capture atmospheric carbon (CO₂) in the soil. The long-term storage of carbon dioxide (carbon capture and storage) reduces strain on the atmosphere, tackling global climate change. The organic substances in soil consist of around half carbon, an important marker of soil fertility and something that regular cover crop cultivation can aid. Find out more on page 72.
Our top recommendations for your subsequent crops

...for potatoes

Recommended blends

The soil should be perfectly prepared before potatoes. The oilseed radish varieties DEFENDER, AGRONOM and SILETIA NOVA tackle various potato diseases and form the ideal base for SortenGreening® blends. In combination with vetch, they can develop excellent with good soil covering in areas with low nitrogen availability.

viterra® POTATO is a substantial blend with a focus on soil improvement. viterra® INTENSIV N-PLUS with DEFENDER oilseed radish, PRATEX saia oat and a 23% vetch content also grows without additional fertilisation.

Recommended varieties

Multi-resistant oilseed radish
DEFENDER, CONTROL, ANGUS, CARUSO, CONTRA

Oilseed radish against internal rust spot
SILETIA NOVA, BENTO, AGRONOM

Oilseed radish SILETINA

Saia oat PRATEX, OTEX, CODEX

...for sugar beet

Recommended blends

viterra® RÜBE or SortenGreening® VERDI + Egyptian clover can be used to professionally tackle beet cyst nematodes. If improving soil fertility is a priority, viterra® RÜBENGARE and viterra® TRIO are ideal blends. SortenGreening® blends with clover or vetch can be used on fields with low nitrogen availability. viterra® BODENGARE not only improves soil, but also generates additional nitrogen for the main crop.

Recommended varieties

Nematode-resistant oilseed radish
Level 1 AMIGO, COMET and more
Level 2 DEFENDER, COMPASS, AGRONOM, CARUSO and more

Nematode-resistant white mustard
Level 1 NARWAL
Level 2 VERDI, MASTER, TOPAS, ACCENT, PROFi and more

Nematode-neutral
Saia oat PRATEX, OTEX, CODEX
Phacelia ANGELIA
Recommended blends

Crucifer-free blends reduce the risk of rapeseed diseases being spread, improving yield stability. viterra® UNIVERSAL and viterra® RAPS are tried-and-tested drought-tolerant blends with clover that do not limit fertilisation. For areas that are not fertilised, viterra® UNIVERSAL N-PLUS or viterra® BODENGARE are beneficial. viterra® UNIVERSAL LEGUMINOSENFREI is recommended when the subsequent main crop contains legumes.

viterra® BEISAAT is new and available in two types: GROB (coarse) and FINE. Both should be sown together with winter oilseed rape.

Recommended varieties

Phacelia ANGELIA
Saia oat PRATEX, CODEX, OTEX
Ryegrass ALISCA, DIPLOMAT
Rye PROTECTOR, LUNATOR and more
Linseed JULIET, ZOLTAN
Persian clover FELIX
Egyptian clover OTTO
Broad bean AVALON

...for rapeseed

...for maize

Recommended blends

viterra® MAIS, viterra® MULCH and viterra® WASSERSCHUTZ are suitable for agriculture on sites with high nitrogen replenishment potential. Thanks to a high legume content, winter-hardy blend viterra® MAIS STRUKTUR and freezing-off blend viterra® BODENGARE both encourage soil fertility.

viterra® SCHNELLGRÜN, viterra® SCHNELLGRÜN LEGUMINOSENFREI, viterra® WASSERSCHUTZ and new blend viterra® WINTERGRÜN are especially well suited to late sowing.

Recommended varieties

White mustard ALBATROS, CLASSIC, COVER
Oilseed radish SILETINA
Taproot-forming oilseed radish STINGER
Forage rape JUMBO 00, FONTAN 00
Winter turnip rape JUPITER
Phacelia ANGELIA
Saia oat PRATEX, OTEX, CODEX
Ryegrass ALISCA, DIPLOMAT
Rye PROTECTOR, LUNATOR and more
Beet cyst nematodes (Heterodera schachtii) are still the most important sugar beet pest economically. So, tackling nematodes in affected areas must be a top priority. Especially in tight sugar beet rotations, resistant cover crops contribute to forcing nematodes under the damage threshold and creating optimal growth conditions. Even when cultivating sugar beets, resistant cover crops not only reduce the nematode population, but also promote the long-term beet and sugar yield, and therefore the rentability of growing beets.

Resistant oilseed radish and white mustard activate larval hatching and migration to the roots.

**Impact of cover crops in sugar beet crop rotations**

![Impact of cover crops in sugar beet crop rotations](image)

Unlike host plants, resistant plants restrict the formation of the nurse cell system. The nematodes cannot get sufficient nutrients, so the majority die prematurely. As the females require around 40 times more nutrition during their development than the males, the sex ratio is skewed in resistant plants to 100 (up to 1,000) males to 1 female. The lack of females leads to population decline.

Resistant cover crops are classified into resistance levels according to their reproduction rate (final population / initial population). Resistance level 1 entails a reduction of more than 90% (reproduction rate <0.1). Plants that can serve as host plants for nematodes increase nematode numbers by around 4 times in the same period. Among plants that are not host plants (neutral plants, such as phacelia or saia oat), the nematode population decreases by around 30 percent annually.

Beet nematode cysts can survive in soil for more than 10 years, and can be found in deep layers of the ground. Alongside beets, host plants include many crucifers (rapeseed, mustard, radish, camelina and spinach) as well as many different weeds.

**Even after 40 years of using resistant cover crops, and even in stress situations, no resistance-breaking nematodes have developed. As well as comprehensive resistance, the promotion of antagonistic fungi is also part of biological nematode control.**
How to use diversity of varieties:

Nematode-resistant cover crops are exceptionally well suited to reducing beet cyst nematode infection in cover crop cultivation. Intense breeding has led to a range of varieties suitable for individual use. Nematode resistance, initial development and flowering tendency are important criteria when choosing a variety:

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Choice of white mustard</th>
<th>Choice of oilseed radish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Low flowering tendency</td>
<td>All</td>
</tr>
<tr>
<td>Medium</td>
<td>Low flowering tendency</td>
<td></td>
</tr>
<tr>
<td>Late</td>
<td>Medium flowering tendency</td>
<td>Rapid initial development and medium flowering tendency</td>
</tr>
<tr>
<td>Very late</td>
<td>Very rapid initial development</td>
<td></td>
</tr>
</tbody>
</table>

White mustard has a strong reaction to day length so should not be sown too early. Even with later sowing dates up to mid of September White mustard grows well. Good initial development not only ensures weed suppression through good coverage, but also creates soil tilth and evaporation protection.

<table>
<thead>
<tr>
<th>Nematode reduction</th>
<th>Choice of white mustard</th>
<th>Choice of oilseed radish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beets</td>
<td>Well suited for medium to low nematode infestation levels</td>
<td>Strong nematode reduction through better resistance and deeper root penetration</td>
</tr>
<tr>
<td>Stem nematodes</td>
<td>Avoid white mustard</td>
<td>No multiplication of Ditylenchus dipsaci</td>
</tr>
<tr>
<td>Beet-potato crop rotations</td>
<td>Avoid white mustard</td>
<td>Multi-resistant oilseed radish</td>
</tr>
</tbody>
</table>

Oilseed radish reaches deep into the lower layers of soil to reduce nematodes even deep down. It is also better at promoting natural beet cyst nematode antagonists. Only oilseed radish can purposefully reduce more nematodes and diseases (see additional nematodes and diseases, page 18).

<table>
<thead>
<tr>
<th>Dryness</th>
<th>White mustard is more tolerant to drought and able to generate lots of biomass with little water available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrients</td>
<td>White mustard can build up dense crops in low-nutrient conditions</td>
</tr>
<tr>
<td></td>
<td>Oilseed radish can absorb a lot of nitrogen in a short time, preventing displacement.</td>
</tr>
<tr>
<td>Freezing off / mulch sowing</td>
<td>White mustard is not frost-hardy. More stable varieties dry out better and are suitable for mulch as well as direct sowing</td>
</tr>
<tr>
<td></td>
<td>Varieties that are not very winter-hardy and those that have developed to the point of flowering freeze off more easily</td>
</tr>
</tbody>
</table>

Extra high-quality seeds ensure dense, thorough crop coverage and actively contribute to weed reduction.
**Nematode-resistant white mustard**

### VERDI
**A class of its own**
- Tested in France and allocated to resistance level H1 (over 90% reduction in sugar beet nematodes)
- Extremely late flowering allows early sowing without seed formation
- Easy sowing, fast ground cover and long vegetative growth phase

### NARWAL
**Nematode resistance level 1**
- Newly approved
- Specialist for controlling nematodes in beet crop rotations
- Especially suited to sowing from early August

### MASTER
**Fast beginning – late flowers**
- High tolerance to late sowing thanks to rapid initial development: sowing till mid of September delivers good results
- Weeds are effectively suppressed and valuable nutrients organically protected from leaching

### TOPAS
**Optimised and efficient**
- Combination of rapid initial development and late flowering ensures a long period of nematode control
- Reliably freezes off over winter and leaves optimal conditions for mulch sowing
**ACCENT**

Well-known and well-valued
- Up to 90% reduction of nematodes in official tests - resistance level 2
- Quick and easy sowing, rapid and complete ground cover

**CLINT**

A resounding success
- Fast initial development ensures good tolerance to late sowing with effective weed suppression
- Good biomass can still be achieved when sowed up to mid September

**PROFI**

The professional before beets
- Generous ground shade intensively promotes weed suppression and tilth formation
- Late flowers for long vegetative development and long-lasting hatching stimulation

**GAUDI**

A treat before sugar beet
- Low flowering tendency allows early sowing dates without the formation of mature seeds
- Easy to sow and rapid ground cover

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**Nematode-resistant white mustard overview**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>VETO</td>
<td>Force against nematodes</td>
</tr>
<tr>
<td>LOTUS</td>
<td>For direct sowing</td>
</tr>
<tr>
<td>LUCIDA</td>
<td>Extremely late bloomer</td>
</tr>
<tr>
<td>SCOUT</td>
<td>Most rapid initial development</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Resistance level 1 to beet cyst nematodes</th>
<th>Resistance level 2 to sugar beet nematodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LUCIDA NARWAL</td>
</tr>
<tr>
<td>3</td>
<td>VERDI</td>
</tr>
<tr>
<td>4</td>
<td>GAUDI VETO LOTUS</td>
</tr>
<tr>
<td>5</td>
<td>PROFI CLINT TOPAS</td>
</tr>
<tr>
<td>6</td>
<td>ACCENT MASTER</td>
</tr>
<tr>
<td>7</td>
<td>SCOUT</td>
</tr>
</tbody>
</table>

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Key:
- Resistance level 1
- Resistance level 2
- Variety names

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Initial development
**Nematode-resistant oilseed radish**

### AMIGO

**A sugar beet’s best friend**
- Highest level of resistance: encourages beet cyst nematodes to hatch and actively reduces the population to under the damage threshold
- Also suitable for late sowing up to early September
- Rapid development increases sensitivity to frost
- Dense root system fixes nutrients and prevents leaching into deep soil layers

### AGRONOM

**The specialist for sugar beet and potatoes**
- Fastest ground cover for reliable weed suppression
- Delayed flowering offers flexibility regarding sowing time
- Strong root penetration of the soil and good nutrient storage offer optimal conditions for the following crop
- AGRONOM controls beet cyst nematodes and Corky Ringspot Syndrom in potatoes

### COMPASS

**Freezes off easily**
- Resistance level 2, freezes off more easily and faster than traditional oilseed radish varieties
- Fast soil warming in spring due to the low mulch layer allows early sowing of sugar beet and maize
- No additional work or costs required to work in - ideal for mulching and direct sowing of following crop

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**Sensitivity to frost**

Due to the low winter hardiness of COMPASS, a very high percentage of the plants freeze off during winter. The remaining plants can be destroyed cost-effectively by rolling the crop on frozen ground in a process that is both soil-friendly and environmentally-friendly. A clean field in spring proves good weed suppression.
Efficient with nematodes and nutrients

- Strong initial development for quick ground cover and use of remaining heat units
- Forms large amount of mass thanks to long vegetative growth phase
- Intensive root penetration for good tilth

SUNDAY

Cold-tolerant and extremely late-flowering

- Low-growing for less work with the flail mower
- Ideal for long-term retention of nutrients over winter
- Deep roots thanks to extremely long vegetative growth phase

SUCCESS

Successful beet cultivation

- Good weed suppression and robust initial development
- Strong root penetration with reserved flowering tendency
- Fixes nutrients in the topsoil

Nematode-resistant oilseed radish overview

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAGIO</td>
<td>Top variety for reliable nematode control</td>
</tr>
<tr>
<td>COMET</td>
<td>Best performance against beet cyst nematodes</td>
</tr>
<tr>
<td>CONCORDE</td>
<td>Promotes beet yield and quality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variety</th>
<th>Flowing tendency</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUNDAY</td>
<td>2</td>
</tr>
<tr>
<td>CONTRA</td>
<td>3</td>
</tr>
<tr>
<td>COMPASS</td>
<td>4</td>
</tr>
<tr>
<td>ADAGIO</td>
<td>4</td>
</tr>
<tr>
<td>COMET</td>
<td>4</td>
</tr>
<tr>
<td>CARUSO</td>
<td>5</td>
</tr>
<tr>
<td>SUCCESS</td>
<td>6</td>
</tr>
<tr>
<td>ANGUS</td>
<td>7</td>
</tr>
<tr>
<td>DEFENDER</td>
<td>8</td>
</tr>
<tr>
<td>SULINA</td>
<td>8</td>
</tr>
<tr>
<td>AGRONOM</td>
<td>8</td>
</tr>
</tbody>
</table>

Initial development

Resistance level 1 to beet cyst nematodes
Resistance level 2 to beet cyst nematodes
Underlined varieties also tackle Meloidogyne chitwoodi
DEFENDER

Multi-resistant top variety

Resistances:
- Disrupts disease cycles in vegetable, potato, sugar beet and cereal crop rotations
- Up to 90% reduction of beet cyst nematodes (resistance level 2+)
- No multiplication of stem nematodes (Ditylenchus dipsaci)
- Reduces Corky ringspot syndrome in potatoes
- Efficient reduction of root-knot nematodes and free-living nematodes

Agronomic properties:
- Strong initial development and rapid ground cover for effective weed suppression
- Deep-reaching, fine root system improves soil structure

CONTROL

The multi-resistant update

- Multi-resistant origin: selected from DEFENDER
- Resistance to beet cyst nematodes in the upper area of level 2
- Officially confirmed resistance to root gall nematodes
- No multiplication of stem and bulb nematodes, reduces Corky Ringspot syndrome
- Encourages positive soil life
- Worsens survival conditions for Rhizoctonia
- Medium frost susceptibility for long-lasting nutrient binding and soil protection
- Strong vegetative growth with intense root formation

CARUSO

Exceptional before potatoes

- Effective control of various nematodes and diseases e.g. *Heterodera schachtii* and root knot nematodes
- Rapid ground covering for effective suppression of volunteer growth and weeds
- Fast, healthy initial development, increases organic substance and supports soil fertility

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRA</td>
<td>The specialist for vegetable crop rotations</td>
</tr>
<tr>
<td>ANGUS</td>
<td>The multi-resistant powerhouse</td>
</tr>
</tbody>
</table>
Overview: Effectiveness of cover crops against nematodes and diseases

Beet cyst nematodes
- Over 90% reduction of Heterodera schachtii possible
- Controlling of Heterodera betae
- No development of resistance-breaking nematodes
- Controls even in deeper soil layers

Southern root-knot nematodes
- Meloidogyne incognita and M. javanica are effectively reduced
- In greenhouses and in peppers, tomatoes and pumpkins

Root-knot nematodes
- Officially tested resistance to Meloidogyne chitwoodi
- Prevents the development of M. fallax
- For crop rotations with potatoes, vegetables and flower bulbs

Stem and bulb nematodes
- No multiplication of Ditylenchus dipsaci as a cover crop
- For crop rotations with beets, vegetables and flower bulbs

Northern root-knot nematodes
- Efficient control of Meloidogyne hapla
- For organic crop rotations with high clover growing frequency and carrot farming
- Also protects potatoes and sugar beet

Lesion nematodes
- Poor host plants for Pratylenchus nematodes
- On sandy soil as a cover crop
- For crop rotations with potatoes, rapeseed, cereals, vegetables and flower bulbs

Corky Ringspot syndrome
- Reduces Corky Ringspot syndrome (Tobacco Rattle Virus) in potatoes
- Suppresses free-living Trichodorus nematodes that spread the virus
- Reduces weeds through rapid ground cover

Pythium
- Reduces damage caused by Pythium fungus
- In crop rotations with peas, potatoes and flower bulbs

Rhizoctonia rot
- Reduction of yield and quality issues caused by Rhizoctonia
- Controls root-kill disease and dry-core in potatoes
- Controls Rhizoctonia in beets
- In lettuce, cabbage and many other cultures including maize, grass, beans and flowering bulbs
- Promotes structure, pore volume and aeration of the soil
- Encourages natural antagonists

Clubroot
- No build-up of the clubroot pathogen Plasmodyphora brassicae when grown as a cover crop in crop rotations with oilseed rape and cabbage

Cereal crop rotation diseases
- Good disruption of the disease cycles in cereal crop rotations (e.g. take-all (Gaeumannomyces graminis)

Preceding crop impact of various cover crops:

<table>
<thead>
<tr>
<th>Sugar beet</th>
<th>Potatoes</th>
<th>Rapeseed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heterodera schachtii</td>
<td>Trichodorus spp.</td>
<td>Meloidogyne hapla</td>
</tr>
<tr>
<td>Ditylenchus dipsaci</td>
<td>Trichodorus spp.</td>
<td>Meloidogyne hapla</td>
</tr>
<tr>
<td>Rhizoctonia</td>
<td>TRV</td>
<td>Clubroot</td>
</tr>
<tr>
<td></td>
<td>Pratylenchus spp.</td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td>Meloidogyne chitwoodi</td>
<td></td>
</tr>
<tr>
<td>Oilseed radish</td>
<td>Varieties</td>
<td>Varieties</td>
</tr>
<tr>
<td>Tillage radish</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>White mustard</td>
<td>Varieties</td>
<td>Varieties</td>
</tr>
<tr>
<td>Brown mustard</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Forage rape</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Turnip rape</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Saia oat</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Forage rye</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Phacelia</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Berseem clover</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Persian clover</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Common vetch</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Blue lupin</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Flax</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Positive</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

Legend: positive, neutral, negative, no entry.
Additional nematodes and diseases

As well as beet cyst nematodes, other nematodes are increasingly causing problems. Crop rotations with a high proportion of root crops and vegetables are especially affected. In addition to beet cyst nematodes, multi-resistant oilseed radish varieties also reduce other nematodes and have been tested for their impact on many diseases of the following crop.

The cultivation of cover crops must be carefully considered so that the cover crop varieties used do not exacerbate the infestation and endanger the main crop. A reduction in chemical treatment options and warmer climatic conditions are making the problem worse. Subsequent crop planning, cultivation and field hygiene form the basis for successful pest management.

**Trichodorus and Corky Ringspot syndrome**

As free-living nematodes, Trichodorus are hard to treat directly as they are also found deep in the soil, waiting to attack new plants. Here, only rough classification of host plant status for plant varieties has been possible up to now. It is important to encourage the initial development of main cultures through optimal growth conditions so that they can quickly develop out of their vulnerable initial phase.

Cover crops can reduce the transfer of the tobacco rattle virus, which causes the Corky Ringspot syndrome. In particular, the cultivation of oilseed radish has proven a very effective control. The Trichodorus nematode loses the virus when a suitable cover crop is cultivated, so it is no longer able to spread the virus disease.

As many weeds and volunteer potatoes provide an opportunity for nematodes to reinfect themselves with the virus, these agricultural measures form the foundations of treatment. Cover crops with rapid ground cover and good weed suppression support these measures.

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**Impact of various cover crops on potato yield and Corky Ringspot syndrome**

(private trial carried out by LWK NRW)

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**Our recommended varieties against viral internal rust spot**

- **Multi-resistant oilseed radish:** DEFENDER, ANGUS, CONTRA, CONTROL, CARUSO
- **Oilseed radish, resistant to beet cyst nematodes:** COMPASS, AGRONOM
- **Oilseed radish, conventional:** SILETTA NOVA, BENTO
- **More cover crops** (blend partner for oilseed radish): Flax, saia oat PRATEX and CODEX, common vetch and blue lupin.

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**Find out more in the YouTube video**

‘Zwischenfruchtanbau bei Kartoffel-Profis’

[YouTube]
Root Lesion Nematode (*Pratylenchus ssp*)

These migratory root nematodes are often found in sandy soils and can lead to significant losses in potato, vegetable and grain yields. They usually form clusters. Plants that are attacked experience stunted growth and are more susceptible to fungal infections such as *Verticillium* and *Fusarium*.

French marigold *Tagetes patula* is a real specialist in reducing root lesion nematodes, as it actively controls the nematodes by excreting thioterpene compounds. Once *Tagetes patula* has been cultivated successfully, the population will only slowly recover, so this impact lasts for several years. Seeds should be sown in June with special sowing machinery, which is relatively expensive. As marigold multiplies Corky Ring spot syndrome, potato farmers have limited options.

The cultivation of saia oat is a practical compromise. Saia oat doesn’t multiply root lesion nematodes and reduces Corky Ring spot syndrome. It is an easy-going cover crop that suppresses weeds as an alternative host for nematodes with its plentiful foliage and roots, while stimulating positive soil life.

Multi-resistant oilseed radish is also a bad host for root lesion nematodes. When infested with lesion nematodes, the components of seed blends should be carefully considered: even a small ratio of host plants can be used by nematodes for mass reproduction, endangering yield.

Gall-forming nematodes (*Meloidogyne chitwoodi, Meloidogyne hapla*)

The *columbia root knot nematode* (*Meloidogyne chitwoodi*) has an immensely large range of host plants and should not be underestimated, as this is a quarantine disease in Europe.

High-performance oilseed radish varieties are available that suppress infestation to under the detection level. The oilseed radish DEFENDER was selected in the EU Project DREAM (Durable Resistance Against Meloidogyne) and was the first oilseed radish used to reduce this quarantine-worthy pest. In the meantime, this property is being reviewed at official variety testing in Germany and the Netherlands on request, and is documented in variety lists. Take the opportunity to regulate this pest with oilseed radish! Oilseed radish varieties with resistance to *Meloidogyne chitwoodi*: ANGUS, CARUSO, CONTRA, CONTROL, DEFENDER.

The *northern root knot nematode* (*Meloidogyne hapla*) only attacks dicotyledonous plants. As legumes are good host plants, this pest is often found in organically cultivated soil. As well as the thorough avoidance of dicotyledonous plants, the CONTRA and ANGUS oilseed radish varieties can be used to suppress nematodes.

Both root gall nematodes need host plants to survive. A purposefully unsuitable cover crop can almost completely eliminate an infestation.
Rhizoctonia

Fungal Rhizoctonia causes damage and loss of yield in potato, sugar beet, broad bean and soy crops.

Rhizoctonia can be split up into various host spectrums (anastomosis groups). Sugar beet, legumes, maize and grasses are mostly affected by group AG 2-2, while potatoes are mainly impacted by AG-3 and a more general group (AG-4) that only causes minimal damage.

All Rhizoctonia groups thrive in conditions including waterlogging and ground compaction, tight crop rotations and lots of unrotted, lignin-rich organic material.

Aside from the species’ and varieties’ susceptibility to Rhizoctonia fungus, the proportion in a blend is a deciding criterion in the disease’s occurrence.

Cover crops that encourage root penetration and soil ventilation make it harder for this fungal disease to survive. Furthermore, many crucifers directly suppress Rhizoctonia thanks to their distinct roots and sulphur content.

Clubroot

One particularly important disease that must be taken seriously in winter oilseed rape cultivation is clubroot (Plasmodiophora brassicae). Clubroot is a slime mould and affects the roots of crucifer plants, on which it forms swollen masses (hernias). Clubroot can survive for up to 20 years in the soil, meaning complete carnage for winter oilseed rape.

If oilseed rape is cultivated in soil infected with clubroot, crucifers should not be used as cover crops as they can further exacerbate the infection. As well as white mustard, brown mustard and forage rape, camelina and cress are among the crucifers. Oilseed radish is less susceptible than other cover crops from the crucifer family, but even oilseed radish should only be used as a cover crop in less tight crop rotations without clubroot infection. The oilseed radish variety with the lowest clubroot infection rate is DEFENDER.

Cover crops that do not act as host plants for clubroot, such as phacelia, saia oat, flax, legumes and others, avoid the risk of exacerbating a clubroot infection.

To sum it up:

Controlling individual nematodes and diseases requires targeted cultivation management, as nematodes don’t usually appear as individual groups, rather as a mixture of various groups. In order to effectively reduce diseases with cover crops, it is helpful to know as much about the nematodes in the soil as possible. The best time to take soil samples is during a cool, moist phase (generally November to February).

In warm and dry conditions, free and migratory root nematodes withdraw to deeper soil layers and cannot be detected. If you suspect Pratylenchus, it is advisable to have plant roots tested, as nematodes can overwinter there. Many agricultural institutes carry out nematode tests. Some independent labs in the Netherlands have even specialised in soil samples before potato crops.

If the reduction of nematodes and disease is the focus when choosing a suitable cover crop, it is generally advisable to limit yourself to a few species. Within these species, take advantage of the immense progress made within breeding. Even agronomic properties such as rapid initial development, late sowing suitability and easy freezing off can help to improve treatment. Diverse blends increase the risk that nematodes and diseases could use individual components to reproduce. It is therefore important to only use these if the subsequent crop is not vulnerable.
**SILETTA NOVA**

Reduces Corky Ringspot syndrome in potatoes

- Reliable and tested for quality potatoes
- SILETTA NOVA alleviates virus transfer by Trichodorus nematodes
- Rapid and especially leafy ground shade suppresses weeds that the virus could use to multiply
- The deep root system creates optimal soil conditions and reduces soil compaction
- SILETTA NOVA contributes to long-term, sustainable potato yields

More yield with oilseed radish
(Kartoffelberatung LWK NRW, Kanders + Beerendonk, 2004 - 2019)

<table>
<thead>
<tr>
<th>Crop rotation</th>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Silage maize</td>
<td>Silage maize</td>
</tr>
<tr>
<td>2nd year</td>
<td>Winter wheat</td>
<td>WW + oilseed radish</td>
</tr>
<tr>
<td>3rd year</td>
<td>Potatoes</td>
<td>Potatoes</td>
</tr>
</tbody>
</table>

**Sticky nightshade**

Sticky nightshade is resistant to *Globodera rostochiensis* (pathotypes 1 to 4) and *Globodera pallida* (pathotypes 2 and 3) and is part of the *Solanaceae* family (nightshades). Sow: Mid May to mid July.

**WHITE STAR**

Dense root penetration to control *Globodera*

**DIAMOND**

Strong growth and strong control
Saia oat against Pratylenchus

Saia oat (Avena strigosa) is a commonly used cover crop thanks to its undemanding nature. Grown for nematode reduction, erosion protection, as a biomass producer or in cover crop blends, it covers a large range of needs.

Especially in light soil, damage caused by Pratylenchus can lead to considerable quality and yield losses. Not only the nematodes themselves damage the plants, but they also enable fungi such as Fusarium and Verticillium to easily access the plants. The large number of possible host plants includes both cultivated crops and weeds, which makes control even more difficult. PRATEX has proven its suppression skills in many tests and in practical planting. New saia oat varieties CODEX, TRADEX and OTEX also reduce Pratylenchus penetrans.

New knowledge from research: unlike standard oat varieties, PRATEX, OTEX and CODEX reduce cereal cyst nematodes (Heterodera avenae).

PRATEX

Controlling Pratylenchus penetrans

- Controls lesion nematodes (Pratylenchus penetrans) without any multiplication of Trichodoridus species
- Sowing: As a cover crop with a seed drill
- Very rapid initial development and good competition against weeds (allelopathy) that could be potential multipliers for Pratylenchus
- High production of organic mass, dense root penetration of soil
- Cover crop that freezes off well

OTEX

Strong initial development

- Flexible use - as green manure and for fodder production
- Rapid soil coverage and weed suppression

CODEX

The late saia oat

- Long vegetative growth phase through late ear emergence
- Fine root network with mycorrhiza formation

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUNEX</td>
<td>Green manure or fodder</td>
</tr>
<tr>
<td>TRADEX</td>
<td>The yielding one</td>
</tr>
</tbody>
</table>

Breeding of cereal cyst nematodes (Heterodera avenae)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Females per plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coddy</td>
<td>30.1</td>
</tr>
<tr>
<td>Delin</td>
<td>23.4</td>
</tr>
<tr>
<td>Symphony</td>
<td>16.8</td>
</tr>
<tr>
<td>Poseidon</td>
<td>54.4</td>
</tr>
</tbody>
</table>

Oat Avena sativa
Saia oat Avena strigosa

Source: P. H. PETERS, own research

Practical experiences regarding infestations and the control of Pratylenchus in the ‘Aus der Praxis’ article www.saaten-union.de/aus-der-praxis/
<table>
<thead>
<tr>
<th>ALBATROS</th>
<th>SIL NOVA</th>
<th>STINGER</th>
<th>FONTAN</th>
<th>GRÜNER</th>
<th>JUPITER</th>
<th>PRATEX</th>
<th>PROTECTOR</th>
<th>AUSCA</th>
<th>ANGELIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASTER</td>
<td>COMPASS</td>
<td>MINER</td>
<td>EMERALD</td>
<td>ANGELER</td>
<td>CODEX</td>
<td>TRAKTOR</td>
<td>LUNATOR</td>
<td>DIPLOMAT</td>
<td>etc.</td>
</tr>
<tr>
<td>VERDI</td>
<td>DEFENDER</td>
<td>JUMBO</td>
<td>CAMARO</td>
<td>OTEX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>etc.</td>
</tr>
<tr>
<td>etc.</td>
<td>AGRONOM</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
</tr>
</tbody>
</table>

**Structure for the soil**

<table>
<thead>
<tr>
<th>White mustard</th>
<th>Oilseed radish</th>
<th>Tillage radish</th>
<th>Forage rape</th>
<th>Marrow stem kale</th>
<th>Winter turnip rape</th>
<th>Saia oat</th>
<th>Forage rye</th>
<th>Annual and Italian ryegrass</th>
<th>Phacelia</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVALON</td>
<td>RUBIN</td>
<td>ILDIGO</td>
<td>NEON</td>
<td>FELIX</td>
<td>OTTO</td>
<td>CONTEA</td>
<td>PEREDOVICK</td>
<td>TABEA</td>
<td>JULIET</td>
</tr>
<tr>
<td>etc.</td>
<td>PIONIR</td>
<td>ARGON</td>
<td>BELLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Poster:**
The most important cover crops at a glance. Order your copy at service@saaten-union.de, ask your sales rep or download one in the download centre.
**SILETINA**

**Biologically highly effective green manure**

- Tried-and-tested by many farmers: convincing growing - even when sown late and in unfavourable soil conditions
- Extraordinary rapid initial development for effective weed suppression

---

**INFORMER**

**Boosts soil life and protects from erosion**

- Flexible sowing thanks to low flowering tendency
- The organic matter vitalises soil activity, keeps nutrients in the topsoil and provides valuable humus

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKIRO</td>
<td>Robust and fast</td>
</tr>
</tbody>
</table>

---

**STINGER**

**Tillage radish to improve soil**

- Leafy initial development and low growth height
- Binds freely available nitrogen in autumn and prevents leaching
- Radish dies off and rots over winter
- The roots form large holes in the soil, encouraging spring soil warming.

---

**MINER**

**Forms taproots to aerate soil**

---

**Marrow stem kale**

Marrow stem kale is used for cattle fodder, on gameland and in winter-hardy cover crop blends.

**GRÜNER ANGELITER**

**Protein-rich and vitamin-dense dairy cattle fodder**

- Very high mass yield with balanced leaf ratio
- High vitamin, nutrient and protein content
- Reliable basic feed through to autumn

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMARO</td>
<td>For fodder and gameland</td>
</tr>
<tr>
<td>ANGLIAN GOLD</td>
<td>Exceptional frost resistance</td>
</tr>
</tbody>
</table>

---

**Tillage radish**
White mustard for soil covering

CLASSIC

Late-flowering

- Especially long vegetative growth for more organic matter
- Allows sowing from August into autumn without seed formation or woody growth
- Recommended for water conservation areas, mulch sowing and agricultural blends

ALBATROS

Tried-and-tested quality variety

- Secure freezing off in winter - plant residues provide good erosion protection even after dying off
- The nutrients conserved in the organic matter are protected from erosion during winter and are available in the following spring
- Tried and tested for trouble-free mulch sowing - especially in maize rotations

COVER

Rapid initial development

- Strong initial development allows late sowing
- Effective weed suppression and reliable protection against erosion and nutrient loss over winter
- Freezes off safely

Brown mustard (Brassica juncea)

High levels of special glucosinolates in the leaves and grains make this species (Brassica juncea) excellently suited to use in biofumigation to combat soil-bound diseases. Also used to make mustard products for human consumption.

TERRAFIT

Fast-growing

- Fast early development und growing, early start of flowering
- Very high active substance content
- Dark seeds

ENERGY

Multifunctional

- Fast initial development, medium-early flowering
- High levels of isothiocyanates released
- Multi-coloured seeds
Forage rape (Brassica napus)

Forage rape is a tasty fodder for cattle. It offers very good green matter and dry matter yields with a high protein content. As green manure, the organic matter helps humus formation and promotes optimal soil quality. A high capacity to bind nutrients makes both winter and summer forage rape an excellent species for water protection. The network of fine roots covers large areas of soil, stabilising soil structure and promoting air exchange within the soil.

**Spring forage rape**

**JUMBO 00**

**Great in fodder and green manure**

- Free of erucic acid and glucosinolates
- Favourable leaf/stalk ratio
- Withstands light frosts
- Good stability

**Fontan**

**Fast-growing and efficient supplier of feed**

- Early fodder reserve
- High-quality protein fodder
- Fast ground cover as erosion and nutrient protection

**Emerald**

**Tasty and high-yield**

- Highly digestible quality fodder
- Effective green manure

**Prestige 00**

**Valuable for trough and soil**

- Fast-growing and leafy
- Can be sown early or late

Winter turnip rape (Brassica rapa var. silveticus)

As a winter-hardy green manure for erosion protection and nitrate binding with dense root penetration and a high potential for nitrate return to the subsequent crop. It can be cut or grazed off.

**Jupiter**

**Use for fodder, green manure and water conservation**

- Suitable for late sowing up to mid September
- When sown early, can first be used after 6-8 weeks
- High nutrient uptake capacity
- Effective water protection measure

[Graph: Nitrogen storage and release: a comparison of oilseed radish and winter turnip rape]

Source: Richter, 1992-96
Phacelia (*Phacelia tansyfolia*)

As a neutral plant for beet nematodes and clubroot, phacelia is a suitable cover crop for beet crop rotations with rapeseed. In all crop rotations, phacelia impresses with its undemanding nature and drought tolerance. As a popular pasture plant for bees, it improves the landscape when sown alone or as part of a floral blend, then reliably freezes off and protects the soil from erosion damage.

**ANGELIA**

*The most delicate stems*

- High-yielding honey plants, can be used to fill the summer gap
- Leaves an easy-to-work and dark fine-stemmed mulch layer in spring that promotes soil warming
- Additional organic substance stabilises the soil’s humus content
- Unlocks organically bound phosphorus

**AMERIGO**

*Drought-tolerant, dense growth*

- Low requirements for soil type and water supply

**Linseed (*Linum usitatissimum*)**

This traditional plant for oil production is also excellently suited to growing as a cover crop. Linseed is a fine-seeded, neutral plant in cover crop blends. It has deep root penetration and can develop silicon as a nutrient for the subsequent crop.

**JULIET**

*Fine and drought-tolerant*

- Easy and reliable cover crop
- Established plants are frost-sensitive

**ZOLTAN**

*Easy-going and stable*

- Fine taproots that grow deep into the soil
- Good support plant for climbing legumes
- Striking flowers enhance the blend

**Extra high-quality seeds**

Seed production is subject to constant quality control. The latest cleaning and preparation equipment as well as high-performance packaging systems guarantee that seed is only delivered if it exceeds statutory norms.

<table>
<thead>
<tr>
<th>Multiplication</th>
<th>Cleaning</th>
<th>Control and certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officially tested seed base</td>
<td>The latest, high-performance cleaning facilities</td>
<td>In-house quality management from multiplication to delivery</td>
</tr>
<tr>
<td>Selection of suitable regions and plots</td>
<td>Efficient and gentle processing</td>
<td>Official certification system</td>
</tr>
<tr>
<td>Intensive multiplication support</td>
<td>Experienced and trained staff</td>
<td>Organic certification in accordance with EU regulation no. 834/2007</td>
</tr>
<tr>
<td>Field inspections by independent reviewers</td>
<td>High-performance packaging plant</td>
<td>OSS tested &amp; certified</td>
</tr>
</tbody>
</table>
Buckwheat

Buckwheat provides fast ground cover and good weed suppression. Buckwheat freezes off over winter safely. Fast flowering and seed maturation allow for grain production, meaning this plant deserves particular recognition as a cover crop.

Common buckwheat (*Fagopyrum esculentum*)

**ESKALAR**

**NEW**

**Double usage:**
- Suitable as a fast-growing cover crop or to produce grain
- Rapid initial development and ground cover with exceptional weed suppression
- Can make organically stored phosphorous available to plants
- Low requirements for soil quality and nutrients

**HAJNALKA**

**Robust and neutral regarding subsequent crop**
- Is valuable for honey bees and is often used in wild forage blends
- Fast growing, susceptible to frost

**Tartary buckwheat (*Fagopyrum tataricum*)**

Tartary buckwheat flowers significantly later than common buckwheat and contains bitterns.

**TABEA**

**NEW**

**Extremely late-flowering**
- Fast-growing and leafy for effective ground cover
- Not winter-hardy

**Legumes as cover crops**

Legumes have the ability to enter into a symbiosis with rhizobia, utilising nitrogen from the atmosphere for plant growth. This means that legumes provide any crops with additional nitrogen. Properly used, this reduces the need for mineral fertiliser and its energy-intensive production as well as increasing the subsequent crop’s N-elasticity. To maintain plant health, a sufficient cultivation distance must be ensured in crop rotations with legumes as the main crop.

Legumes are a very diverse group. We are constantly working to expand our range. If you can’t find your preferred legume over the following pages, don’t hesitate to contact us.
Clover

These annual clovers are low-maintenance and have fine seeds. With rapid development, these clovers cover the middle to deep layers of blends, and actively contribute to the nitrogen supply. Clover flowers are also attractive nectar sources for honey production.

Berseem clover (*Trifolium alexandrinum*)

**OTTO**

Nitrogen provider, valuable as a preceding crop and fodder

- Ideal properties for green manure and fodder production
- OTTO is segmental and withstands gentle frosts down to -6°C

Persian clover (*Trifolium resupinatum*)

**FELIX**

For main and cover crop cultivation

- FELIX provides very tasty and protein-rich green fodder and silage
- Dense crops that freeze off reliably for soil protection and improvement

Balansa clover (*Trifolium michelianum*)

Frost-sensitive Balansa clover is a low-maintenance blend partner with an especially small thousand kernel weight.

Fava bean (*Vicia faba*)

Fava beans are impressive cover crops with great value as preceding crops: on one hand, broad beans fix nitrogen through symbiosis with rhizobia bacteria; on the other, their strong taproots break up compacted soil and improve soil structure with their high root mass.

**AVALON**

Extremely small-grained - ideal as a cover crop

- Very low thousand kernel weight (300 - 350 g) allows a shallow sowing depth and sowing with other cover crops in a blend
- Also suitable for intersowing with winter rapeseed (see page 54)
- High N binding through symbiosis with rhizobia bacteria
- Strong taproot with high root mass for dense root penetration and improvement of soil structure
- Large rounded leaves for good weed suppression and encouraging tilth

*Intersowing AVALON with oilseed rape*
Blue lupins have a TKW about 160-200g and are pioneer plants because of their marked taproot. A symbiosis with root nodule bacteria also encourages soil fertility. As well as nitrogen, lupins are also good at absorbing potassium and phosphorus.

**ILDIGO**

**Strong growth, improves soil with deep impact**
- Ideal plant for green manuring that can bind nitrogen in its root knot
- Can grow regardless of soil’s nitrogen content and also provides neighbouring plants in the blend with the nutrient for growth
- Very valuable preceding crop

**Field peas (Pisum sativum)**

Field peas also grow in dry conditions, are more robust than protein peas and provide more biomass. When combined with other plants, field peas use any free space to suppress weeds and take advantage of light.

**RUBIN**

**Summer field pea**
- Rapid growth and very stable
- Attractive, colourful-flowering legume with small seeds
- Ample, deep root system encourages soil life

**PIONIR**

**Winter field pea**
- Especially small seeds (field peas)
- Winter-hardy as an addition to cereal blends
- Valuable fodder and green manure plant

**Vetchling/Peavine (Lathyrus sativus)**

Robust summer legumes with lots of biomass and a great ability to accumulate a lot of nitrogen within a short time. Reliably freezes off.

**ETERNA**

**For biodiversity and soil fertility**
- Colourful flowers for insect enrichment
- A valuable partner in blends and as a companion plant to oilseed rape

**Serradella (Ornithopus sativus)**

Serradella is a legume used for green manure as well as wild forage and as a meadow plant. Serradella’s dense, fine root system contributes to soil loosening and therefore soil improvement. This protects the soil from drying out and stops nutrients being washed away.
Vetches are excellent fodder plants and blend partners. They produce better and are healthier when grown together with supportcrops. The multitude of vetch species contributes to biodiversity. In blends, they contribute to the nitrogen supply of their non-legume partners.

**Common vetch**

**ARGON**

Compact-growing cover crop for blends

- Voracious grower, compact growth and reliable protein provider
- Partner for peas and oats as well as rye

**NEON**

Resistant and high-yield

- Resistant to *Aphanomyces euteiches* (blackleg in pulses)
- Ideal for producing fodder containing protein as it has the highest dry mass yield

**Winter vetch**

**BELLA**

Strong growth and a high yield - solo and in blends

- Extremely winter-hardy, secure establishment in autumn
- Exceptional development in spring and good ground cover
- Vigorous grower with good, protein-rich dry mass yields

**Crimson clover**

Winter-hardy crimson clover is ideal in grassy blends for biomass production. Through symbiosis with Rhizobiaceae, crimson clover delivers additional nitrogen, penetrates the soil densely with its roots and is therefore an excellent and impactful preceding crop.

**LATIGO**

Excellent for green manuring and fodder

This deep-rooting legume is known as the ‘queen of forage plants’, as it is persistent and winter-hardy. Ideal as a blend partner for protein-rich fodder or cover crop

<table>
<thead>
<tr>
<th>Variety</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROTEUS</strong></td>
<td>Protein-rich and fine-stemmed</td>
</tr>
<tr>
<td><strong>POSEIDON</strong></td>
<td>Versatile and high-yield</td>
</tr>
</tbody>
</table>
Winter forage rye (Secale cereale)

Forage rye is an excellent addition to biomass crop rotations areas with good water supply. Forage rye is suitable for use in fodder and biogas production. In comparison to grain types of rye forage rye tillers more strongly, has a more leavy and faster early development and is extremely cold tolerant.

PROTECTOR

Europe’s leading forage rye

- Longstanding number 1 in German evaluations
- Biomass and fodder provider with excellent return on invested time
- Double usage: for cattle and biogas
- Excellent winter growth, exceptional erosion protection
- Very good tolerance to late sowing: up to late October for greening after maize

LUNATOR

High-yield and improved stability

- High biomass-yields early in spring - ideal as previous crop before maize sowing
- Low lodging tendency for clean mowing and minimal soiling of harvested goods for very good silage quality

PROTECTOR – Top forage rye

Yield performance of winter forage rye PROTECTOR

Sowing time: autumn; harvest in following spring

<table>
<thead>
<tr>
<th>Year of harvest</th>
<th>Yield rel.</th>
<th>Yield dt/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>100.0</td>
<td>74.9</td>
</tr>
<tr>
<td>2020</td>
<td>102.0</td>
<td>64.5</td>
</tr>
<tr>
<td>2019</td>
<td>102.0</td>
<td>76.9</td>
</tr>
<tr>
<td>2017</td>
<td>102.0</td>
<td>63.2</td>
</tr>
<tr>
<td>2016</td>
<td>100.0</td>
<td>75.6</td>
</tr>
</tbody>
</table>

Source: Variety trials 2016 to 2021

TRAKTOR

Biomass and erosion protection

- High number of tillars and intensive ground cover in autumn offer good weed suppression and protection from erosion caused by wind and water
- Improved stability makes harvesting easier

Find out more in the praxisnah article ‘2023 sicher Futter erzeugen: Grünschnittroggen - anspruchslos, robust und im Aufwärtstrend’
**Perennial rye (Secale montanum)**

Perennial rye is not only suitable as a partner in wildlife feed blends, but also for producing grain for use in flavoursome, healthy baked goods.

**JOHAN**

**Original and traditional**
- Small grains and strong tillers
- Extremely winter-hardy and persistent

**Spring forage rye (Secale cereale)**

**OVID**

**Robust population rye**
- Can be used as a main crop for grain production or as a secondary crop for biomass production

**SU VERGIL**

**Healthy population rye**
- For use in cereal production and as a secondary crop
- Improved stability and heathy growing

**Annual ryegrass (Lolium multiflorum)**

Fast growing cover crop for additional forage production after cereal harvest. It can be used as fresh fodder, ensiled or used in biogas plants. The dense roots provide additional organic matter to improve humus and stabilise the soil’s structure. Also possible in undersowing or to regenerate the soil’s humus content.

**ALISCA**

**Tetraploid**
- Medium late - very flexible harvest window
- High-yield and healthy

**DIPLOMAT**

**Diploid**
- Early and fast
- Upright growth for easy cutting
## Sowing and use at a glance

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Sowing density, pure seed kg/ha</th>
<th>Thousand kernel weight g</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>White mustard nematode</td>
<td>NARWAL</td>
<td></td>
<td></td>
<td></td>
<td>15 - 25</td>
<td>6 - 10</td>
<td>12</td>
</tr>
<tr>
<td>resistance level 1*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>White mustard nematode</td>
<td>LUCIDA, VERDI H1, CLINT, TOPAS, ACCENT PROFI, GAUDI, VETO, LOTUS MASTER, SCOUT</td>
<td></td>
<td></td>
<td></td>
<td>15 - 25</td>
<td>6 - 10</td>
<td>12</td>
</tr>
<tr>
<td>resistance level 2*</td>
<td></td>
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<td></td>
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<tr>
<td>Oilseed radish nematode</td>
<td>AMIGO</td>
<td></td>
<td></td>
<td></td>
<td>20 - 30</td>
<td>10 - 15</td>
<td>14</td>
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<tr>
<td>resistance level 1*</td>
<td>COMET</td>
<td></td>
<td></td>
<td></td>
<td>20 - 30</td>
<td>10 - 15</td>
<td>14</td>
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<tr>
<td>Oilseed radish nematode</td>
<td>SUNDAY AGRONOM ADAGIO, COMPASS CONCORDE, SUCCESS, SULINA</td>
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<td>20 - 30</td>
<td>10 - 15</td>
<td>14</td>
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<tr>
<td>resistance level 2*</td>
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</tr>
<tr>
<td>Oilseed radish multi-resistant</td>
<td>ANGUS</td>
<td></td>
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<td>20 - 30</td>
<td>10 - 15</td>
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<tr>
<td>level 1*</td>
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<tr>
<td>Oilseed radish multi-resistant</td>
<td>CONTROL DEFENDER CONTRA CARUSO</td>
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<tr>
<td>Oilseed radish</td>
<td>BENTO, SILETTA NOVA AKIRO, SILETINA, INFORMER</td>
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<td></td>
<td></td>
<td>20 - 30</td>
<td>10 - 15</td>
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<tr>
<td>White mustard</td>
<td>ALBATROS COVER, CLASSIC</td>
<td></td>
<td></td>
<td></td>
<td>15 - 25</td>
<td>6 - 10</td>
<td>25</td>
</tr>
<tr>
<td>Tillage radish</td>
<td>MINER, STINGER</td>
<td></td>
<td></td>
<td></td>
<td>6 - 8</td>
<td>10 - 15</td>
<td>24</td>
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<tr>
<td>Saia oat</td>
<td>PRATEX, OTEX, TRADEX LUNEX, CODEX</td>
<td></td>
<td></td>
<td></td>
<td>60 - 80</td>
<td>15 - 30</td>
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<tr>
<td>Nematode-neutral phacelia</td>
<td>ANGELIA, AMERIGO</td>
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<td></td>
<td></td>
<td>8 - 12</td>
<td>2</td>
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<tr>
<td>Spring forage rape</td>
<td>JUMBO</td>
<td></td>
<td></td>
<td></td>
<td>10 - 20</td>
<td>3 - 7</td>
<td>26</td>
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<tr>
<td>Winter forage rape</td>
<td>EMERALD, FONTAN, PRESTIGE</td>
<td></td>
<td></td>
<td></td>
<td>8 - 20</td>
<td>3 - 7</td>
<td>26</td>
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<tr>
<td>Marrow stem kale</td>
<td>GRÜNER ANGELITER, CAMARO, ANGLIAN GOLD</td>
<td></td>
<td></td>
<td></td>
<td>3 - 4</td>
<td>3.5 - 4.6</td>
<td>24</td>
</tr>
</tbody>
</table>

* Resistance levels are based on resistance to *Heterodera schachtii* and were determined by way of official tests. Fertilisation according to local recommendations.
<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Sowing window</th>
<th>Sowing density, pure seed kg/ha</th>
<th>Thousand kernel weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter forage rye</td>
<td>PROTECTOR, LUNATOR, TRAKTOR</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Spring forage rye</td>
<td>OVID, SU VERGIL</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Perennial rye</td>
<td>JOHAN</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Winter turnip rape</td>
<td>JUPITER</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Annual ryegrass</td>
<td>ALISCA tetraploid, DIPLOMAT diploid</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Sticky nightshade</td>
<td>WHITE STAR, DIAMOND</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Brown mustard</td>
<td>ENERGY, TERRAFIT</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Linseed</td>
<td>JULIET, ZOLTAN</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Fava bean</td>
<td>AVALON</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Persian clover</td>
<td>FELIX</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Berseem clover</td>
<td>OTTO</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Balansa clover</td>
<td></td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Crimson clover</td>
<td></td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Buckwheat</td>
<td>TABOR, TABEA ESQUIRE, ESKALAR, HAJNALKA</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Common vetch</td>
<td>ARGON, NEON</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Winter vetch</td>
<td>LATIGO, BELLA</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Blue lupin</td>
<td>ILDIGO</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Serradella</td>
<td></td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<td>Alfalfa</td>
<td>PROTEUS, POSEIDON</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
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<tr>
<td>Spring field pea</td>
<td>RUBIN</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Winter field pea</td>
<td>PIONIR</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Vetchling</td>
<td>ETERNA</td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
<tr>
<td>Sunflower</td>
<td></td>
<td>July</td>
<td>Aug</td>
<td>Sep</td>
</tr>
</tbody>
</table>

Fertilisation according to local recommendations.
'Many hands make light work' or 'too many cooks spoil the broth'? Is there such a rule for cover crops? What effect do these two approaches have on crop reliability, ground cover, root penetration, organic mass, nutrients and soil health?

**Crop reliability**
Blends with lots of different species can use their diversity to cancel out unfavourable conditions. There is a greater chance that the right component is there to deal with any difficult weather conditions and heterogenous soil.

**Ground cover**
Dense coverage is achieved through proper tillage, suitable sowing density and competitive species. Crucifers such as oilseed radish and mustard are clear winners here as they form extensive leaves through strong early growth. The soil is quickly protected from rain-related soil displacement and overheating caused by direct sun, which is essential for the suppression of weeds, volunteer cereal and volunteer oilseed rape. Cover crop cultivation only gives the soil a holiday if it actually gets a break from the species in its main crop.

Last but not least, different varieties play a major role. Initial mass formation is established and compared in official state trials. AGRONOM oilseed radish was given the highest mark in this category (8 = strong to very strong). SCOUT is a white mustard variety to consider. The properties of these tested varieties often make all the difference if the cover crop grows and is able to suppress weeds and volunteers.

**Root penetration**
Above-ground growth and underground root mass have a direct impact on one another. Only a cover crop with good growth also develops healthy rootstock. Intensive root penetration contributes towards a strong added value for the subsequent main crop.

Various root types can complement one another in a cover crop blend. Experience has shown that the fibrous roots of PRATEX saia oat complement the taproots of DEFENDER oilseed radish in the viterra® INTENSIV blend very well. When more species with the same root types are added, there is hardly any space left without root penetration. Multiple plants with flat roots simply share the same root space rather than opening up new space.

**Nutrients**
Various cover crops have special strategies to make nutrients available. Depending on nutrient availability, these strategies can be very beneficial. But what counts when it comes to binding nutrients is that the cover crop grows well.
Vigorous species and varieties and varieties with healthy initial growth have a higher leaf area index. This results in more photosynthesis, i.e. more organic mass is formed. If grown well, oilseed radish tilled in mid August will achieve four tonnes of whole-plant dry mass per hectare, which then feeds the soil. Due to the C/N ratio, the roots are more effective for humus formation than above-ground growth. The root mass accounts for around 20% of the whole plant in white mustard and phacelia, whereas this is around 35% to 40% in oilseed radish and over 40% for rye grasses.

To sum it up:

diverse blends with exotic components may be lovely to look at but may fail the main task of cover crop cultivation. The primary goal of cover crop cultivation is and remains a healthy main crop with a high yield. This is how cover crops contribute towards sustainable agriculture. If biodiversity is the main goal, we must consider whether wildflower strips in fields and along thoroughfares may be more meaningful contributions. The number of species in a cover crop blend is just a number. It says nothing about the seed ratios or the quality of the components involved. The right answer is: it depends on the value of the individual components.

1) The choice of cover crop must be suitable for the agricultural aim and the location in terms of species and variety.
2) There should be no unsuitable components.
3) The use of quality seed minimises the risk of unwanted species and ensures emergence in the field.

Cover crop calculator

Working out which cover crop best suits your main crop and your business may quickly become a real challenge due to many different factors. Our cover crop calculator uses targeted questions about important conditions such as subsequent crop, soil processing, nutrient availability and sowing window to simplify your search and your decision-making process.

Simply go to https://www.saaten-union.de/zwischenfruchtrechner to use our online calculator.

Can’t find the blend you need?

SAATEN-UNION custom blends
We can make your own personal blend! When you order at least 1,500kg of each blend before the 30th of April, we can prepare your custom order with a lead time of four weeks. Please send us the percentage ratios for your components or your precise blend composition to spezialmischung@saaten-union.de or get in contact with your local sales representative. Your seed partner will take care of the invoicing.
## Overview of cover crop blends

### viterra® soil fertility blends

<table>
<thead>
<tr>
<th>Blend</th>
<th>Special feature</th>
<th>Suitable for crop rotation with Maize</th>
<th>Contents as abbreviations</th>
<th>Sowing window</th>
<th>Legume proportion, seed%</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTENSIV</strong></td>
<td>The health blend</td>
<td>++ + ++ ++ ++</td>
<td>HS, OR</td>
<td>April</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>INTENSIV N-PLUS</strong></td>
<td>The N-flexible potato trio</td>
<td>++ + ++ ++ ++</td>
<td>OR, HS, WIS</td>
<td>May</td>
<td>23</td>
<td>52</td>
</tr>
<tr>
<td><strong>POTATO</strong></td>
<td>The versatile boost for potatoes</td>
<td>++ + ++ ++</td>
<td>OR, HS, WIS, LN, LUB</td>
<td>June</td>
<td>24</td>
<td>66</td>
</tr>
<tr>
<td><strong>MULCH</strong></td>
<td>Frost-sensitive blend without clover</td>
<td>++ + ++ ++</td>
<td>HS, OR</td>
<td>July</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>RÜBE</strong></td>
<td>Professional against nematodes</td>
<td>++ ++ OR, SF</td>
<td>20 - 25</td>
<td>August</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>RÜBENGARE</strong></td>
<td>The versatile beet blend</td>
<td>++ ++</td>
<td>PHA, AKL, HS, SF, WIS, EF</td>
<td>September</td>
<td>24</td>
<td>66</td>
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<tr>
<td><strong>TRIO</strong></td>
<td>Frost-sensitive blend with clover</td>
<td>++ ++</td>
<td>PHA, AKL, OR</td>
<td>October</td>
<td>24</td>
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<tr>
<td><strong>MAZE</strong></td>
<td>Fast-growing blend without legumes</td>
<td>++ ++</td>
<td>PHA, OR, HS, LN, HI, SBL</td>
<td>November</td>
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<tr>
<td><strong>MAIS STRUKTUR</strong></td>
<td>Loosens stressed soil</td>
<td>++ ++</td>
<td>PHA, PKL, WKL, KKL, RUIW, HS, OR, RAW, WIW, LUB, HI, SBL</td>
<td>December</td>
<td>46</td>
<td>47</td>
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<tr>
<td><strong>SCHNELLGRÜN</strong></td>
<td>Suitable for late sowing, with clover</td>
<td>++ ++</td>
<td>SF, MKL, LND, SFB</td>
<td>January</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td><strong>SCHNELLGRÜN LEGUMINOSENREI</strong></td>
<td>Suitable for late sowing, without clover</td>
<td>++ ++</td>
<td>LND, SF, SFB, LN</td>
<td>February</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>WASSERSCHUTZ</strong></td>
<td>For effective groundwater protection</td>
<td>++ ++</td>
<td>RAW, RUIW, KOF</td>
<td>March</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>WINTERGRÜN</strong></td>
<td>Winter-hardy and tolerant of late sowing</td>
<td>++ ++</td>
<td>RUIW, IKL, RAW</td>
<td>April</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td><strong>UNIVERSAL</strong></td>
<td>Cruft-free and drought-tolerant</td>
<td>++ ++</td>
<td>PHA, HS, MKL, AKL, PKL</td>
<td>May</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td><strong>UNIVERSAL LEGUMINOSENREI</strong></td>
<td>No crucifers or legumes</td>
<td>++ ++</td>
<td>PHA, HS, LN, HI</td>
<td>June</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>UNIVERSAL N-PLUS</strong></td>
<td>Cruft-free and nitrogen-fixing</td>
<td>++ ++</td>
<td>PHA, HS, WIS, MKL, PKL, AKL, EF</td>
<td>July</td>
<td>29</td>
<td>61</td>
</tr>
<tr>
<td><strong>BODENGARE</strong></td>
<td>A powerhouse for main crops</td>
<td>++ ++ ++</td>
<td>PHA, PKL, WKL, MKL, AKL, HI, WIS, EF, LUB, BA, SBL</td>
<td>August</td>
<td>61</td>
<td>89</td>
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<tr>
<td><strong>HÜLSENFRUCHT-GENEME</strong></td>
<td>The nitrogen supplier</td>
<td>++ ++ ++</td>
<td>WIS, EF, BA</td>
<td>September</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>RAPS</strong></td>
<td>Frost-sensitive blend without crucifers</td>
<td>++ ++ ++</td>
<td>PHA, LN, MKL, PKL, AKL</td>
<td>October</td>
<td>24</td>
<td>12</td>
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## SortenGreening®

<table>
<thead>
<tr>
<th>Blend</th>
<th>Suitable for crop rotation with</th>
<th>Contents as abbreviations</th>
<th>Sowing window</th>
<th>Legume proportion, seed%</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VERDI + Egyptian clover</strong></td>
<td>++ ++ ++</td>
<td>SF, AKL</td>
<td>April</td>
<td>36</td>
<td>22</td>
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<tr>
<td><strong>DEFENDER + common vetch</strong></td>
<td>++ ++ ++ ++</td>
<td>OR, WIS</td>
<td>May</td>
<td>29</td>
<td>66</td>
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<tr>
<td><strong>AGRONOM + common vetch</strong></td>
<td>++ ++ ++ ++</td>
<td>OR, WIS</td>
<td>June</td>
<td>29</td>
<td>65</td>
</tr>
<tr>
<td><strong>SILETTA NOVA + common vetch</strong></td>
<td>++ ++ ++</td>
<td>OR, WIS</td>
<td>July</td>
<td>29</td>
<td>66</td>
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## viterra® special blends

<table>
<thead>
<tr>
<th>Blend</th>
<th>Special feature</th>
<th>Suitable for crop rotation with Maize</th>
<th>Contents as abbreviations</th>
<th>Sowing window</th>
<th>Legume proportion, seed%</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNTERSaat Klee PLUS</strong></td>
<td>Clover undersowing for cereals</td>
<td>++ ++ ++</td>
<td>WD, WKL</td>
<td>April</td>
<td>Depending on main crop</td>
<td>29</td>
</tr>
<tr>
<td><strong>UNTERSaat GRAS FRüh</strong></td>
<td>Efficient greening for sowing with maize</td>
<td>++ ++ ++</td>
<td>ROT, WSC</td>
<td>May</td>
<td>Depending on main crop</td>
<td>0</td>
</tr>
<tr>
<td><strong>UNTERSaat GRAS</strong></td>
<td>For sustainable maize cultivation</td>
<td>++ ++ ++</td>
<td>WV, WD</td>
<td>June</td>
<td>Depending on main crop</td>
<td>0</td>
</tr>
<tr>
<td><strong>BEISAAT FEIN</strong></td>
<td>Intensowing for high-yield rapeseed cultivation</td>
<td>++ ++ ++</td>
<td>AKL, PKL, BKH, MKL</td>
<td>July</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>BEISAAT GROB</strong></td>
<td>Strong partner for oilseed rape cultivation</td>
<td>++ ++ ++</td>
<td>BA, LUB</td>
<td>August</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Blend</td>
<td>Special feature</td>
<td>Suitable for crop rotation with</td>
<td>Contents as abbreviations</td>
<td>Seed quantity kg/ha</td>
<td>Sowing window</td>
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<td>---------------------------</td>
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<td>---------------------------------</td>
<td>--------------------------</td>
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<td></td>
</tr>
<tr>
<td>LUNDSGAADER GEMENGE</td>
<td>Winter-hardy fodder blend for greening</td>
<td>+ + + + +</td>
<td>WV, WK, WJ, WEF</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRANOPUR</td>
<td>WPS use before winter</td>
<td>+ + + + + + +</td>
<td>TIS, HA, HS, RS</td>
<td>130 - 150</td>
<td>0 0 56</td>
<td></td>
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<tr>
<td>GRANOLEG</td>
<td>WPS use before winter with legumes</td>
<td>+ + + + + + +</td>
<td>TIS, HA, RS, EF, HS</td>
<td>130 - 150</td>
<td>4 19 56</td>
<td></td>
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<tr>
<td>WICKROGEN</td>
<td>Winter-hardy WPS blend</td>
<td>+ + + + + + +</td>
<td>RW, WW</td>
<td>100 - 120</td>
<td>9 10 57</td>
<td></td>
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<tr>
<td>WICKROGEN FUTTER</td>
<td>Winter-hardy blend for WPS and fodder use</td>
<td>+ + + + + + +</td>
<td>RW, WJ, WW</td>
<td>110</td>
<td>4 10 57</td>
<td></td>
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<tr>
<td>ERBSENTRITICALE</td>
<td>Winter-hardy blend</td>
<td>+ + + + + + +</td>
<td>TIW, EF</td>
<td>150 - 170</td>
<td>11 23 57</td>
<td></td>
</tr>
<tr>
<td>SOMMERFUTTER</td>
<td>Forage blend for harvest in year of growing</td>
<td>+ + + + + + +</td>
<td>PKL, WEI, WW</td>
<td>25 - 30</td>
<td>47 28 58</td>
<td></td>
</tr>
<tr>
<td>SOMMERFUTTER A2</td>
<td>Winter-hardy fodder for harvest after winter</td>
<td>+ + + + + + +</td>
<td>WV, WEI</td>
<td>40 - 45</td>
<td>0 0 58</td>
<td></td>
</tr>
<tr>
<td>KLEEGRAS</td>
<td>Clover blend for perennial cultivation</td>
<td>+ + + + + + +</td>
<td>WV, WD, RKL, WKL</td>
<td>35 - 40</td>
<td>46 51 59</td>
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<tr>
<td>KLEEGRAS</td>
<td>Winter-hardy blend</td>
<td>+ + + + + + +</td>
<td>RD, RK, WW</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KLEEGRAS</td>
<td>Clover blend for perennial cultivation</td>
<td>+ + + + + + +</td>
<td>RD, RK, WW</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KARTOFFEL OKO</td>
<td>Optimal green manure before potatoes</td>
<td>+ + + + + + +</td>
<td>HS, OR</td>
<td>40 - 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POTATO OKO</td>
<td>The boost for potatoes</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPOT OKO</td>
<td>Nutrient reservoir</td>
<td>+ + + + + + +</td>
<td>HS, OR, SF, PHA, SOL</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPRINT OKO</td>
<td>The quick starter</td>
<td>+ + + + + + +</td>
<td>BW, SF, RAS, PHA</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BODENGARE OKO</td>
<td>A powerhouse for main crops</td>
<td>+ + + + + + +</td>
<td>BA, EF, WIS, LUB, AXL, PHA, SOL</td>
<td>60 - 70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HULSFRUCHT-MENGE OKO</td>
<td>The nitrogen supplier</td>
<td>+ + + + + + +</td>
<td>BA, WIS, EF</td>
<td>120 - 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUNTBRAHCE</td>
<td>For fallow land</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUNTBRAHCE</td>
<td>For fallow land</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIENE ECO</td>
<td>Flowering blend, suitable for flowering under Eco-Scheme 1.2</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIENE</td>
<td>Annual bee-honey fallow without crucifers</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLÜHZAUBER</td>
<td>The flowering meadow</td>
<td>Not recommended for arable farming</td>
<td>Over 40 flowering varieties</td>
<td>5 - 7 kg/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLUMENTEPPICH</td>
<td>Perennial flowering blend</td>
<td>Not recommended for arable farming</td>
<td>Over 30 flowering annuals</td>
<td>5 - 7 kg/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HORRIDO</td>
<td>Biennial game pasture blend</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HORRIDO</td>
<td>Biennial game pasture blend</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOCHWILD</td>
<td>Biennial game pasture blend without crucifers</td>
<td>+ + + + + + +</td>
<td>WIS, LUB, OR, HS</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
viterra® soil fertility blends

viterra® soil fertility blends contribute to humus formation and improve soil fertility. Blend partners with various root types allow deep soil penetration by the roots, offering protection from erosion. Nitrogen and other nutrients are fixed over winter and remain available in the top layers near the roots. Additional organic mass also stimulates and encourages soil life.

Our soil fertility blends can do more: tailored to the subsequent crop, they are an important component in disrupting diseases in the main crop. All of these features lead to an increase in the main crop’s quality and yield.

The blend viterra® WINTERGRÜN is a new addition to the range, and is ideal for late sowing, e.g. after silage maize, thanks to rapid initial development of winter turnip rape and winter forage rape.

All viterra® soil fertility blends are ideally suited to meeting requirements to restore nature and force biodiversity.

viterra® INTENSIV

The health blend

- Reduces migratory root nematodes (Pratylenchus) and viral internal rust spot in potatoes
- Fast-growing with intensive weed suppression and high nutrient absorbency before winter
- The fibrous roots of PRATEX and the taproots of multi-resistant DEFENDER complement each other to achieve root penetration of the entire soil

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to early September</td>
<td>Recommended</td>
<td>Maize</td>
</tr>
<tr>
<td>40 - 50 kg/ha</td>
<td>N-flexible</td>
<td>Cereals</td>
</tr>
<tr>
<td>Recommendation according to DÜV: 0 seed % / 0 weight %</td>
<td>Not required</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® INTENSIV seed proportions:

56% saia oat PRATEX, 44% multi-resistant oilseed radish DEFENDER

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
viterra® INTENSIV N-PLUS

The N-flexible potato trio

- **Red zones**: high level of flexibility regarding nutrient availability through common vetch’s atmospheric nitrogen fixing
- Reduces viral internal rust spot in potatoes
- Fast-growing with intensive weed suppression
- **Tip**: Moderate legume content of < 30 seed percentage allows for use within voluntary agreements (e.g. water conservation)

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to early September</td>
<td>Recommended</td>
<td>Maize XX</td>
</tr>
<tr>
<td>50 - 60 kg/ha</td>
<td>N-flexible</td>
<td>Cereals X</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 23 seed % / 52 weight %</td>
<td>Not required</td>
<td>Rapeseed X</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet XX</td>
</tr>
</tbody>
</table>

Optimised 2023 blend

viterra® INTENSIV N-PLUS seed proportions:
- 49% multi-resistant oilseed radish DEFENDER
- 23% common vetch NEON/ARGON
- 28% saia oat PRATEX

viterra® POTATO

The versatile boost for potatoes

- Substantial blend to improve soil and enrich humus in potato and sugar beet crop rotations
- **Red zones**: also suitable for sites with low nitrogen availability thanks to legume content
- Blue lupin ILDIGO and multi-resistant oilseed radish CONTROL penetrate large volumes of soil rapidly with their deep roots, improving the structure of the soil

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to mid August</td>
<td>Recommended</td>
<td>Maize X</td>
</tr>
<tr>
<td>50 - 60 kg/ha</td>
<td>N-flexible</td>
<td>Cereals X</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 24 seed % / 66 weight %</td>
<td>Not required</td>
<td>Rapeseed X</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet X</td>
</tr>
</tbody>
</table>

Optimised 2023 blend

viterra® POTATO seed proportions:
- 48% oilseed radish CONTROL,
- 20% saia oat PRATEX,
- 17% common vetch NEON/ARGON,
- 8% flax JULIET,
- 7% blue lupin ILDIGO
viterra® MULCH

The frost-sensitive blend without clover

- Blend with oilseed radish COMPASS, which freezes off easily, and frost-sensitive saia oat PRATEX
- Especially recommended for direct and mulch sowing, especially before maize and sugar beet
- The root channels allow rapid deep root formation in maize
- Saia oat promotes mycorrhizal fungi to stabilise soil structure

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Mid July to early September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowing density</td>
<td>40 - 50 kg/ha</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td>0%</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td>25kg paper sack or 500kg BigBag</td>
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<table>
<thead>
<tr>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended</td>
<td>Maize XX</td>
</tr>
<tr>
<td>N-flexible</td>
<td>Cereals X</td>
</tr>
<tr>
<td>Not required</td>
<td>Rapeseed X</td>
</tr>
<tr>
<td></td>
<td>Sugar beet XX</td>
</tr>
<tr>
<td></td>
<td>Potatoes X</td>
</tr>
<tr>
<td></td>
<td>Legumes X</td>
</tr>
</tbody>
</table>

viterra® MULCH seed proportions:
56% saia oat PRATEX
44% nematode-resistant oilseed radish COMPASS

viterra® RÜBE

Professional against nematodes

- High-performance blend of two nematode-resistant oilseed radishes (AMIGO and COMPASS) and white mustards (VERDI and MASTER) for improved crop reliability and optimal control success
- A sufficient plant density of over 160 plants/m² allows active nematode control at the highest level
- Oilseed radish roots penetrate deep into the lower layers of soil to reduce nematodes even deep down

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Mid July to early September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowing density</td>
<td>20 - 25 kg/ha</td>
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<tr>
<td>Legume proportion according to DüV:</td>
<td>0%</td>
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<tr>
<td>Packaging unit:</td>
<td>25kg paper sack or 500kg BigBag</td>
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<table>
<thead>
<tr>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended</td>
<td>Maize X</td>
</tr>
<tr>
<td>N-flexible</td>
<td>Cereals X</td>
</tr>
<tr>
<td>Not required</td>
<td>Rapeseed X</td>
</tr>
<tr>
<td></td>
<td>Sugar beet XX</td>
</tr>
<tr>
<td></td>
<td>Potatoes X</td>
</tr>
<tr>
<td></td>
<td>Legumes X</td>
</tr>
</tbody>
</table>

viterra® RÜBE seed proportions:
28% nematode-resistant oilseed radish COMPASS
26% nematode-resistant oilseed radish AMIGO
24% nematode-resistant white mustard VERDI
22% nematode-resistant white mustard MASTER

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
viterra® RÜBENGARE

The versatile beet blend

- No multiplication of beet cyst nematodes
- This diverse, insect-friendly blend offers optimal root penetration through the topsoil, leaving fertile soil for sugar beet mulch sowing
- Reliably freezes off so that dead plant matter protects soil from wind and water erosion over winter
- **Red zones:** also suitable for sites with low nitrogen availability

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>July to late August</td>
<td>Recommended</td>
<td>Maize ×</td>
</tr>
<tr>
<td>Legume density</td>
<td>N-flexible</td>
<td>Cereals ×</td>
</tr>
<tr>
<td>30kg/ha</td>
<td>Not required</td>
<td>Rapeseed ×</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td></td>
<td>Sugar beet ××</td>
</tr>
<tr>
<td>24 seed % / 66 weight %</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
<td>Legumes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
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<td></td>
</tr>
</tbody>
</table>

**viterra® RÜBENGARE seed proportions:**
- 49% phacelia ANGELIA
- 14% Egyptian clover OTTO
- 14% saa oat PRATEX
- 13% white mustard VERDI
- 8% common vetch NEON/ARGON
- 2% summer field pea RUBIN

viterra® TRIO

The frost-sensitive blend with clover

- Freezing off easily, oilseed radish COMPASS, phacelia and Egyptian clover leave behind a fine-stemmed mulch layer for optimal erosion protection until spring sowing
- No multiplication of beet cyst nematodes
- Fast initial development and dense soil penetration with thick and thin roots
- Bees and insects use the late phacelia flowers

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early-mid July to mid August</td>
<td>Recommended</td>
<td>Maize ×</td>
</tr>
<tr>
<td>Sowing density</td>
<td>N-flexible</td>
<td>Cereals ×</td>
</tr>
<tr>
<td>15 - 18kg/ha</td>
<td>Not required</td>
<td>Rapeseed ×</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td></td>
<td>Sugar beet ××</td>
</tr>
<tr>
<td>24 seed % / 16 weight %</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
<td>Legumes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**viterra® TRIO seed proportions:**
- 52% phacelia ANGELIA
- 24% Egyptian clover OTTO
- 24 % nematode-resistant oilseed radish COMPASS

Blend only available in Germany
**viterra® MAIS**

**Fast-growing blend without legumes**

- Fast ground cover with vigorously growing components
- Good processor of slurry and other nutrients, excellent erosion and water protection
- Combination of deep and flat roots for thorough root penetration, stabilisation of soil structure and rapid root penetration in maize crops
- Saia oat promotes mycorrhizal fungi to stabilise soil structure

---

**Sowing**
Mid July to late August

**Sowing density**
20kg/ha

**Legume proportion according to DüV:**
0%

**Packaging unit:**
25kg paper sack or 500kg BigBag

---

**Fertilisation**

- **Recommended**
- **N-flexible**
- **Not required**

---

**Suitable for subsequent crop**

<table>
<thead>
<tr>
<th>Crop</th>
<th>MAIS</th>
<th>STRUKTUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Rapeseed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar beet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**viterra® MAIS seed proportions:**

40% phacelia ANGELIA
27% oilseed radish SILETINA
18% saia oat PRATEX
9% linseed Juliet
5% sorghum
<1% sunflower

---

**viterra® MAIS STRUKTUR**

**Variety and structure for stressed soil**

- Lasting soil protection and nutrient fixing thanks to around 40% winter-hardy components
- Intensively loosened soil with increased filtration thanks to a tapestry of wide and deep roots and the enormous taproots of the STINGER daikon radish
- High-quality legumes such as common vetch, lupin and clover provide subsequent crops with new nitrogen
- **Red zones:** suitable for sites with low nitrogen availability

---

**Sowing**
Mid July to late August

**Sowing density**
25 - 30 kg/ha

**Legume proportion according to DüV:**
46 seed %, 47 weight %

**Packaging unit:**
25kg paper sack or 500kg BigBag

---

**Fertilisation**

- **Recommended**
- **N-flexible**
- **Not required**

---

**Suitable for subsequent crop**

<table>
<thead>
<tr>
<th>Crop</th>
<th>MAIS</th>
<th>STRUKTUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Rapeseed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar beet</td>
<td></td>
<td></td>
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<tr>
<td>Potatoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**viterra® MAIS STRUKTUR seed proportions:**

25% phacelia ANGELIA
15% Persian clover FELIX
15% white clover
12% crimson clover
11% winter turnip rape JUPITER
8% saia oat PRATEX
4% daikon radish STINGER
4% summer forage rape JUMBO
3% winter vetch BELLA
1% sorghum
1% blue lupin ILDIGO
<1% sunflower

---

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.*
viterra® SCHNELLGRÜN

Suitable for late sowing, with clover

- Fast greening and good tolerance to late sowing thanks to especially voracious growers, white mustard ALBATROS and brown mustard ENERGY
- Non-hardy varieties make mulch sowing the following crop much easier in spring
- Tip: Low demands on the seedbed and scatter capability make for cheap and easy sowing

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Early August to mid-late September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowing density</td>
<td>12 - 15 kg/ha</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td>22 seed % / 6 weight %</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td>25kg paper sack or 500kg BigBag</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fertilisation</th>
<th>Recommended</th>
<th>N-flexible</th>
<th>Not required</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Suitable for subsequent crop</th>
<th>Maize</th>
<th>Cereals</th>
<th>Rapeseed</th>
<th>Sugar beet</th>
<th>Potatoes</th>
<th>Legumes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✗ ✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td>✗</td>
</tr>
</tbody>
</table>

viterra® SCHNELLGRÜN seed proportions:
43% white mustard ALBATROS
22% Balansa clover

22% camelina
13% brown mustard ENERGY

Optimised 2023 blend

viterra® SCHNELLGRÜN LEGUMINOSENFREI

Suitable for late sowing, without clover

- Good convertor of slurry and other nutrients
- Fast greening and good tolerance to late sowing thanks to especially voracious growers, white mustard ALBATROS and brown mustard ENERGY
- Low demands on the seedbed and scatter capability make for cheap and easy sowing
- Tip: Ideal before maize and also suitable as a cover crop after early maize harvests

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Early August to mid-late September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowing density</td>
<td>12 - 15 kg/ha</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td>0%</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td>25kg paper sack or 500kg BigBag</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fertilisation</th>
<th>Recommended</th>
<th>N-flexible</th>
<th>Not required</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Suitable for subsequent crop</th>
<th>Maize</th>
<th>Cereals</th>
<th>Rapeseed</th>
<th>Sugar beet</th>
<th>Potatoes</th>
<th>Legumes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✗ ✗</td>
<td>✗</td>
<td></td>
<td></td>
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<td>✗</td>
</tr>
</tbody>
</table>

viterra® SCHNELLGRÜN LEGUMINOSENFREI seed proportions:
40% camelina
31% white mustard ALBATROS

16% linseed ZOLTAN
14% brown mustard ENERGY

Optimised 2023 blend
viterra® WASSERSCHUTZ

For effective groundwater protection

- High nitrogen absorption capacity and good nutrient storage potential in the winter-hardy varieties
- Stored nutrients are released during the following maize’s main growth period from June
- Winter forage rape EMERALD and winter turnip rape JUPITER quickly root into deep soil layers and absorb freely available nutrients
- Tasty source of nutrition for wild game

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to late September</td>
<td>Recommended ✗</td>
<td>Maize XXX</td>
</tr>
<tr>
<td>10 - 12 kg/ha</td>
<td>N-flexible</td>
<td>Cereals XXX</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 0%</td>
<td>Not required</td>
<td>Rapeseed XXX</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet XXX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes ✗</td>
</tr>
</tbody>
</table>

viterra® WASSERSCHUTZ seed proportions:

- 52% winter forage rape EMERALD
- 43% winter turnip rape JUPITER
- 5% marrow stem kale ANGLIAN GOLD

viterra® WINTERGRÜN  NEW

Extremely tolerant of late sowing and winter-hardy

- Rapid greening and good tolerance of late sowing thanks to voracious species
- Winter-hardy blend fixes nutrients until spring
- Components suitable for scatter sowing make for simple and cheap sowing
- Crimson clover offers N-flexibility

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to late September</td>
<td>Recommended ✗</td>
<td>Maize XXX</td>
</tr>
<tr>
<td>12kg/ha</td>
<td>N-flexible</td>
<td>Cereals XXX</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 35 seed %, 37 weight %</td>
<td>Not required</td>
<td>Rapeseed XXX</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet XXX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® WINTERGRÜN seed proportions:

- 36% winter turnip rape JUPITER
- 35% crimson clover
- 29% winter forage rape EMERALD

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
viterra® UNIVERSAL

Crucifer-free and drought-tolerant

- Ideal for adding to rapeseed crop rotations, disrupts disease cycles
- Thanks to drought-tolerant components, suitable for universal use
- Quick shade retains tilth and ensures good weed suppression
- Phacelia and clover flowers attract countless insects

Sowing
Early July to early September

Sowing density
25kg/ha

Legume proportion according to DüV:
24 seed %, 5 weight %

Packaging unit:
25kg paper sack or 500kg BigBag

Fertilisation
Recommended
N-flexible
Not required

Suitable for subsequent crop
Maize
Cereals
Rapeseed
Sugar beet
Potatoes
Legumes

viterra® UNIVERSAL seed proportions:
49% phacelia ANGELIA
27% saia oat PRATEX
14% Balansa clover

5% Egyptian clover OTTO
5% Persian clover FELIX

Optimised 2023 blend

viterra® UNIVERSAL LEGUMINOSENFREI

No crucifers or legumes

- Low-maintenance, ideal for use in rapeseed-legume crop rotations, disrupts disease cycles
- Good converter of slurry and other nutrients, fixing these to areas near roots
- Quick shade retains tilth and ensures good weed suppression

Sowing
Early July to early September

Sowing density
25kg/ha

Legume proportion according to DüV:
0%

Packaging unit:
25kg paper sack or 500kg BigBag

Fertilisation
Recommended
N-flexible
Not required

Suitable for subsequent crop
Maize
Cereals
Rapeseed
Sugar beet
Potatoes
Legumes

viterra® UNIVERSAL LEGUMINOSENFREI seed proportions:
47% phacelia ANGELIA
36% saia oat PRATEX
13% linseed ZOLTAN
4% sorghum

Optimised 2023 blend
**viterra® UNIVERSAL N-PLUS**

**Crucifer-free and nitrogen-fixing**

- Ideal for adding to rapeseed crop rotations, disrupts disease cycles and freezes off reliably
- Harmonious collaboration between nitrogen consumers and nitrogen multipliers, so the subsequent crop benefits
- Phacelia and legume flowers feed bees and other insects
- **Red zones:** also suitable for sites with low nitrogen availability

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early July to mid August</td>
<td>Recommended</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>N-flexible</td>
<td>Cereals</td>
</tr>
<tr>
<td>35 - 40 kg/ha</td>
<td>Not required</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Legume proportion according to DüV</td>
<td></td>
<td>Sugar beet</td>
</tr>
<tr>
<td>29 seed %, 61 weight %</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>Packaging unit</td>
<td></td>
<td>Legumes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**viterra® UNIVERSAL N-PLUS seed proportions:**
- 49% phacelia ANGELIA
- 22% saia oat PRATEX
- 8% common vetch ARAGON/NEON
- 7% Balansa clover

**viterra® BODENGARE**

**A powerhouse for main crops**

- Promotes soil structure, revegetation and crumb formation to improve soil fertility
- High-quality blend with a high proportion of valuable coarse legumes
- After early preceding crop (e.g. WPS) as a summer cover crop for soil regeneration, free from grasses
- Crucifer-free, so especially suitable for oilseed rape crop rotation
- **Red zones:** also suitable for sites with low nitrogen availability

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid June to mid August</td>
<td>Recommended</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>N-flexible</td>
<td>Cereals</td>
</tr>
<tr>
<td>45 - 50 kg/ha</td>
<td>Not required</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Legume proportion according to DüV</td>
<td></td>
<td>Sugar beet</td>
</tr>
<tr>
<td>61 seed %, 39 weight %</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>Packaging unit</td>
<td></td>
<td>Legumes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**viterra® BODENGARE seed proportions:**
- 34% phacelia ANGELIA
- 22% Persian clover FELIX
- 22% Balansa clover
- 8% Egyptian clover OTTO
- 5% common vetch ARAGON/NEON
- 5% sorghum
- 2% summer field pea RUBIN
- 1% blue lupin ILDIGO
- <1% broad bean AVALON
- <1% sunflower

---

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.*
viterra® HÜLSENFRUCHTGEMENGE

The nitrogen supplier

- Very high value as a preceding crop thanks to atmospheric nitrogen fixing, improvement of soil tilth, revegetation and crumb formation
- Small-seeded broad bean AVALON boasts deep root penetration and improves soil structure
- Use: high-quality protein fodder as fresh feed in late summer to autumn, generates nitrogen in crop rotations or when intersown with oilseed rape
- Red zones: also suitable for sites with low nitrogen availability

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>July to mid August</td>
<td>Recommended</td>
<td>Maize XXX</td>
</tr>
<tr>
<td>Sowing density</td>
<td>N-flexible</td>
<td>Cereals XXX</td>
</tr>
<tr>
<td>120kg/ha to 150kg/ha</td>
<td>Not required</td>
<td>Rapeseed XXX</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 100%</td>
<td></td>
<td>Sugar beet X</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Potatoes X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® HÜLSENFRUCHTGEMENGE seed proportions:
57% common vetch ARGON/NEON
32% summer field pea RUBIN
11% broad bean AVALON

viterra® RAPS

Frost-sensitive blend without crucifers

- Low-maintenance blend of components that freeze off easily, allowing for easy sowing of the subsequent crop
- Ideal for cereal and rapeseed crop rotations, as changing the crop type disrupts disease cycles
- Effective root penetration improves the soil’s structure and encourages air exchange in the soil

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early July to late August</td>
<td>Recommended</td>
<td>Maize X</td>
</tr>
<tr>
<td>Sowing density</td>
<td>N-flexible</td>
<td>Cereals XX</td>
</tr>
<tr>
<td>15kg/ha</td>
<td>Not required</td>
<td>Rapeseed XX</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 24 seed %, 12 weight %</td>
<td></td>
<td>Sugar beet X</td>
</tr>
<tr>
<td>Packaging unit: 25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Potatoes X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® RAPS seed proportions:
52% phacelia ANGELIA
24% linseed ZOLTAN
12% Balansa clover
8% Persian clover FELIX
4% Egyptian clover OTTO
SortenGreening® contains practice-orientated two-component blends for the professional farmer, precisely tailored to the needs of subsequent crops. The subsequent crop dictates the blend’s main variety and its partners. Blends containing multi-resistant oilseed radish DEFENDER and TRV-reducing oilseed radishes SILETTA NOVA and AGRONOM are ideal for subsequent potato crops. The addition of common vetches ensures the development of oilseed radish varieties on plots with low nitrogen supply.

Blends containing DEFENDER or AGRONOM are ideal for use before sugar beet in ‘red zones’ to tackle beet cyst nematodes. The blend of VERDI white mustard and Egyptian clover reduces beet cyst nematodes, is easy to sow and freezes off reliably.

### Table: SortenGreening® Blends

<table>
<thead>
<tr>
<th>Main component</th>
<th>Seed proportion (%)</th>
<th>Blend partners</th>
<th>Sowing density (kg/ha)</th>
<th>Sowing window</th>
<th>Legume proportion/seed weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUGAR BEET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nematode-resistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITE MUSTARD VERDI</td>
<td>64</td>
<td>Egyptian clover (seed proportion 36%)</td>
<td>15</td>
<td>Early August - late September</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22%</td>
</tr>
<tr>
<td>OILSEED RADISH DEFENDER</td>
<td>71</td>
<td>Common vetch (seed proportion 29%)</td>
<td>55 - 60</td>
<td>Early August - late August</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>66%</td>
</tr>
<tr>
<td>OILSEED RADISH AGRONOM</td>
<td>71</td>
<td>Common vetch (seed proportion 29%)</td>
<td>55 - 60</td>
<td>Early August - early September</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>65%</td>
</tr>
<tr>
<td>POTATOES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OILSEED RADISH SILETTA NOVA</td>
<td>71</td>
<td>Common vetch (seed proportion 29%)</td>
<td>55 - 60</td>
<td>Early August - late August</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>66%</td>
</tr>
</tbody>
</table>

**Fertilisation:** SortenGreening® oilseed radish blends with common vetch do not require additional fertilisation.

SortenGreening® white mustard VERDI with Egyptian clover is N-flexible.
SortenGreening®

for sugar beet
White mustard VERDI + Egyptian clover
- High resistance to beet cyst nematodes
  (H1 in France - highest resistance class)
- Easy to sow and rapid ground cover
- Freezes off reliably

for sugar beet and potatoes
Oilseed radish DEFENDER + common vetch
- Multi-resistant top variety for potato crops
- Also reduces beet nematodes
- Rapid initial development and good weed suppression

Oilseed radish AGRONOM + common vetch
- TRV-reducing oilseed radish with common vetch
- Also reduces beet nematodes
- Reliable ground cover, shade and weed suppression thanks to fastest initial development

for potatoes
Oilseed radish SILETTA NOVA + common vetch
- TRV-reducing oilseed radish with common vetch
- Low-growing and late-blooming
- Especially leafy

Nitrogen symbiosis:
Oilseed radish and common vetch
‘Vetch kisses oilseed radish’
Stock benefits in a number of ways:
- Fewer nitrogen-consuming plants per area, i.e. more nutrients for each individual plant
- Vetch’s N-fixing is stimulated by the oilseed radish’s N-consumption
- Vetch sheds old plant matter
- Vetch deposits organic material (rhizodeposition)
= nitrogen flow to oilseed radish approx. 45 - 85 kg/ha

Main nutrients found in AGRONOM + common vetch (160 dt/ha FMI/ha)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>N absorption</td>
<td>73kg</td>
</tr>
<tr>
<td>P absorption</td>
<td>22kg</td>
</tr>
<tr>
<td>K absorption</td>
<td>79kg</td>
</tr>
<tr>
<td>Mg absorption</td>
<td>8kg</td>
</tr>
<tr>
<td>N-fixing</td>
<td>30kg</td>
</tr>
</tbody>
</table>

Supposition: 60% allowability for subsequent crop
Price: 2.4€/kg N (calcium ammonium nitrate)
103kg N x 60% x 2.4€ → 148€/ha
Price: 1.25€/kg K2O (Kornkali 60%)*
79kg K x 0.6 x 1.25€ → 59€/ha

= 207€/ha

Rhizodeposition is the effect that makes a combination of vetch and oilseed radish so effective. Organic materials are deposited into the soil through the roots (mucilage, dead cells).

Source for nutrient contents: Bayrisches Landesamt für Landwirtschaft: nutrient contents of secondary crops and cover crops
* Valid as of December 2022

+ plus increased growth reliability
+ plus less weed competition
+ plus more soil fertility
+ plus freezing off reliably
**viterra® special blends**

**viterra® special blends** are blends for special applications such as undersowing and intersowing. **Undersowing** contributes to humus formation, particularly in humus-consuming cultures, and offers protection from erosion as well as nutrient leaching. It also improves the soil’s load bearing capacity while offering a time and cost saving in comparison to regular cover crop cultivation. **Undersowing** is also ideal for fulfilling GLÖZ 7 in tight maize crop rotations.

**viterra® UNTERSAAT GRAS FRÜH**, a slow-growing blend of meadow fescue and red fescue for dense sod formation, is new to the range.

**Intersowing** aims to reduce weed competition before winter, distract pests and supply the main crop with nitrogen. The intersown crop freezes off over winter and the remaining mulch protects the main crop from erosion and frost.

---

**viterra® UNTERSAAT KLEE PLUS**

**Clover undersowing for cereals or rotational fallow**

- Easy spreading and reliable establishment among young cereal crops
- Very generous ground cover after cereal harvests for reliable erosion protection and good weed suppression
- German ryegrass’ good root growth and clover’s good nitrogen fixing improve humus content and provide nitrogen for the subsequent crop
- Can be used for grazing or cutting
- **Tip**: Can be sown direct for use as rotational fallow or green manure

**Sowing**

Undersowing with summer cereals: 2-leaf stage up to approx. 2 weeks before gaps between rows are covered. Undersowing with winter cereals: from the last frost.

**Sowing density**

15kg/ha (undersowing), 40kg/ha (direct sowing)

**Legume proportion according to DÜV:**

29 seed %, 12 weight %

**Packaging unit:**

15kg paper sack or 500kg BigBag

**Suitable for subsequent crop**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
</tr>
<tr>
<td>Cereals</td>
<td>XX</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>XX</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>X</td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
</tr>
</tbody>
</table>

**viterra® UNTERSAAT KLEE PLUS seed percentages:**

- 71% German ryegrass
- 29% white clover

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
**Efficient greening for sowing with maize**

- Slow-growing blends with dense sod formation and high herbicide tolerance, allowing undersowing together with maize.
- Fescues tolerate drought very well, ensuring good establishment
- Red fescue leaves behind an extensive root mass in the soil, improving load capacity and humus balance

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortly before or with maize seed</td>
<td>Maize XX</td>
</tr>
<tr>
<td><strong>Sowing density</strong></td>
<td>Cereals</td>
</tr>
<tr>
<td>8 - 10 kg/ha</td>
<td>Rapeseed</td>
</tr>
<tr>
<td><strong>Legume proportion according to DüV:</strong></td>
<td>Sugar beet</td>
</tr>
<tr>
<td>0%</td>
<td>Potatoes</td>
</tr>
<tr>
<td><strong>Packaging unit:</strong></td>
<td>Legumes</td>
</tr>
<tr>
<td>15kg paper sack or 500kg BigBag</td>
<td></td>
</tr>
</tbody>
</table>

**viterra® UNTERSAAT GRAS FRÜH seed proportions:**
90% red fescue
10% meadow fescue

---

**For sustainable maize cultivation**

- Vigorous Italian ryegrass combined with late German ryegrass ensures good reliability
- After the maize harvest, the grass continues to develop and binds freely available nitrogen, allowing an additional biomass harvest
- **Tip:** To avoid herbicide intolerance, sowing should take place at least 6 weeks after the last herbicide treatment

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8 weeks after maize sowing, at 6-8-leaf stage in maize</td>
<td>Maize XX</td>
</tr>
<tr>
<td><strong>Sowing density</strong></td>
<td>Cereals</td>
</tr>
<tr>
<td>10 - 15 kg/ha</td>
<td>Rapeseed</td>
</tr>
<tr>
<td><strong>Legume proportion according to DüV:</strong></td>
<td>Sugar beet</td>
</tr>
<tr>
<td>0%</td>
<td>Potatoes</td>
</tr>
<tr>
<td><strong>Packaging unit:</strong></td>
<td>Legumes</td>
</tr>
<tr>
<td>15kg paper sack or 500kg BigBag</td>
<td></td>
</tr>
</tbody>
</table>

**viterra® UNTERSAAT GRAS seed proportions:**
50% Italian ryegrass (tetraploid)
50% German ryegrass (diploid, mid-late, fodder variety)
viterra® BEISAAT FEIN

Intersowing for high-yield rapeseed cultivation

- Intersowing reduces weed competition in the main crop and distracts pests (cabbage fly, rape flea beetle)
- Fenugreek repels various rapeseed pests
- Fine-seeded legumes support soil life and nitrogen supply through into winter
- The intersown crop freezes off, the remaining mulch offers erosion protection and protects the main crop from frost

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Together with rapeseed (two-tank system) or shortly before</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>Cereals</td>
</tr>
<tr>
<td>8 - 10 kg/ha</td>
<td>✔</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 100%</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Packaging unit: 15 kg paper sack or 500 kg BigBag</td>
<td>Sugar beet</td>
</tr>
<tr>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

Optimised 2023 blend

viterra® BEISAAT FEIN seed proportions:

- 25% Persian clover FELIX
- 25% fenugreek
- 25% Egyptian clover OTTO
- 25% Balansa clover

Optimised 2023 blend

viterra® BEISAAT GROB

Strong partner for oilseed rape cultivation

- Supports the vitality of oilseed rape, optimises nitrogen dynamics and distracts pests (cabbage fly, rape flea beetle) from the main crop
- Especially small-seeded broad bean AVALON offers benefits in terms of sowing technique, and its broad leaves are effective at suppressing weeds
- The companion crop freezes off reliably over winter and the remaining mulch protects the main crop from erosion and frost

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Together with rapeseed (two-tank system) or shortly before</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>Cereals</td>
</tr>
<tr>
<td>35 kg/ha</td>
<td>✔</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 100%</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Packaging unit: 15 kg paper sack or 500 kg BigBag</td>
<td>Sugar beet</td>
</tr>
<tr>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

Optimised 2023 blend

viterra® BEISAAT GROB seed proportions:

- 57% broad bean AVALON
- 43% blue lupin ILDIGO

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
V-Max® for fodder and biomass

V-Max® blends are ideal for biomass production for biogas facilities or for cattle fodder. There’s always the right blend to suit the purpose and subsequent crop. Summer cereal blends are suitable as secondary crops after early harvest grains. Winter-hardy blends, on the other hand, can provide biomass as a cover crop or main crop.

Blends with legumes are suitable for locations with low N availability and increase the value of fodder as a valuable protein component. Pure cereal blends, however, are very well suited to potato crop rotations. Fodder gaps can be effectively closed with V-Max® grass blends.

V-Max® LUNDSGAARDER GEMENGE

Winter-hardy blend for fodder and soil fertility

- Suitable for exceptionally high-quality fodder production or as a winter cover crop for green manuring and soil improvement
- Italian ryegrass uses growth phases over winter, while winter vetch and winter field pea are valuable protein components in fodder
- Balanced combination of nitrogen multipliers and consumers has a positive impact on plant growth and soil life
- Also impressive under the ground thanks to enormous root formation, actively contributing towards humus formation and carbon fixing - ideally suited to carbon farming
- Tip: Also suitable for undersowing with maize

Sow: Late August to mid September or in spring as an undersown crop with maize

Sowing density: 50kg/ha, undersown 15 - 20 kg/ha

Harvest window: April to early May

Harvest: As green fodder with silage trailer, for silage use with silage trailer or harvester after pre-wilting phase

Suitable for subsequent crop

Maize XX
Cereals
Rapeseed
Sugar beet
Potatoes
Legumes

Optimised 2023 blend

V-Max® LUNDSGAARDER GEMENGE weight proportions:
- 30% Italian ryegrass
- 28% crimson clover
- 22% field pea NS PIONIR
- 21% winter vetch BELLA

Legume proportion according to DüV:
- 46 seed %, 71 weight %

Packaging unit:
- 25kg paper sack or 500kg BigBag

Potential yield*: 40 - 60 dt TM/ha
V-Max® GRANOPUR

WPS use before winter

- For biomass production after whole plant silage or an early cereal harvest with cutting before winter
- Increased cultivation reliability thanks to a balanced composition of various cereal components
- Soil tilth is maintained over summer
- V-Max® GRANOPUR is a pure cereal blend so very well suited to subsequent potato crops

Sow:
Late March to late May or early July to early August
Sowing density: 130 - 150 kg/ha
Harvest window: June/July when sown in spring, October/November when sown in summer
Harvest: From standing stock to dough stage

Suitable for subsequent crop

<table>
<thead>
<tr>
<th>Crop</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
</tr>
<tr>
<td>Cereals</td>
<td>XX</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>X</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>X</td>
</tr>
<tr>
<td>Potatoes</td>
<td>XX</td>
</tr>
<tr>
<td>Legumes</td>
<td>X</td>
</tr>
</tbody>
</table>

Legume proportion according to DüV:
0%
Packaging unit:
25kg paper sack or 500kg BigBag

Optimised 2023 blend

V-Max® GRANOPUR weight proportions:
26% spring rye OVID
26% saa oat PRATEX
25% oat
23% spring triticale

V-Max® GRANOLEG

WPS use before winter with legumes

- For biomass production after whole plant silage or an early cereal harvest with cutting before winter
- V-Max® GRANOLEG contains summer field pea, which provides additional nitrogen for stressed soil and keeps crops greener for longer (optimised harvest window)
- Increased cultivation reliability thanks to a balanced composition of various cereals in combination with legumes
- Good shade promotes tilth and keeps soil life thriving

Sow:
Late March to late May or early July to early August
Sowing density: 130 - 150 kg/ha
Harvest window: June/July when sown in spring, October/November when sown in summer
Harvest: From standing stock to dough stage

Suitable for subsequent crop

<table>
<thead>
<tr>
<th>Crop</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
</tr>
<tr>
<td>Cereals</td>
<td>XX</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>X</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>X</td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
</tr>
</tbody>
</table>

Legume proportion according to DüV:
4 seed %, 19 weight %
Packaging unit:
25kg paper sack or 500kg BigBag

Optimised 2023 blend

V-Max® GRANOPUR weight proportions:
32% oat
18% spring rye OVID
19% summer field pea
16% saa oat PRATEX
15% spring triticale

*Yield values may vary depending on location and conditions. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.*
V-Max® WICKROGGEN

Winter-hardy WPS blend
- Winter-hardy biomass-legume blend for high-yield WPS use with high protein and energy content
- Winter-hardy vetch delivers additional nitrogen for the rye and the subsequent crop
- Excellent erosion protection
- Fixes valuable nitrogen and converts it into climate-friendly biomass

Sow:
Mid September to mid October
Sowing density: 100 - 120 kg/ha
Harvest window: Dough stage, mid to late June
Harvest: From standing crop, side knives recommended

Legume proportion according to DüV:
9 seed %, 10 weight %
Packaging unit:
25kg paper sack or 500kg BigBag

Suitable for subsequent crop
- Maize
- Cereals
- Rapeseed
- Sugar beet
- Potatoes
- Legumes

V-Max® WICKROGGEN weight proportions:
- 90 % winter rye MATADOR
- 10% winter vetch

Potential yield*:
80 - 110 dt TM/ha

V-Max® ERBSENTRITICALE

Winter-hardy blend for WPS and grain use
- Flexible: as protein-rich whole-plant silage, for in-house fodder production or harvesting grain
- In the blend, winter triticale BILBOQUET offers better stability than other cereals, winter field pea PIONIR increases the protein content of fodder
- Good weed suppression, high levels of nitrogen fixing, optimal erosion protection and increased biodiversity
- Fewer mineral fertiliser and plant protection measures required without major impacts on yield

Sow:
Mid September to mid October
Sowing density: 150 - 170 kg/ha
Harvest window: WPS harvest to dough stage, mid to late June or combining
Harvest: From standing crop, side knives recommended

Legume proportion according to DüV:
11 seed %, 23 weight %
Packaging unit:
25kg paper sack or 500kg BigBag

Suitable for subsequent crop
- Maize
- Cereals
- Rapeseed
- Sugar beet
- Potatoes
- Legumes

Optimised 2023 blend

V-Max® ERBSENTRITICALE weight proportions:
- 77% winter triticale BILBOQUET
- 23% winter field pea PIONIR

Potential yield*:
GPS 145 dt TM/ha
Grain yield*
up to 40dt/ha
V-Max® SOMMERMUTTER

Fodder blend, can be used in growing year

- Provides additional quality fodder when used as a summer cover crop
- Annual ryegrass provides sufficient structure, Persian clover provides a high protein content, tuft-forming Italian ryegrass allows winter greening after cutting
- High value as a preceding crop thanks to good tilth condition, a high level of root penetration and humus formation – ideally suited to carbon farming

<table>
<thead>
<tr>
<th>Sow:</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late June to late July (for greening, up to late August)</td>
<td>Maize</td>
</tr>
<tr>
<td>Harvest density: 25 - 30 kg/ha</td>
<td>Cereals</td>
</tr>
<tr>
<td>Harvest window: October</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Harvest: As green fodder with silage trailer, for silage use with silage trailer or harvester after pre-wilting phase</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td>Potatoes</td>
</tr>
<tr>
<td>47 seed %, 28 weight %</td>
<td>Legumes</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
</tr>
<tr>
<td>20kg paper sack or 500kg BigBag</td>
<td></td>
</tr>
<tr>
<td><strong>V-Max® SOMMERMUTTER weight proportions:</strong></td>
<td></td>
</tr>
<tr>
<td>36% Italian ryegrass (tetraploid)</td>
<td></td>
</tr>
<tr>
<td>36% annual ryegrass (diploid/tetraploid)</td>
<td></td>
</tr>
<tr>
<td>28% Persian clover FELIX</td>
<td></td>
</tr>
</tbody>
</table>

**Potential yield*: 65 - 80 dt TM/ha

V-Max® SOMMERMUTTER A2

Grass blend for harvest in growing year

- Composition as recommended quality standard blend A2
- Combination of annual and Italian ryegrass delivers well-structured fodder for ruminants as a summer cover crop
- The vigorous Italian ryegrass allows winter greening after the harvest
- High preceding crop value thanks to good root penetration and soil tilth

<table>
<thead>
<tr>
<th>Sow:</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late June to late July (for greening, up to late August)</td>
<td>Maize</td>
</tr>
<tr>
<td>Harvest: As green fodder with silage trailer, for silage use with silage trailer or harvester after pre-wilting phase</td>
<td>Cereals</td>
</tr>
<tr>
<td>Harvest window: October</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Sowing density: 40 - 45 kg/ha</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Legume proportion according to DüV:</td>
<td>Potatoes</td>
</tr>
<tr>
<td>0%</td>
<td>Legumes</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
</tr>
<tr>
<td>15kg paper sack or 500kg BigBag</td>
<td></td>
</tr>
<tr>
<td><strong>V-Max® SOMMERMUTTER A2 weight proportions:</strong></td>
<td></td>
</tr>
<tr>
<td>67% Italian ryegrass (tetraploid)</td>
<td></td>
</tr>
<tr>
<td>30% annual ryegrass (diploid/tetraploid)</td>
<td></td>
</tr>
</tbody>
</table>

**Potential yield*: 30 - 40 dt TM/ha

*Yield values may vary depending on location and conditions. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights if unavailable, varieties may be replaced with varieties of equal value.
**V-Max® FUTTER**

Grass-clover blend for harvesting after winter

- Suitable for dual-culture use systems in combination with maize or sorghum
- Nutrient uptake before the winter break and in early spring prevents loss
- Organic substances from roots and stubble improve humus balance and ensure good pre-crop value – ideally suited to carbon farming
- Not recommended for dry sites or soils with low water storage capacity
- Tip: Also suitable for undersowing with maize

### Sow: Mid to late September as a winter cover crop. Late July to early August as a summer cover crop

### Sowing density: 35 - 40 kg/ha, undersown 15kg/ha

### Harvest window: April to early May, can be cut before winter if sown early

### Harvest: As green fodder with silage trailer, for silage use with silage trailer or harvester after pre-wilting phase

---

**Suitable for subsequent crop**

<table>
<thead>
<tr>
<th>Crop</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Rapeseed</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Sugar beet</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Potential yield*: 35 - 40 dt TM/ha**

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**V-Max® KLEEGRAS**

Clover blend for perennial cultivation

- One to two (or more) main usage years, suitable for grazing and cutting
- Dense growth with excellent flexibility despite few location requirements
- Very low costs per cut as annual sowing is not necessary
- Forms dense, walkable sod
- When red clover dies down in the second year, white clover makes more of a contribution

### Sowing

**Direct sowing:** August to mid September

### Sowing density

30 - 35 kg/ha for direct sowing

### Harvest window

April to late September

---

**Legume proportion according to DüV:**

<table>
<thead>
<tr>
<th>Seed %</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>37</td>
</tr>
</tbody>
</table>

### Packaging unit:

15kg paper sack or 500kg BigBag

---

**Optimised 2023 blend**

V-Max® KLEEGRAS weight proportions:

- 33% German ryegrass
- 21% red clover
- 16% white clover
- 15% Italian ryegrass (tetraploid)
- 15% hybrid ryegrass

---

**Potential yield*: 40 - 50 dt TM/ha**
Organic blends

The demand for organically grown foods has grown significantly over the last few years. The number of organic farms has increased, along with the demand for suitable organic seed with special characteristics. SAATEN-UNION offers varieties as well as blends for use as cover crops and in forage production.

viterra® organic blends are a valuable basis for good crop rotation in organic farming. The main focus is on optimising the flow of nutrients within crop rotations. The need for good weed suppression is met by fast-growing components in these reliable blends. Cover crop blends with nectar and pollen plants encourage biodiversity and increase agroecological value.

V-Max® organic blends ensure high fodder yields and high-quality feed in organic farming.

viterra® KARTOFFEL ÖKO

Optimal green manure before potatoes

- Reduction of viral internal rust spot in potatoes thanks to SILETTA NOVA oilseed radish and PRATEX saia oat
- Fast-growing with intensive weed suppression
- Plenty of organic matter vitalises soil life
- The fibrous roots of PRATEX and taproots of SILETTA NOVA complement each other to achieve root penetration of the entire soil

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid July to early September</td>
<td>Recommended ×</td>
<td>Maize ×</td>
</tr>
<tr>
<td>40 - 50 kg/ha</td>
<td>N flexible Not required</td>
<td>Cereals ×</td>
</tr>
<tr>
<td>0%</td>
<td></td>
<td>Rapeseed ×</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Sugar beet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes × ×</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legumes ×</td>
</tr>
</tbody>
</table>

viterra® KARTOFFEL ÖKO weight proportions:

76% saia oat PRATEX
24% oilseed radish SILETTA NOVA

*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand-kernel weights. If unavailable, varieties may be replaced with varieties of equal value.
viterra® DEPOT ÖKO

The nutrient reservoir

- Vigorous varieties bind nutrients, storing them during the winter and making them available to the following crop
- Efficient suppression of weeds thanks to rapid initial development
- A balanced blend offers excellent root penetration of the soil by deep and flat rooters, stabilising soil structure and improving the soil’s infiltration capacity
- Especially suited to crop rotations with legumes as the main crop

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late July to late August</td>
<td>Recommended</td>
<td>Maize XX</td>
</tr>
<tr>
<td>Sowing density</td>
<td></td>
<td>Cereals XX</td>
</tr>
<tr>
<td>20kg/ha</td>
<td>N-flexible</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 0%</td>
<td>Not required</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Legumes XX</td>
</tr>
</tbody>
</table>

viterra® DEPOT ÖKO weight proportions:
- 45% saia oat PRAEX
- 23% oilseed radish SILETINA
- 15% white mustard ALBATROS
- 12% phacelia ANGELIA
- 5% sunflower

Optimised 2023 blend

viterra® SPRINT ÖKO

The quick starter

- Exceptionally rapid ground cover, so suitable as a cover crop before winter cereals or for late greening after maize
- Forms a lot of organic mass over a short vegetation period
- Fast-growing buckwheat in particular ensures effective ground cover, suppressing weeds and protecting the surface of the soil
- All varieties have a high ecological value for bees and other insects in the form of nutrition and shelter

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Fertilisation</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>July to early September</td>
<td>Recommended</td>
<td>Maize XX</td>
</tr>
<tr>
<td>Sowing density</td>
<td></td>
<td>Cereals XX</td>
</tr>
<tr>
<td>15kg/ha</td>
<td>N-flexible</td>
<td>Rapeseed</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 0%</td>
<td>Not required</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Packaging unit:</td>
<td></td>
<td>Potatoes</td>
</tr>
<tr>
<td>25kg paper sack or 500kg BigBag</td>
<td></td>
<td>Legumes XX</td>
</tr>
</tbody>
</table>

viterra® SPRINT ÖKO weight proportions:
- 43% buckwheat
- 35% white mustard ALBATROS
- 10% summer forage rape JUMBO
- 12% phacelia ANGELIA

Optimised 2023 blend
The following products are also available as organic blends:

**V-Max® LUNDSGAARDER GEMENGE ÖKO**
Winter-hardy blend for fodder and soil fertility

**V-Max® WICKROGGEN FUTTER ÖKO**
Winter-hardy blend for fodder or green manure

**V-Max® KLEEGRAS ÖKO**
Clover blend for perennial cultivation

**V-Max® ERBSENTRITICALE ÖKO**
Winter-hardy blend for WPS and grain use

**viterra® POTATO ÖKO**
The boost for potatoes

**viterra® BODENGARE ÖKO**
A powerhouse for main crops

**viterra® HÜLSENFRUCHTGEMENGE ÖKO**
The nitrogen supplier

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*Theoretical value. Amounts may differ in practice. The weight or seed proportions of individual components may vary slightly due to differences in thousand kernel weights. If unavailable, varieties may be replaced with varieties of equal value.*
**viterra® nature and environmental blends**

**viterra® nature and environmental blends** include blends for flowering spaces, wild forage sites and fallow fields. Flowering blends and wild forage blends aim to enhance the image of agriculture as well as conserving species and providing for native animal species. A varied composition means that these blends offer long-term nutrition for lots of beneficial animals, and encourage biodiversity. Our wild forage blends have been designed for biennial cultivation so that they are also available in winter as grazing and cover for wild game.

Flowering blend **viterra® BIENE ECO** is new to the range, ideal for biennial cultivation and eligible for Eco Scheme funding in some states.

New fallow blends **viterra® BRACHE** and **viterra® BUNTBRACHE** allow for meaningful greening to prevent nitrogen washing and maintain field hygiene, ensuring the targeted management and promotion of desired soil life and the provision of nutrition for insects. They are also ideal for fulfilling GLÖZ 4 and GLÖZ 8.

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**viterra® BRACHE** **NEW**

**Grass-heavy fallow blend**

- Easy, vigorous and low-maintenance
- Ideal for fallow land and riparian strips
- Red fescue forms dense sod to ensure weed suppression
- Fescues establish well even in drought, while white clover ensures an independent nitrogen supply

### Sowing
- Autumn sowing: Early August - mid September
- Spring sowing: Late February - mid March

### Sowing density
- 15 - 20 kg/ha

### Legume proportion according to DüV:
- 21 seed %, 10 weight %

### Packaging unit:
- 15kg paper sack or 500kg BigBag

### Suitable for subsequent crop
- Maize
- Cereals
- Rapeseed
- Sugar beet
- Potatoes
- Legumes

**For fallow land**

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**viterra® BRACHE seed proportions:**
- 53% red fescue
- 26% meadow fescue
- 21% white clover
viterra® BUNTBRACHE  NEW

Flowering fallow blend

- Versatile blend for fallow land and riparian strips
- Encourages honeybees, wild bees, bumblebees, butterflies and many more insects thanks to various different flowering plants
- Offers erosion and soil protection on fallow land over many years
- Tip: Eligible for funding in NRW (sow by 15th May, blend must remain on the same land over the whole period of obligation)

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>From early April to mid August</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>Cereals</td>
</tr>
<tr>
<td>20 - 25 kg/ha</td>
<td>Rape seed</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 60 seed %, 44 weight %</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Packaging unit: 25 kg paper sack or 500 kg Big Bag</td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® BUNTBRACHE seed proportions:

- 25% red clover
- 16% alfalfa
- 13% white clover
- 11% phacelia ANGELIA
- 9% meadow fescue
- 8% perennial rye
- 5% linseed ZOLTAN
- 3% buckwheat
- 3% crimson clover
- 3% sainfoin
- 3% winter forage rape
- <1% blue lupin
- <1% sunflower

viterra® BIENE ECO  NEW

Flowering blend, suitable for funding under Eco Scheme 1.2*  

- Economically and ecologically helpful blend of annual and biennial flowering plants
- High value for the ecosystem thanks to long life and diverse flowers
- Comprises twelve species to meet political requirements, fulfilling eligibility for biennial funding
- Practicality tested in Germany-wide trials
- Tip: Funding through Eco Schemes: sow by 15th May

* State-specific funding regulations not fully established by time of printing. Please contact your state departments for more information or go online: www.saaten-union.de

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>From early April to mid August</td>
<td>Maize</td>
</tr>
<tr>
<td>Sowing density</td>
<td>Cereals</td>
</tr>
<tr>
<td>12.5 kg/ha</td>
<td>Rape seed</td>
</tr>
<tr>
<td>Legume proportion according to DüV: 52 seed %, 38 weight %</td>
<td>Sugar beet</td>
</tr>
<tr>
<td>Packaging unit: 12.5 kg paper sack or 500 kg Big Bag</td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Legumes</td>
</tr>
</tbody>
</table>

viterra® BIENE ECO seed proportions:

- 20% white clover
- 20% Phacelia ANGELIA
- 18% red clover
- 12% dill
- 20% alfalfa
- 6% sainfoin
- 6% buckwheat
- 4% marigold
- 4% chicory
- 1% mallow
- 1% sunflower
- <1% borage

*The weight and seed proportions of the individual components may vary slightly due to different TKVs. If unavailable, varieties may be replaced with varieties of equal value.
viterra® BIENE

Annual bee/honey fallow without crucifers

- Crucifer-free blend with eleven components, buckwheat-free
- Use of fallow land with honey plants
- Flowering blend with long flowering phase for good biodiversity and a positive impact on agricultural image
- Roots penetrate different soil levels and stabilise soil structure
- Grass-free for easy control in subsequent culture

Sowing
Early March to mid August
(please see AUM sowing requirements)

Sowing density
25kg/ha

Legume proportion according to DüV:
71 seed %, 84 weight %

Packaging unit:
25kg paper sack or 500kg BigBag

Suitable for subsequent crop

<table>
<thead>
<tr>
<th>Crop</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Cereals</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Rapeseed</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Sugar beet</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

viterra® BIENE seed proportions:
31% Egyptian clover OTTO
28% Persian clover FELIX
18% Phacelia ANGELIA
9% dill
6% alfalfa
3% serratella
2% common vetch ARGON/NEON
<1% marigold
<1% summer field pea RUBIN
<1% blue lupin ILDIGO
<1% sunflower

viterra® BLÜHZAUBER

The annual flowering meadow

- Visually pleasing, featuring a range of more than 40 flowering varieties with different petal colours and shapes
- Continuous flowering period from late May into autumn, providing pollen and nectar for bees, bumblebees, butterflies and many different insects

viterra® BLUMENTEPPICH

Perennial flowering blend

- Perennial species flower in the year of sowing, then biennial and perennial species dominate from the second year
- Offers shelter for insects to overwinter as well as nutrition and shelter for birds and wild animals
- Can be cut in autumn or spring

Sow: April to mid June

Sowing density: 5 - 7 g/m²

Packaging unit: 25g, 100g, 500g, 1kg, 25kg

Not recommended for arable farming

viterra® BLÜHZAUBER components:
Marigold, Mexican aster, California poppy, yellow toadflax, baby blue eyes, leucanthemum, field poppy, sunflower... and many more

viterra® BLUMENTEPPICH weight proportions:
42% annuals and 58% perennials such as chamomile, sage, bluebell, tufted pansy, common poppy, coriander, cornflower, dog daisy, marigold, red flax, yarrow, echinacea, hollyhock, mallow, tansy... and many more

For gardeners and nature fans
Our online shop for small orders.
Visit us at www.LUNDGAARD.de
viterra® HORRIDO

Biennial gameland pasture blend

- Suitable for all native game
- Flowers attract lots of insects
- Also suitable for arable land
- Winter-hardy components offer grazing and cover even in winter and during frosts
- **Cultivation tip:** Sow part of the area with a double gap between cereals to create attractive free space for pheasants and partridges

<table>
<thead>
<tr>
<th>Sowing</th>
<th>Suitable for subsequent crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>March to late July</td>
<td>Maize</td>
</tr>
<tr>
<td>25 - 30 kg/ha</td>
<td>Cereals</td>
</tr>
</tbody>
</table>

**Legume proportion according to DÜV:**
- 52 seed %, 20 weight %

**Packaging unit:**
- 10kg paper sack or 500kg BigBag

**viterra® HORRIDO weight percentages:**
- 27% perennial rye
- 25% buckwheat
- 10% saia oat PRATEX
- 6% serradella
- 6% sunflower
- 4% winter vetch BELLA
- 3% Egyptian clover OTTO
- 3% Malva sylvestris
- 3% winter forage rape FONTAN
- 2.5% Persian clover FELIX
- 2% linseed ZOLTAN
- 2% red clover
- 2% alfalfa
- 1.5% phacelia ANGELIA
- 1% oilseed radish SILETINA
- 1% winter turnip rape JUPITER
- 1% narrow stem kale GRÜNER ANGELITER

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viterra® HOCHWILD

Biennial game pasture blend without crucifers

- Suitable for wild forage on areas that are not used for agriculture
- Returning clover species can be used to prevent docks growing as weeds
- Excellent wild grazing with tasty protein-rich plants
- Robust and winter-hardy varieties ensure long-lasting stock
- **Cultivation tip:** If the seeds are scattered by hand, sand can be mixed in to prevent segregation.

<table>
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<tr>
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<th>Suitable for subsequent crop</th>
</tr>
</thead>
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<td>March to late July</td>
<td>Maize</td>
</tr>
<tr>
<td>25kg/ha</td>
<td>Cereals</td>
</tr>
</tbody>
</table>

**Legume proportion according to DÜV:**
- 100%

**Packaging unit:**
- 10kg paper sack or 500kg BigBag

**viterra® HOCHWILD weight percentages:**
- 37% lupin
- 31% winter field pea NS PIONIR
- 8% crimson clover
- 7% Balansa clover
- 6% Egyptian clover OTTO
- 6% red clover
- 5% alfalfa

*The weight and seed proportions of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced with varieties of equal value.*
High yield with cover crops.

The main aim of cover crop cultivation is a high yield of healthy main crop throughout the whole subsequent cultivation period, tailored both to the location and operational requirements. The targeted selection of suitable species, varieties and blends means that each business’ aims can be prioritised:

- **Soil biology management** by reducing disease and nematodes while simultaneously promoting beneficial organisms and the soil’s defences. More diverse crop rotations, lower herbicide use and particular processing methods are taken into account in cultivation recommendations. The impact and role of the microbiome on soil’s defences (suppressive ability) is currently the topic of extensive research. New genetic methods and refined analytical techniques allow for a differentiated breakdown of the microbiome (all soil life). Results up to this point have confirmed that the targeted cultivation of cover crops boosts the soil’s defences and makes the soil, as the most important production tool, more climate-stable and more resilient to freak weather events.
  
  - Each gram of soil contains several thousand species of microorganisms.
  - One teaspoon of soil is home to an estimated 200 metres of mushroom threads and around one billion bacterial cells.

- **Humus production and soil improvement** through extensive root penetration and optimal use of growing gaps also ensure erosion protection, improved water retention capacity and better percolation of rain, ensuring soil fertility and therefore the basis of plant farming in the long term. Intelligent, tailored soil processing systems and gentle cultivation complement these effects.

- **Efficient nutrient management** through nutrient conservation in the topsoil and active groundwater protection as well as the mobilisation of existing nutrients for the subsequent crop are significant aims of cover crop cultivation. The use of legumes as cover crops not only allows cultivation in areas without additional fertilisation but also adds additional nitrogen to the crop rotation, ultimately benefiting the main crops.

- **Ensuring quality and yield** is specific to each different main crop. That’s why cover crop recommendations are individually tailored to the subsequent crop. What’s more, cover crop cultivation is more heavily subsidised for fodder and biomass production, as on-site production is becoming ever more important. The range is completed by cover crop blends that can be used to fulfil criteria for state-specific environmental schemes. Cover crop cultivation also offers practical solutions for the GAP Reform 2023, contributing to stable yields and the efficient use of resources in future.

The targeted cultivation of cover crops is a valuable tool in shaping future-proof, resource-efficient agriculture.
Cover crops unfurl their full benefits when sown like a main crop. This applies even more so when nitrogen is at a premium.

**Hay management**

Large amounts of cereal hay fix a lot of nitrogen during rotting. If the land cannot be fertilised and the cover crop is expected to achieve a lot (e.g. nematode reduction), hay removal is recommended. If it remains on the field, good hay distribution and fine chopping is helpful.

**Plough, mulch or direct sowing?**

Direct sowing immediately after the harvest can make sense on dry land in order to utilise remaining soil moisture and prevent unproductive evaporation. Direct sowing works best when the cover crop germinates before the end of any volunteer cereal’s dormancy period.

However, the plough is the best option if there is enough ground moisture. Without fertilisation, it will be harder for cover crops to suppress volunteer cereals, rapeseed and weeds. This means that soil preparation for field hygiene will become more difficult. Furthermore, the cover crop also benefits a great deal from stimulated mineralisation. However, if ploughing is not desirable due to the disruption to soil life and soil structure, a chisel plough can yield good results. It makes sense to turn over the soil deeply for cover crops so that only a shallow mix is required for the subsequent crop (e.g. maize). Cover crops with deep and extensive root systems stabilise any weak points created in the soil and populate them biologically.

**Stubble working**

If the soil is worked, enough time should be spent tackling volunteer cereals, volunteer oilseed rape, weeds and grasses in advance. Ideally, there should first be a flat pass to process the top layer to create a good germination level before the second, deeper pass.

**Liming**

The success of cover crops also depends on pH. Only when the soil has enough calcium can the fine roots join forces with active soil life to form stable soil aggregates.

**Sowing window**

The more vegetation time the cover crop has before winter, the more it can unleash its benefits. Legumes in particular are very heat-loving and benefit from early sowing. Many species also freeze off overwinter more easily when they are better established.

The rule of thumb for good plant development is fast, even emergence in the field. To achieve this, the sowing level should have adequate moisture. Especially when dealing with high-quality cover crops such as disease-reducing oilseed radishes, it is often important to wait until shortly before precipitation to sow. Oilseed radish boasts very good root penetration even when sown from mid to late August.

Late sowing comes with other challenges for cover crops. If it is necessary to sow after potatoes or early beets or maize in late September, fast-growing species and varieties are beneficial. White mustard, winter turnip rape and forage rye are particularly tolerant of late sowing. The later the seed is sown, the more important seed density becomes.
Sowing technique

Seed drilling into fine, well-consolidated soil is beneficial for rapid development and effective ground cover. Blends often contain species with various optimal sowing depths. Experience has shown, however, that a sowing depth of 1 to 2 cm is a good compromise.

When using extensive sowing processes, e.g. a seed spreader, white mustard is often the best choice as a low-maintenance light germinator.

Sowing depth recommendations for our cover crop blends are based on field trials and many years of experience. The right sowing depth is key to ensuring that the potential of quality blends is fully realised. Only dense stock can successfully suppress switch grass or nematodes, for example.

Scattering or seed drill?

A seed drill is advisable for:
- viterra® TRIO, viterra® MAIS, viterra® UNIVERSAL,
- viterra® UNIVERSAL LEGUMINOSENFREI,
- viterra® UNIVERSAL N-PLUS, viterra® BODENGARE,
- viterra® RAPS, viterra® INTENSIV, viterra® POTATO,
- viterra® MULCH, viterra® RÜBENGARE, viterra® MAIS STRUKTUR,
- SortenGreening® DEFENDER plus vetch,
- SortenGreening® AGRONOM plus vetch,
- SortenGreening® SILETTA NOVA plus vetch

Scattering is possible for:
- viterra® RÜBE, viterra® SCHNELLGRÜN,
- viterra® SCHNELLGRÜN LEGUMINOSENFREI,
- viterra® WASSERSCHUTZ, viterra® WINTERGRÜN
- SortenGreening® VERDI plus Egyptian clover

Working in after winter

The remaining mulch layer may be very different in spring. Brittle, dry material is ideal for mulching and direct sowing. Ground frost can be used to roll stock (e.g. with a Cambridge roller). Rolled stock is weaker in winter, dies off more easily and is easier to process in spring. Very good results have also been achieved with the cost-effective use of knife rollers.

Depending on the aim of cover crop cultivation, winter-hardy plants may be desired, e.g. for better accessibility in spring or additional biomass. If cover crops have not frozen off, chemical or intense mechanical measures may be used. In regions prone to spring drought, cover crops that freeze off or that can be processed earlier are ideal as they don’t impact the subsequent crop’s water supply.

To sum it up:

Establishing satisfying cover crop development is a bigger challenge without fertilisation in autumn. Contrary requirements, such as earlier sowing and the careful tackling of volunteer cereals, mean compromises are necessary. Overall, experience has shown that careful preparation and proper sowing of the cover crop lead to the best results. Regardless of the location, all soils benefit from the promotion of soil fertility as well as a good supply of organic matter. So, cover crop cultivation helps to achieve good harvest yields with little fertilisation in the long term.

Questions about cultivation?

From time to time, we publish tips under PRAXISWISSEN. Simply scan the QR code to view the information.
The challenge of nutrient efficiency
Nutrient efficiency is currently taking centre stage in agriculture to an extent never seen before. The reasons are significant increases in fertiliser prices and restrictions affecting nutrient application as well as a more prominent awareness of resource conservation and environmental protection. This means that farmers are encouraged more than ever to use and retain nutrients effectively in their cultivation systems.

Cover crops as the solution

Prevent nutrient loss
Compared to some main crops, cover crops can absorb considerably more nutrients in autumn. Cleverly combined in viterra® cover crop blends, various root shapes intensively penetrate the soil’s volume and ensure good nutrient uptake. This prevents nutrient runoff, creating a comprehensive nutrient store for the subsequent crop.

Bringing additional nitrogen into the system
Cover crop blends with a high legume content that can fix atmospheric nitrogen through their symbiosis with root nodule bacteria can bring additional nitrogen into the system. The cover crop itself benefits from this as well as the subsequent crop.

Nutrient transfer for subsequent crops
As soon as the organic matter is mineralised in spring, the nutrients previously fixed in the cover crop are made available to the subsequent crop in a form that is readily available. The scope and time of N-mineralisation depends on a number of factors.

Nitrogen fixing and conversion with cover crops
## Table: Legume content and N-profit for subsequent crop

<table>
<thead>
<tr>
<th>Legume content</th>
<th>Seed%</th>
<th>Weight%</th>
<th>Blend</th>
<th>N-profit for subsequent crop (kgN/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% 100% viterra® HÜLSENFRUCHTGENEMEDE (ÖKO)</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td>80 - 110</td>
</tr>
<tr>
<td>61% 89% viterra® BODENGARE (ÖKO)</td>
<td>61%</td>
<td>89%</td>
<td></td>
<td>70 - 95</td>
</tr>
<tr>
<td>46% 47% viterra® MAIS STRUKTUR</td>
<td>46%</td>
<td>47%</td>
<td></td>
<td>30 - 60</td>
</tr>
<tr>
<td>36% 22% SortenGreening® VERDI + Egypt. clover</td>
<td>36%</td>
<td>22%</td>
<td></td>
<td>25 - 55</td>
</tr>
<tr>
<td>35% 37% viterra® WINTERGRÜN</td>
<td>35%</td>
<td>37%</td>
<td></td>
<td>40 - 70</td>
</tr>
<tr>
<td>29% 65% SortenGreening® AGRONOM + common vetch</td>
<td>29%</td>
<td>65%</td>
<td></td>
<td>45 - 90</td>
</tr>
<tr>
<td>29% 66% SortenGreening® DEFENDER + common vetch</td>
<td>29%</td>
<td>66%</td>
<td></td>
<td>45 - 90</td>
</tr>
<tr>
<td>29% 66% SortenGreening® SILETTA NOVA + common vetch</td>
<td>29%</td>
<td>66%</td>
<td></td>
<td>40 - 80</td>
</tr>
<tr>
<td>29% 61% viterra® UNIVERSAL N-PLUS</td>
<td>29%</td>
<td>61%</td>
<td></td>
<td>35 - 60</td>
</tr>
<tr>
<td>25% 66% viterra® RÜBENGARE</td>
<td>25%</td>
<td>66%</td>
<td></td>
<td>40 - 75</td>
</tr>
<tr>
<td>24% 52% viterra® INTENSIV N-PLUS</td>
<td>24%</td>
<td>52%</td>
<td></td>
<td>40 - 80</td>
</tr>
<tr>
<td>24% 66% viterra® POTATO (ÖKO)</td>
<td>24%</td>
<td>66%</td>
<td></td>
<td>40 - 70</td>
</tr>
<tr>
<td>24% 16% viterra® TRIO</td>
<td>24%</td>
<td>16%</td>
<td></td>
<td>30 - 55</td>
</tr>
<tr>
<td>24% 5% viterra® UNIVERSAL</td>
<td>24%</td>
<td>5%</td>
<td></td>
<td>30 - 55</td>
</tr>
<tr>
<td>23% 12% viterra® RAPS</td>
<td>23%</td>
<td>12%</td>
<td></td>
<td>20 - 35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Legume content</th>
<th>Seed%</th>
<th>Weight%</th>
<th>Blend</th>
<th>N-profit for subsequent crop (kgN/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22% 6% viterra® SCHNELLGRÜN</td>
<td>22%</td>
<td>6%</td>
<td></td>
<td>25 - 50</td>
</tr>
<tr>
<td>0% 0% viterra® INTENSIV</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td>40 - 70</td>
</tr>
<tr>
<td>0% 0% viterra® MAIS</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td>25 - 40</td>
</tr>
<tr>
<td>0% 0% viterra® MULCH</td>
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**Questions about fertilisation?**

Find out more at [https://www.saaten-union.de/aus-der-praxis/duengung-zur-und-nach-der-zwischenfrucht-was-gilt-es-zu-beachten/](https://www.saaten-union.de/aus-der-praxis/duengung-zur-und-nach-der-zwischenfrucht-was-gilt-es-zu-beachten/)
Climate conservation and carbon farming

Carbon farming is a term describing agricultural methods that capture atmospheric carbon (CO₂) in the soil. The long-term storage of carbon dioxide (carbon capture and storage) reduces strain on the atmosphere, tackling global climate change. Carbon farming is currently the topic of much discussion, and certificates in retail create an extra opportunity to honour agriculture for special environmental achievements.

There is, however, still a number of uncertainties as carbon fixing is strongly dependent on soil type, so subject to massive location-based deviations. Coherent measuring methods and evaluation bases must be developed. They are currently the subject of many scientific projects.

Climate-friendly growth

Plants absorb carbon dioxide through photosynthesis, transforming it into plant biomass as organic carbon. If the biomass remains on the field, it contributes to humus formation, fixing the carbon. The organic substances in soil consist of around half carbon and are an important marker of soil fertility. Soils with a high proportion of organic matter can store more nutrients and water, which can then be absorbed by plants. In addition, the soil’s structure is improved, the leaching of nutrients and hazardous substances into groundwater is reduced and the soil’s buffer system is increased. Soil organisms break down dead plant material to form soil carbon through complex nutrient networks. Even the breaking down of soil carbon to CO₂ (mineralisation) is predominantly carried out by microorganisms.

Suitable methods

The choice of plants, fertilisation and soil processing can impact carbon uptake in the soil as well as the living conditions of microorganisms and therefore the proportion of carbon that is mineralised. Many of these practices come under the term ‘regenerative agriculture’. Here too, the aim is to improve soil health as well as the resilience of agriculture in the face of climate change, reducing emissions and increasing the fixing of organic carbon in the soil. The integration of legumes into crop rotations makes another contribution towards environmentally friendly cultivation methods. As they not only produce their own nitrogen for growth but also create a supply for their blend partners and subsequent crops, legumes have an ideal CO₂ footprint.

Promoting soil fertility through soil protection, root penetration and the addition of organic matter has always been a goal of cover crop cultivation. Well-balanced, winter-hardy blends such as V-Max® LUNDSGAARDER GEMENGE, viterra® MAIS STRUKTUR as well as viterra® UNTERSAAAT GRAS FRÜH, viterra® UNTERSAAAT GRAS and viterra® UNTERSAAAT KLEE PLUS are therefore exceptionally well suited to combining soil fertility and carbon farming.

Therefore, the following measures are appropriate for the retention and multiplication of carbon in the soil:

- Encouraging soil life and humus production through gentle soil processing methods (mulch sowing, direct sowing etc.)
- Long, varied greening phases for intense root penetration (undersowing, winter-hardy cover crops)
- Optimised crop rotations to regenerate arable land and improve nutrient use
- Cultivation and use of undersown plants for root penetration to prevent erosion
- Introduction and cultivation of agroforestry for root penetration, erosion protection and water retention
The cultivation of flowering strips and patches is a simple and effective way to increase biodiversity. Looking at the GAP Reform 2023, it is clear that nature and environmental conservation are becoming increasingly more important. One more reason to consider the proper cultivation and use of flowering patches.

**Benefits of flowering strips and patches**

Flower patches have much more to offer than solely promoting insect diversity. As well as insects, other wild animals find nutrition and shelter here. Perennial flowering blends come with the added benefit that the area is mostly undisturbed for several years, providing a habitat and a place for animals with special needs to overwinter. From an arable farming perspective, annual flower patches are beneficial as each year’s new sowing lowers the risk of weed growth. What’s more, the patch’s growth offers protection from wind and water erosion. The long-lasting nature of the patch and its various root types encourage the formation of humus as well as soil life. Political funding schemes mean that the sowing of flowering blends has become an opportunity for some farmers to generate profit from land with marginal yield. The impact of such areas on the positive image of agriculture as a whole is not to be underestimated.

**Properly establishing flowering strips and buffer strips**

Good seed bed preparation is essential for the successful establishment of flowering strips and patches. This comprises the thorough removal of old weeds and loosening of the soil for a fine crumb in the seed bed. If sowing is delayed until May, this allows for the removal of late, warm-loving weeds in advance, encouraging fast germination and initial development in the flowering plants. The recommended sowing density should not be reduced if good weed suppression is to be achieved. Sawdust or sand can simply be added to increase volume and improve seed distribution. If the plot is plagued by problem weeds, a topping cut should be carried out after six weeks.

**The following are suitable for flowering strips:**

- Buffer strips along bodies of water with severe limitations regarding fertiliser and plant conservation.
- Slopes to prevent erosion.
- Strips along the edges of woodland, which often have less yield with the same production costs.
- Small partial areas that can only be farmed with broad modern machinery with a disproportionate amount of time and effort.
- If wild boar is a problem, hunting aisles with flowering blends may be helpful.
- Surround rest stops as a magnet for visitors.
Eco Schemes

Eco Schemes comprise different environmental measures that farmers can implement on a voluntary basis. Eco Schemes also promote the provision of biodiversity plots. In the European Community each country has different Ecoschemes.
Additional product information and knowledge

Download centre

The viterra® catalogue provides an overview of all the cover crop blends we offer plus some specialist information.

The brochure Gemeinsame Agrarpolitik – gut umgesetzt mit Zwischenfrüchten summarises the most important new information from common agricultural policy from 2023, along with recommendations for the targeted cultivation of cover crops to meet legal requirements while enjoying the benefits of growing these plants.

Cover crop calculator

Working out which cover crop best suits your main crop and your business may quickly become a real challenge due to many different factors. Our cover crop calculator uses targeted questions about important conditions such as subsequent crop, soil processing, nutrient availability and sowing window to simplify your search and your decision-making process.

Simply go to https://www.saaten-union.de/zwischenfruchtrechner to use our online calculator.

Further industry information and useful links:

Questions about cultivation?
We publish current industry content under ‘Aus der Praxis’ from time to time.

Field signs for PR work: for field signs, please contact your responsible sales advisor at SAATEN-UNION.
Or get in touch via service@saaten-union.de

YouTube: Many of our blends are introduced by our sales advisors in clips on YouTube. So you can get a glimpse of our cover crops in the field outside their growing windows.

www.youtube.com > saaten-union zwischenfrucht

Are you planning a field day, cover crop demo/training or industry event?
SAATEN-UNION and P. H. PETERSEN would be happy to help you bring your ideas to life. If you have any questions, please feel free to get in touch. You can find your contact on the back of the catalogue.

You can also find the latest information on species, blends and the industry at www.zwischenfrucht.de
Since its creation in 1965, SAATEN-UNION has been supplying farmers in Europe with high performance varieties that match the markets needs. SAATEN-UNION has already set milestones, and will continue to play a major role in plant breeding in years to come.