Program for Cover and Forage Crops 2023

High Performance with cover crops.

MORE INFO:
WWW.ZWISCHENFRUCHT.DE

SAATEN UNION
Züchtung ist Zukunft

viterra® Zwischenfrucht-Mischungen
Sorten greening®
MAXI®
ÖKO

Cover crops from a reputable supplier

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 18,000m^2 each, the storage and processing facilities in Lundsgaard, Schleswig-Holstein and Sárbogárd, 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.

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P. H. PETERSEN
SAATZUCHT LUNDSGAARD

Contents

The benefits of cover crops

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.

Roots open and stabilize the soil

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.

Biologically tackles soil diseases and breaks development cycles

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.**

Improves soil fertility and encourages humus formation

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 CO_2 and generates 1.5kg of O_2. 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.

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.**

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.**

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 runnoff 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.

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 WICKROGGEN 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.**

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.

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.**

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.

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.**

Provides a habitat and grazing for wild animals

Local big and small game will also benefit from cover crop cultivation. Wild forage blends viterra® HORRIDO and viterra® 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

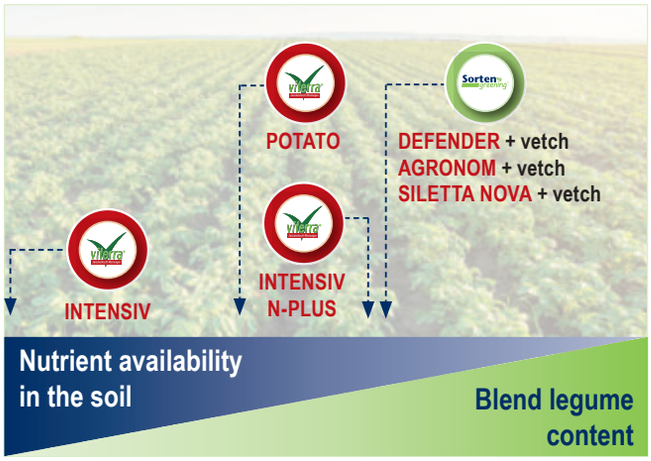
While the introduction of organic substances increases the soil's buffer capacity and water retention in the long term, cover crops also have a direct value as preceding crops. Root penetration of the soil increases the proportion of large and medium pores, which raise the soil's rain absorption and 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!

Climate-friendly carbon storage and carbon farming

Carbon farming is a term describing agricultural methods that capture atmospheric carbon (CO_2) 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 **SILETTA 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

SILETTA 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

...for rapeseed

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 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

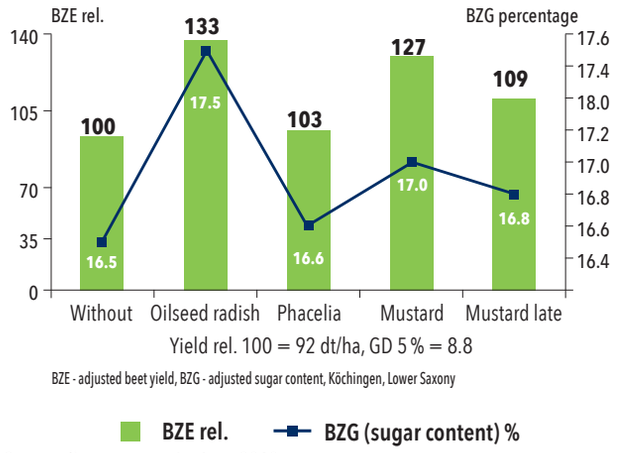
Biological nematode control

Beet cyst nematodes impact yield

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.

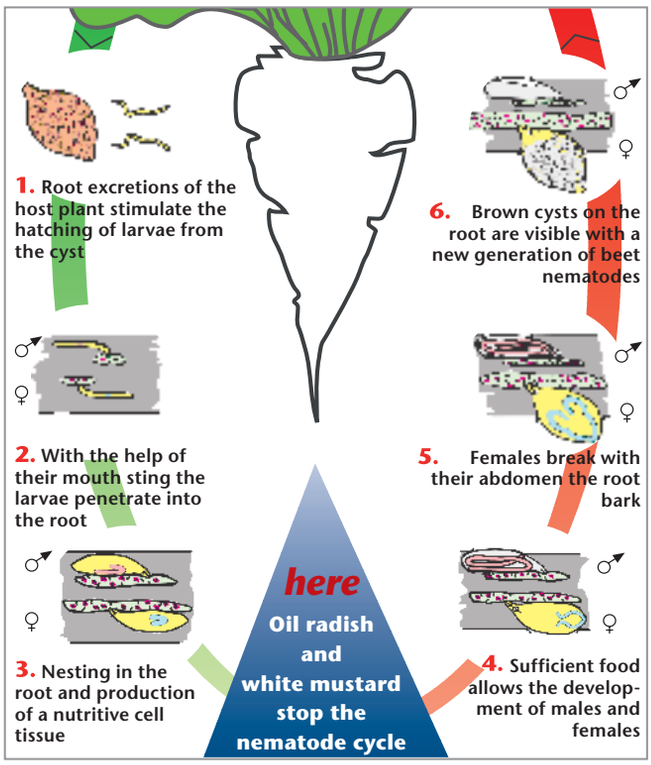
Resistant oilseed radish and white mustard activate larval hatching and migration to the roots.

Impact of cover crops in sugar beet crop rotations



Source: dlz agrarmagazin, June 2010

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:

	Choice of white mustard	Choice of oilseed radish
Sowing		
Early		Low flowering tendency
Medium	Low flowering tendency	All
Late	Medium flowering tendency	Rapid initial development and medium flowering tendency
Very late	Very rapid initial development	

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.

Nematode reduction		
Beets	Well suited for medium to low nematode infestation levels	Strong nematode reduction through better resistance and deeper root penetration
Stem nematodes	Avoid white mustard	No multiplication of *Ditylenchus dipsaci*
Beet-potato crop rotations	Avoid white mustard	Multi-resistant oilseed radish

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).

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

QUALITY IS OUR P.H.PETERSEN TOP PRIORITY

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

NEW

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

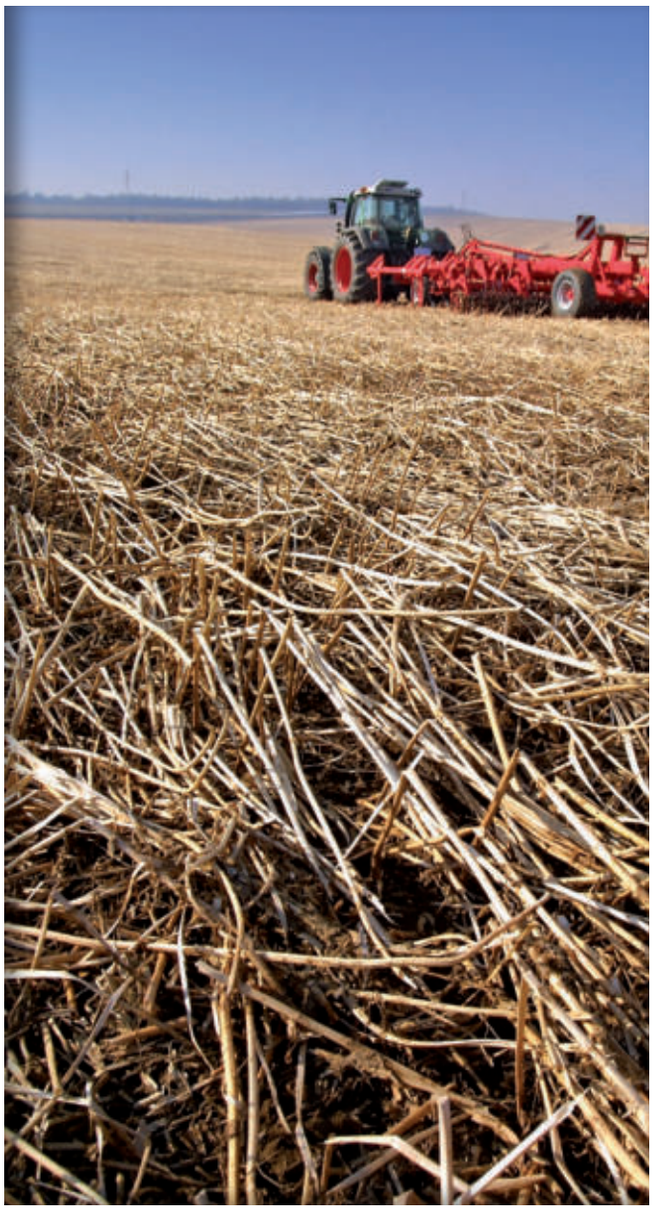
- Generous ground shade intensively promotes weed suppression and tilth formation
- Late flowers for long vegetative development and long-lasting hatching stimulation

GAUDI

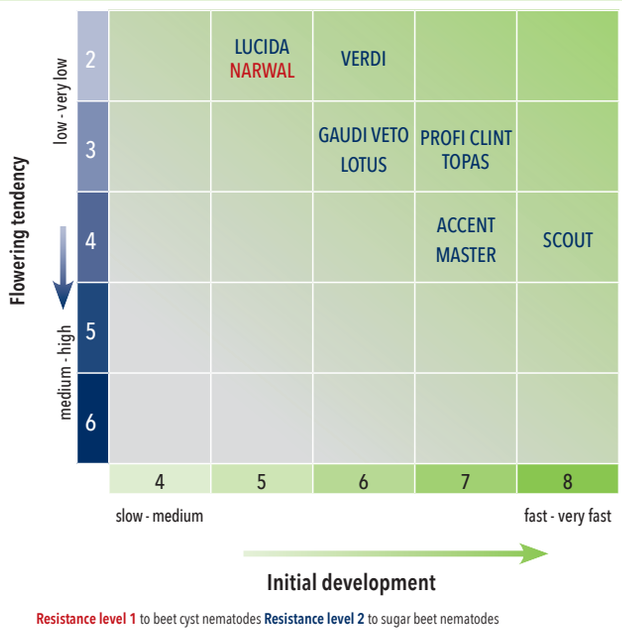
A treat before sugar beet

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

Variety	Profile
VETO	**Force against nematodes**
LOTUS	**For direct sowing**
LUCIDA	**Extremely late bloomer**
SCOUT	**Most rapid initial development**



Nematode-resistant white mustard overview



Resistance level 1 to beet cyst nematodes **Resistance level 2** to sugar beet nematodes

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

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

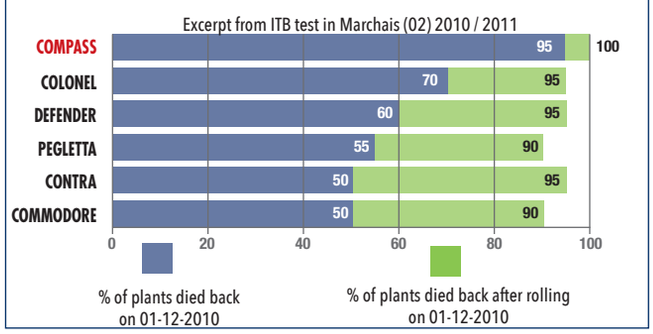
COMPASS before winter

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

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.

COMPASS after winter

SULINA NEW

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

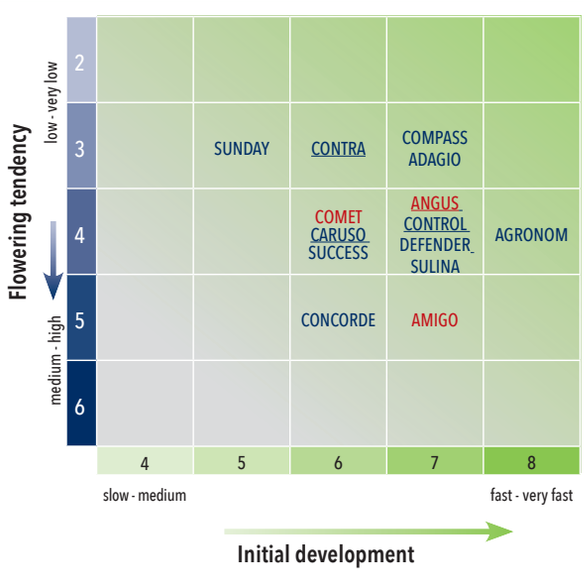
SUCCESS

Successful beet cultivation

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

Variety	Profile
ADAGIO	**Top variety for reliable nematode control**
COMET	**Best performance against beet cyst nematodes**
CONCORDE	**Promotes beet yield and quality**

Nematode-resistant oilseed radish overview



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

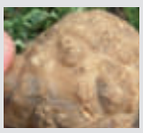
- Effective control of various nematodes and diseases e.g. *Heterodera schachtii* and root-knot nematodes
- Rapid ground covering for effective suppression of volunteer growth and weeds
- Fast, healthy initial development, increases organic substance and supports soil fertility

Variety	Profile
CONTRA	**The specialist for vegetable crop rotations**
ANGUS	**The multi-resistant powerhouse**

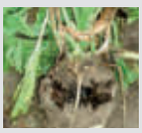
Overview: Effectiveness of cover crops against nematodes and diseases

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

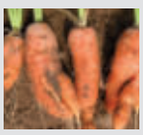
Southern root-knot nematodes
- *Meloidogyne incognita* and *M. javanica* are effectively reduced
- In greenhouses and in peppers, tomatoes and pumpkins



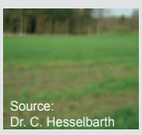
Root-knot nematodes
- Officially tested resistance to *Meloidogyne chitwoodi*
- Prevents the development of *M. fallax*
- For crop rotations with potatoes, vegetables and flower bulbs



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

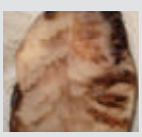


Northern root-knot nematodes
- Efficient control of *Meloidogyne hapla*
- For organic crop rotations with high clover growing frequency and carrot farming
- Also protects potatoes and sugar beet

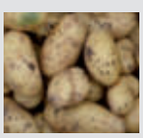


Lesion nematodes
- Poor host plants for *Pratylenchus* nematodes
- On sandy soil as a cover crop
- For crop rotations with potatoes, rapeseed, cereals, vegetables and flower bulbs

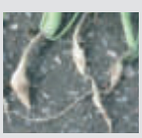
Corky Ringspot syndrome
- Reduces Corky Ringspot syndrome (Tobacco Rattle Virus) in potatoes
- Suppresses free-living *Trichodorus* nematodes that spread the virus
- Reduces weeds through rapid ground cover



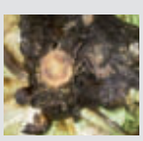
Pythium
- Reduces damage caused by *Pythium* fungus
- In crop rotations with peas, potatoes and flower bulbs

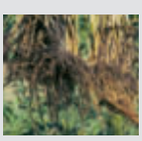


Rhizoctonia rot
- Reduction of yield and quality issues caused by Rhizoctonia
- Controls root-killing disease and dry-core in potatoes
- Controls Rhizoctonia in beets
- In lettuce, cabbage and many other cultures including maize, grass, beans and flowering bulbs
- Promotes structure, pore volume and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



Clubroot
- No build-up of the clubroot pathogen *Plasmodiophora 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:

	Sugar beet		Potatoes						Rapeseed
	Heterodera schachtii	*Ditylenchus dipsaci*	*Rhizoctonia*	*Trichodorus spp.*	*TRV*	*Pratylenchus spp.*	*Meloidogyne chitwoodi*	*Meloidogyne hapla*	Clubroot
Oilseed radish	Varieties				Varieties		Varieties	Varieties	Frequency
Tillage radish									
White mustard	Varieties								
Brown mustard									
Forage rape									
Turnip rape									
Saia oat									
Ryegrass									
Forage rye									
Phacelia									
Buckwheat									
Berseem clover									
Persian clover									
Common vetch									
Blue lupin					Varieties				
Flax									
Sunflower									

Legend: positive | neutral | negative | no entry | Varieties react differently

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.

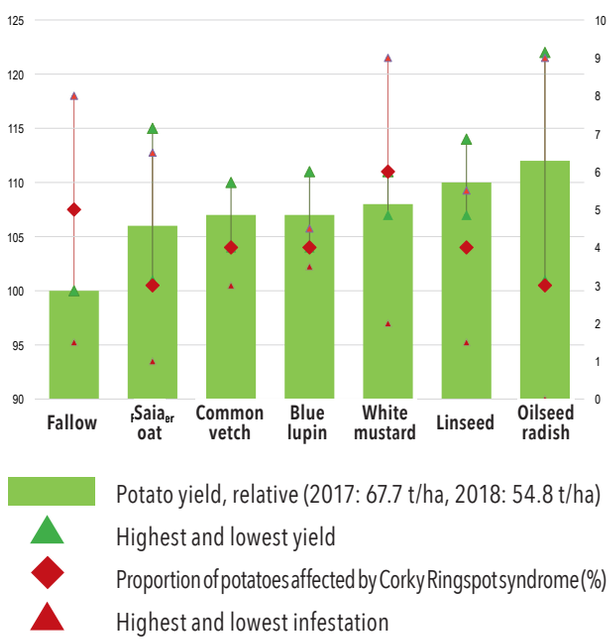
Trichodorus and Corky Ringspot syndrome

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.

Impact of various cover crops on potato yield and Corky Ringspot syndrom
(private trial carried out by LWK NRW)



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.

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 cluster. 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 thioterpenes. 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 Ringspot 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 Ringspot 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*)

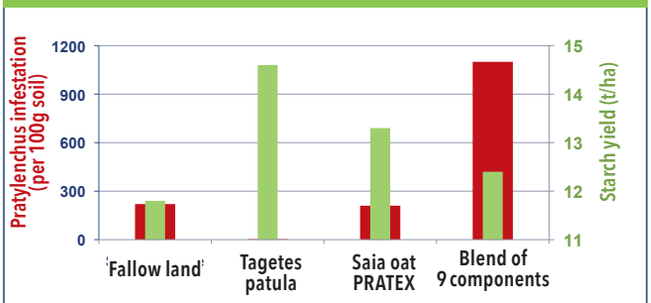
The **columbia root knot nematode** (*Meloidogyne chitwoodi)* has an immensely large range of host plants and should not be underestimated, as this is a quarantine disease in Europe.

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.

Impact of cover crops on Pratylenchus penetrans and potato yield
(PPS GROEN, Valthermond 2016-2017)



Serious Pratylenchen infection (left) / Less infection (right)

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 Rhizctonia 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:

Conrolling 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.

Oilseed radish against Corky Ringspot syndrome

SILETTA NOVA

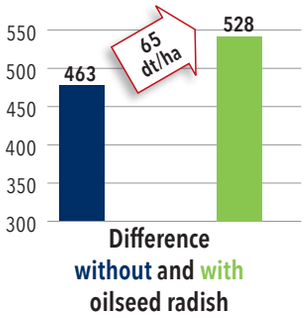
Also available as an organic product

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)

Potato yield, TM in dt/ha, middle of 6 series



Crop rotation

1st year	Silage maize	Silage maize
2nd year	Winter wheat	WW + **oilseed radish**
3rd year	Potatoes	Potatoes

Variety	Profile
BENTO	**Promotes potato quality and yield**

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

Also available as an organic product

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

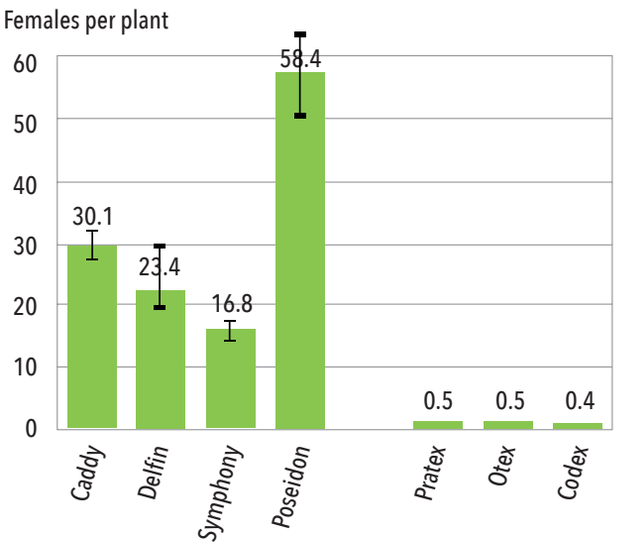
CODEX

The late saia oat

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

Variety	Profile
LUNEX	**Green manure or fodder**
TRADEX	**The yielding one**

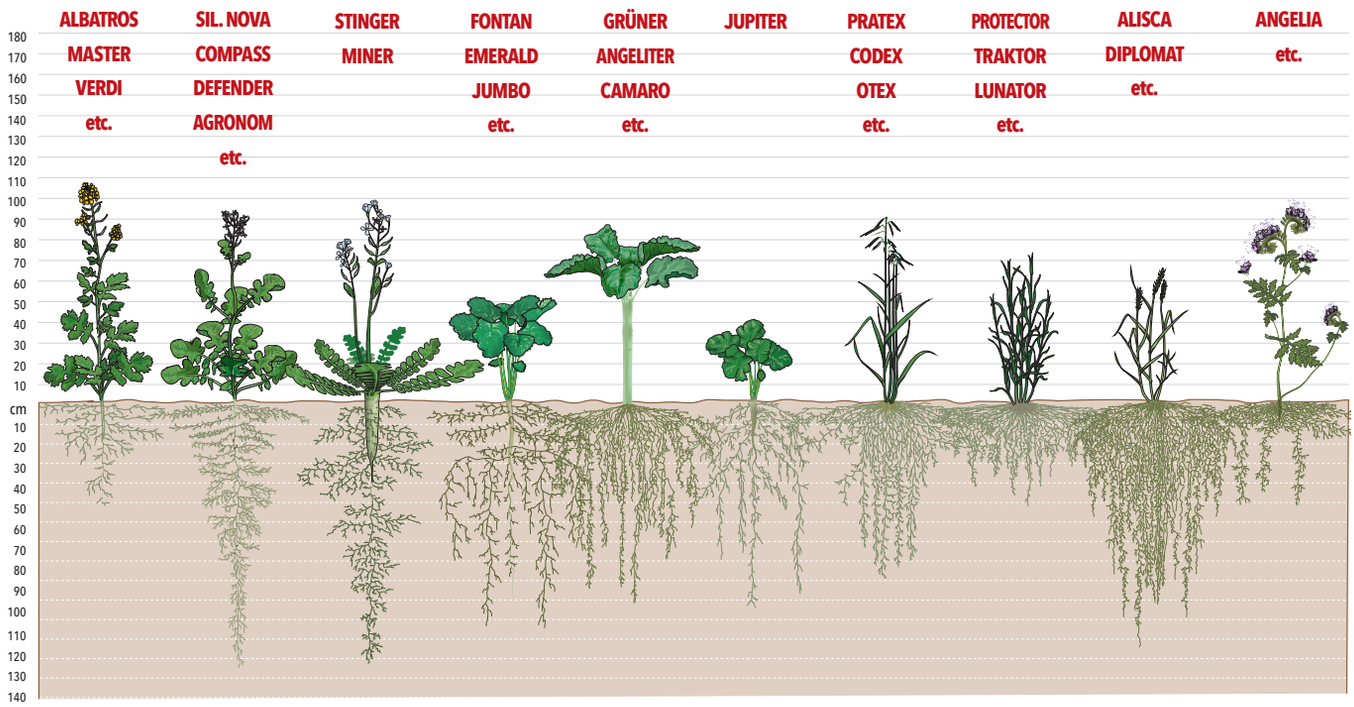
Breeding of cereal cyst nematodes
(Heterodera avenae)

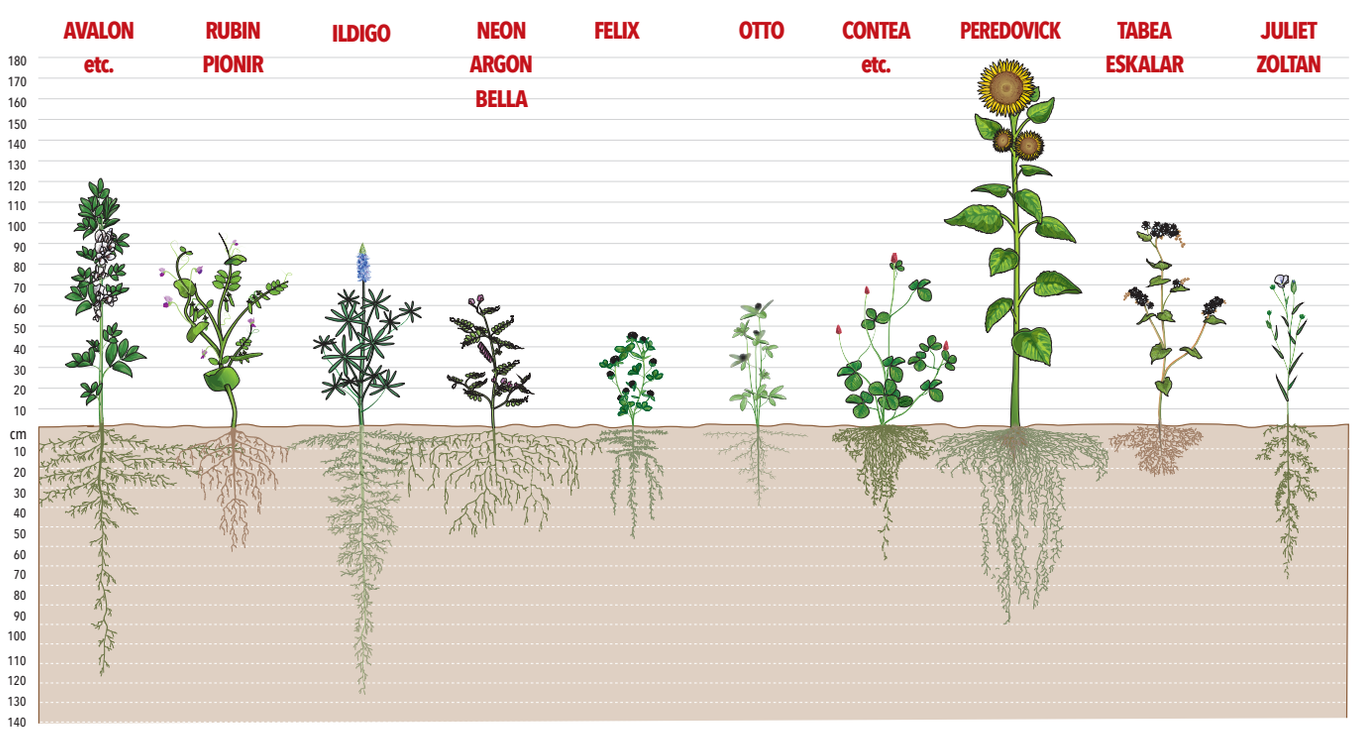


Source: P. H. PETERSEN, own research

Practical experiences regarding infestations and the control of Pratylenchus in the 'Aus der Praxis' article www.saaten-union.de/aus-der-praxis/

Structure for the soil





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.

Oilseed radish for green manuring

SILETINA

Also available as an organic product

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

Variety	Profile
AKIRO	**Robust and fast**

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

Variety	Profile
CAMARO	**For fodder and gameland**
ANGLIAN GOLD	**Exceptional frost resistance**

Tillage radish

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

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

Also available as an organic product

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

Winter forage rape

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

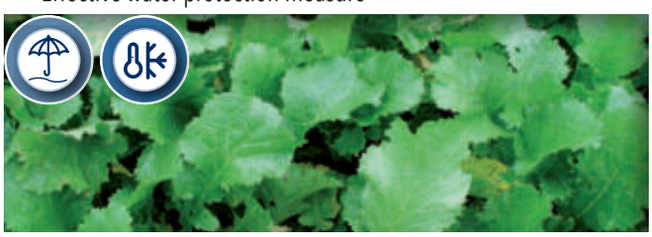
Winter turnip rape (*Brassica rapa var. silvetris*)

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.

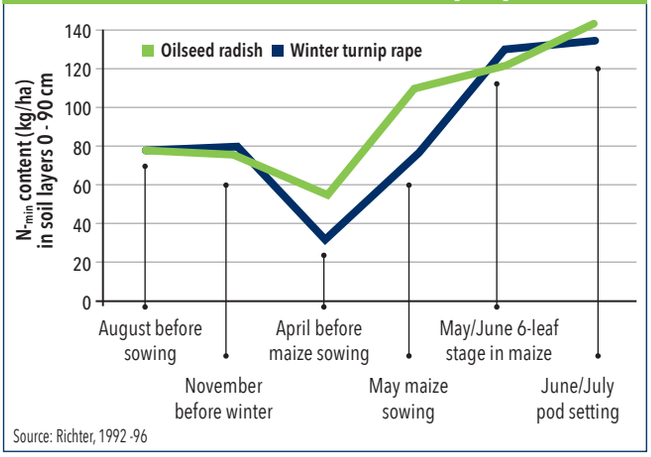
JUPITER

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



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



Source: Richter, 1992 -96

Phacelia (*Phacelia tancetifolia*)

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

Also available as an organic product

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

QUALITY IS OUR TOP PRIORITY P.H.PETERSEN

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.

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

valid until 20.12.2023

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

Also available as an organic product

Robust and neutral regarding subsequent crop

- Is valuable for honey bees and is often used in wild forage blends
- Fast growing, susceptable to frost

Variety	Profile
ESQUIRE NEW	Late-maturing

Tartary buckwheat (*Fagypyrum 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

Variety	Profile
TABOR NEW	Neutral for crop rotation diseases

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 lupin (*Lupinus angustifolius*)

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

Vetches are excellent fodder plants and blend partners. They produce better and are healthier when grown together with support crops. The multitude of vetch species contributes to biodiversity. In blends, they contribute to the nitrogen supply of their non-legume partners.

Common vetch

ARGON

Also available as an organic product

Compact-growing cover crop for blends

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

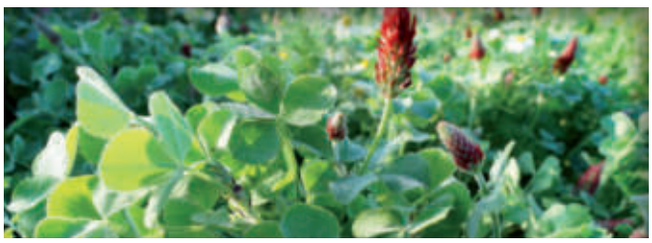
NEON

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

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.



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

LATIGO

Excellent for green manuring and fodder

Alfalfa

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

Variety	Profile
PROTEUS	**Protein-rich and fine-stemmed**
POSEIDON	**Versatile and high-yield**

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

Also available as an organic product

Europe's leading forage rye

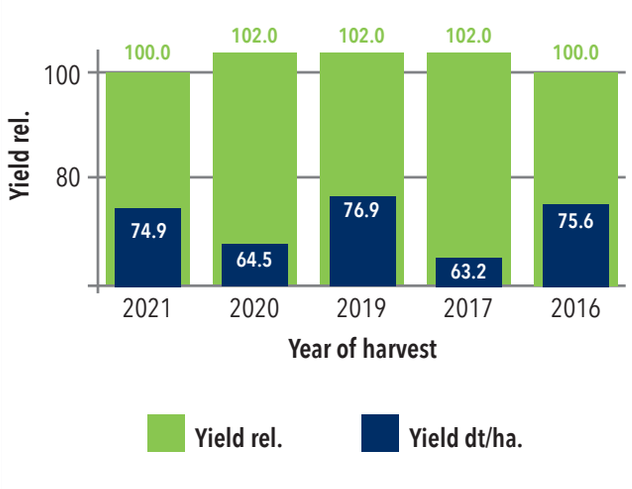
- Longstanding number 1 in German evaluations
- Biomass and fodder provider with excellent return on invested time
- Double usage: for cattle and biogas
- Excellent winter growth, exceptional erosion protection
- Very good tolerance to late sowing: up to late October for greening after maize

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



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

Also available as an organic product

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, ensilaged 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 regenrate 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

Species	Variety	Sowing window			Sowing density, pure seed kg/ha	Thousand kernel weight in g	Page
		July	Aug	Sep			
White mustard nematode resistance level 1*	**NARWAL**				15 - 25	6 - 10	12
White mustard nematode resistance level 2*	**LUCIDA**, **VERDI** H1, **CLINT**, **TOPAS**, **ACCENT** **PROFI**, **GAUDI**, **VETO**, **LOTUS** **MASTER**, **SCOUT**				15 - 25	6 - 10	12 13
Oilseed radish nematode resistance level 1*	**AMIGO** **COMET**				20 - 30	10 - 15	14 15
Oilseed radish nematode resistance level 2*	**SUNDAY** **AGRONOM** **ADAGIO**, **COMPASS** **CONCORDE**, **SUCCESS**, **SULINA**				20 - 30	10 - 15	14 15
Oilseed radish multi-resistant level 1*	**ANGUS**				20 - 30	10 - 15	16
Oilseed radish multi-resistant level 2*	**CONTROL** **DEFENDER** **CONTRA** **CARUSO**				20 - 30	10 - 15	16
Oilseed radish	**BENTO**, **SILETTA NOVA** **AKIRO**, **SILETINA**, **INFORMER**				20 - 30	10 - 15	21 24
White mustard	**ALBATROS** **COVER**, **CLASSIC**				15 - 25	6 - 10	25
Tillage radish	**MINER**, **STINGER**				6 - 8	10 - 15	24
Saia oat	**PRATEX**, **OTEX**, **TRADEX** **LUNEX**, **CODEX**				60 - 80	15 - 30	22
Nematode-neutral phacelia	**ANGELIA**, **AMERIGO**				8 - 12	2	27
Spring forage rape	**JUMBO**				10 - 20	3 - 7	26
Winter forage rape	**EMERALD**, **FONTAN**, **PRESTIGE**				8 - 20	3 - 7	26
Marrow stem kale	**GRÜNER ANGELITER**, **CAMARO**, **ANGLIAN GOLD**				3 - 4	3.5 - 4.6	24

* Resistance levels are based on resistance to *Heterodera schachtii* and were determined by way of official tests.

Fertilisation according to local recommendations.

Species	Variety	Sowing window			Sowing density, pure seed kg/ha	Thousand kernel weight	Page
		July	Aug	Sep			
Winter forage rye	**PROTECTOR** **LUNATOR**, **TRAKTOR**				120 - 180	27 - 35	32
Spring forage rye	**OVID**, **SU VERGIL**				120 - 160	27 - 35	33
Perennial rye	**JOHAN**				140 - 150	17-18	33
Winter turnip rape	**JUPITER**				8 - 20	5 - 10	26
Annual ryegrass	**ALISCA** tetraploid, **DIPLOMAT** diploid				40 - 45	2 - 4	33
Sticky nightshade	**WHITE STAR**, **DIAMOND**				3	3 - 4	21
Brown mustard	**ENERGY**, **TERRAFIT**				10 - 12	2 - 3	25
Linseed	**JULIET**, **ZOLTAN**				20 - 30	7 - 8	27
Fava bean	**AVALON**				130 - 150	150 - 580	29
Persian clover	**FELIX**				15 - 20	1.3 - 1.8	29
Berseem clover	**OTTO**				30 - 35	2.6 - 4	29
Balansa clover					5 - 10	0.9 - 1.1	29
Crimson clover					25 - 35	3 - 5	31
Buckwheat	**TABOR**, **TABEA** **ESQUIRE**, **ESKALAR**, **HAJNALKA**				60 - 80	25 - 35	28
Common vetch	**ARGON**, **NEON**				100 - 130	50 - 62	31
Winter vetch	**LATIGO**, **BELLA**				80 - 160	20 - 50	31
Blue lupin	**ILDIGO**				160 - 180	160 - 200	30
Serradella					30 - 50	3 - 5	30
Alfalfa	**PROTEUS**, **POSEIDON**				25 - 30	1.5 - 2.5	31
Spring field pea	**RUBIN**				120 - 160	100 - 180	30
Winter field pea	**NS PIONIR**				120 - 160	100 - 180	30
Vetchling	**ETERNA**				90 - 120	90 - 130	30
Sunflower					20 - 30	50 - 70	

Fertilisation according to local recommendations.

How many components does a cover crop blend need?

'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 voluteers.

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.

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.

Organic mass

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.

Soil health

The biological reduction of pathogens and pests is the greatest strength of varieties with tested properties. If the cover crops are intended to reduce disease pressure on the subsequent main crop and support yield, specific varieties with tested properties should be selected. Resistances should pursue the same aim and be supported through appropriate growth properties. Unsuitable components can undermine the ultimate agricultural goal and cause unwanted problems. Trials have confirmed the importance of carefully selecting blend components.

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

	Blend	Special feature	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Contents as abbreviations	Seed quantity kg/ha	Scattering ability	Sowing window: April	May	June	July	August	September	October	Legume proportion, seed %	Legume proportion, weight %	Page
Soil fertility blends	INTENSIV	The health blend	+	+	+	++	++	+	HS, OR	40 - 50	–								0	0	40
	INTENSIV N-PLUS	The N-flexible potato trio	++	+	+	++	++		OR, HS, WIS	50 - 60	–								23	52	41
	POTATO	The versatile boost for potatoes	+	+	+	+	++		OR, HS, WIS, LN, LUB	50 - 60	–								24	66	41
	MULCH	Frost-sensitive blend without clover	++	+	+	++	+	+	HS, OR	40 - 50	–								0	0	42
	RÜBE	Professional against nematodes	+	+		++		+	OR, SF	20 - 25	+								0	0	42
	RÜBENGARE	The versatile beet blend	+	+		++			PHA, AKL, HS, SF, WIS, EF	30	–								24	66	43
	TRIO	Frost-sensitive blend with clover	+	+	+	++			PHA, AKL, OR	15 - 18	–								24	16	43
	MAIZE	Fast-growing blend without legumes	++	+				+	PHA, OR, HS, LN, HI, SBL	20	–								0	0	44
	MAIS STRUKTUR	Loosens stressed soil	++	+					PHA, PKL, WKL, IKL, RUW, HS, OR, RAW, WIW, LUB, HI, SBL	25 - 30	–								46	47	44
	SCHNELLGRÜN	Suitable for late sowing, with clover	++	+					SF, MKL, LND, SFB	12 - 15	+								22	6	45
	SCHNELLGRÜN LEGUMINOSENFREI	Suitable for late sowing, without clover	++	+				++	LND, SF, SFB, LN	12 - 15	+								0	0	45
	WASSERSCHUTZ	For effective groundwater protection	++	++				+	RAW, RUW, KOF	10 - 12	+								0	0	46
	WINTERGRÜN NEW	Winter-hardy and tolerant of late sowing	++	++					RUW, IKL, RAW	12	+								35	37	46
	UNIVERSAL	Crucifer-free and drought-tolerant	+	+	++	+			PHA, HS, MKL, AKL, PKL	25	–								24	5	47
	UNIVERSAL LEGUMINOSENFREI	No crucifers or legumes	+	+	++	+		++	PHA, HS, LN, HI	25	–								0	0	47
	UNIVERSAL N-PLUS	Crucifer-free and nitrogen-fixing	+	+	++	+			PHA, HS, WIS, MKL, PKL, AKL, EF	35 - 40	–								29	61	48
	BODENGARE	A powerhouse for main crops	++	++	++	+			PHA, PKL, MKL, AKL, HI, WIS, EF, LUB, BA, SBL	45 - 50	–								61	89	48
	HÜLSENFRUCHT-GEMENGE	The nitrogen supplier	++	++	++	++			WIS, EF, BA	120 - 150	–								100	100	49
	RAPS	Frost-sensitive blend without crucifers	+	++	++	+			PHA, LN, MKL, PKL, AKL	15	–								24	12	49

SortenGreening®

	Blend	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Contents as abbreviations	Seed quantity kg/ha	Scattering ability	Sowing window: April	May	June	July	August	September	October	Legume proportion, seed %	Legume proportion, weight %	Page
SortenGreening®	VERDI + Egyptian clover	++	++		++			SF, AKL	15	+								36	22	51
	DEFENDER + common vetch	++	++	+	++	++		OR, WIS	55 - 60	–								29	66	51
	AGRONOM + common vetch	++	++	+	++	++		OR, WIS	55 - 60	–								29	65	51
	SILETTA NOVA + common vetch	++	++	+		++		OR, WIS	55 - 60	–								29	66	51

viterra® special blends

	Blend	Special feature	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Contents as abbreviations	Seed quantity kg/ha	Scattering ability	Sowing window: April	May	June	July	August	September	October	Legume proportion, seed %	Legume proportion, weight %	Page
Special blends	UNTERSAAT KLEE PLUS	Clover undersowing for cereals	++	++	++	+			WD, WKL	15		Depending on main crop							29	12	52
	UNTERSAAT GRAS FRÜH NEW	Efficient greening for sowing with maize	++						ROT, WSC	8 - 10		Depending on main crop							0	0	53
	UNTERSAAT GRAS	For sustainable maize cultivation	++						WV, WD	10 - 15		Depending on main crop							0	0	53
	BEISAAT FEIN	Intersowing for high-yield rapeseed cultivation		+	++				AKL, PKL, BKH, MKL	8 - 10		Depending on main crop							100	100	54
	BEISAAT GROB	Strong partner for oilseed rape cultivation		+	++				BA, LUB	35		Depending on main crop							100	100	54

V-Max® biomass blends

	Blend	Special feature	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Contents as abbreviations	Seed quantity kg/ha	Scattering ability	Sowing window: March	April	May	June	July	August	September	October	Legume proportion, seed %	Legume proportion, weight %	Page
V-Max® biomass blends	LUNDSGAADER GEMENGE	Winter-hardy fodder blend for greening	++	++	++	+			WV, IKL, WIW, EF	50	–									46	71	55
	GRANOPUR	WPS use before winter	++	++	+	+	++	+	TIS, HA, HS, RS	130 - 150	–									0	0	56
	GRANOLEG	WPS use before winter with legumes	++	++	+	+			TIS, HA, RS, EF, HS	130 - 150	–									4	19	56
	WICKROGGEN	Winter-hardy WPS blend	++	+	+	+			RW, WIW	100 - 120	–									9	10	57
	WICKROGGEN FUTTER	Winter-hardy blend for WPS and fodder use	++	+	+	+			RW, WIW, WV	110	–									4	10	57
	ERBSENTRITICALE	Winter-hardy blend	++	+	++	+			TIW, EF	150 - 170	–									11	23	57
	SOMMERFUTTER	Forage blend for harvest in year of growing	++	++	++	+			PKL, WEI, WV	25 - 30	–									47	28	58
	SOMMERFUTTER A2	Grass blend for harvest in growing year	++	++	++	+		+	WV, WEI	40 - 45	–									0	0	58
	FUTTER	Grass-clover blend for harvest after winter	++	++	+	+	+		WV, IKL	35 - 40	–									46	51	59
	KLEEGRAS	Clover blend for perennial cultivation	++	++	++	+			WV, WB, WD, RKL, WKL	30 - 35	–									56	37	59

Organic blends

	Blend	Special feature	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Contents as abbreviations	Seed quantity kg/ha	Sowing window: April	May	June	July	August	September	October	Page
V-Max® organic blends	LUNDSGAADER GEMENGE ÖKO	Evergreen grasses and legumes for fodder	++	++	++	+			WV, IKL, WIW, EF	50								62
	WICKROGGEN ÖKO	Winter-hardy blend for fodder or green manure	++	+	+	+			RW, WIW	100 - 120								62
	WICKROGGEN FUTTER ÖKO	Winter-hardy blend for fodder or green manure	++	+	+	+			RW, WV, IKL, WIW	100 - 120								62
	ERBSENTRITICALE ÖKO	Winter-hardy blend	++	+	+	+			TIW, EF	150 - 170								62
	KLEEGRAS ÖKO	Clover blend for perennial cultivation	++	++	++	+			WD, WB, RKL, WV, WKL	40								62
viterra® organic blends	KARTOFFEL ÖKO NEW	Optimal green manure before potatoes	+	+	+		++	+	HS, OR	40 - 50								60
	POTATO ÖKO	The boost for potatoes	+	+	+		++		WIS, LUB, OR, HS	50 - 60								62
	DEPOT ÖKO	Nutrient reservoir	++	++				++	HS, OR, SF, PHA, SOL	20								61
	SPRINT ÖKO	The quick starter	++	++				++	BUW, SF, RAS, PHA	15								61
	BODENGARE ÖKO	A powerhouse for main crops	++	+	++	+			BA, EF, WIS, LUB, AKL, PHA, SOL	60 - 70								62
	HÜLSENFRUCHTGE-MENGE ÖKO	The nitrogen supplier	++	++	++	++			BA, WIS, EF	120 - 150								62

viterra® nature and environmental blends

	Blend	Special feature	Suitable for crop rotation with: Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures	Contents as abbreviations	Seed quantity kg/ha	Scattering ability	Sowing window: March	April	May	June	July	August	September	October	Legume proportion, seed %	Legume proportion, weight %	Page
Nature and environmental blends	BRACHE NEW	Grass-heavy fallow blend	For fallow land							ROT, WSC, WKL	15 - 20	–									21	10	63
	BUNTBRACHE NEW	Flowering fallow blend	For fallow land							RKL, WKL, LUZ, PHA, WSR, LN, IKL, BUW, ESP, RAW, LUB	20 - 25	–									60	44	64
	BIENE ECO NEW	Flowering blend, suitable for funding under Eco-Scheme 1.2	++	+	++	+				WKL, PHA, RKL, DIL, LUZ, ESP, BUW, RBL, ZS, MAL, SOL, BOR,	12.5	–									52	38	64
	BIENE	Annual bee/honey fallow without crucifers	++	+	++	+				AKL, PKL, PHA, DIL, LUZ, SD, WIS, RBL, EF, LUB, SOL	25	–									71	84	65
	BLÜHZAUBER	The flowering meadow	Not recommended for arable farming							Over 40 flowering varieties	5-7g/m²	–									-	-	65
	BLUMENTEPPICH	Perennial flowering blend	Not recommended for arable farming							Over 30 flowering annuals and perennials	5-7g/m²	–									-	-	65
	HORRIDO	Biennial gameland pasture blend	+	+						WSR, BUW, HS, SD, SOL, WIW, AKL, PKL, MAL, RAW, LN, RKL, LUZ, PHA, OR, RUW, KOF	25 - 30	–									52	20	66
	HOCHWILD	Biennial game pasture blend without crucifers	++	++	++					MKL, RKL, LUZ, AKL, IKL, EF, LUB	25	–									100	100	66

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

Sowing
Mid July to early September

Sowing density
40 - 50 kg/ha

Legume proportion according to DüV:
0 seed % / 0 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® 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)

Sowing
Mid July to early September

Sowing density
50 - 60 kg/ha

Legume proportion according to DüV:
23 seed % / 52 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	

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

Also available as an organic product

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

Sowing
Mid July to mid August

Sowing density
50 - 60 kg/ha

Legume proportion according to DüV:
24 seed % / 66 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	

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

Sowing
Mid July to early September

Sowing density
40 - 50 kg/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® 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

Sowing
Mid July to early September

Sowing density
20 - 25 kg/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® 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

Sowing
July to late August

Sowing density
30kg/ha

Legume proportion according to DüV:
24 seed % / 66 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® RÜBENGARE seed proportions:

49% phacelia ANGELIA
14% Egyptian clover OTTO
14% saia 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

Sowing
Early-mid July to mid August

Sowing density
15 - 18 kg/ha

Legume proportion according to DüV:
24 seed % / 16 weight %

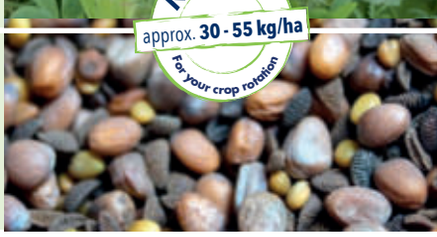
Packaging unit:
25kg paper sack or 500kg BigBag

Fertilisation	
Recommended	
N-flexible	✗
Not required	

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

viterra® TRIO seed proportions:

52% phacelia ANGELIA
24% Egyptian clover OTTO
24 % nematode-resistant oilseed radish COMPASS



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	
Maize	✗✗
Cereals	✗
Rapeseed	
Sugar beet	
Potatoes	
Legumes	✗

Optimised 2023 blend

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	
Maize	✗✗
Cereals	✗
Rapeseed	
Sugar beet	
Potatoes	
Legumes	

Optimised 2023 blend

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

Sowing
Early August to mid-late September

Sowing density
12 - 15 kg/ha

Legume proportion according to DüV:
22 seed % / 6 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	

Optimised 2023 blend

viterra® SCHNELLGRÜN seed proportions:

43% white mustard ALBATROS
22% Balansa clover
22% camelina
13% brown mustard ENERGY

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

Sowing
Early August to mid-late September

Sowing density
12 - 15 kg/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	✗

Optimised 2023 blend

viterra® SCHNELLGRÜN LEGUMINOSENFREI seed proportions:

40% camelina
31% white mustard ALBATROS
16% linseed ZOLTAN
14% brown mustard ENERGY

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

Sowing
Mid July to late September

Sowing density
10 - 12 kg/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	✗

Optimised 2023 blend

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

Sowing
Mid July to late September

Sowing density
12kg/ha

Legume proportion according to DüV:
35 seed %, 37 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® 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	

Optimised 2023 blend

viterra® UNIVERSAL seed proportions:

49% phacelia ANGELIA
27% saia oat PRATEX
14% Balansa clover
5% Egyptian clover OTTO
5% Persian clover FELIX

viterra® UNIVERSAL LEGUMINOSENFREI

No crucifers or legumes

- Low-maintenance, ideal for use in rapeseed-legume crop rotations, disrupts disease cycles
- Good convertor 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	✗✗

Optimised 2023 blend

viterra® UNIVERSAL LEGUMINOSENFREI seed proportions:

47% phacelia ANGELIA
36% saia oat PRATEX
13% linseed ZOLTAN
4% sorghum

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

Sowing
Early July to mid August

Sowing density
35 - 40 kg/ha

Legume proportion according to DüV:
29 seed %, 61 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	

Optimised 2023 blend

viterra® UNIVERSAL N-PLUS seed proportions:

49% phacelia ANGELIA
22% saia oat PRATEX
8% common vetch ARGON/NEON
7% Balansa clover
7% Persian clover FELIX
5% Egyptian clover OTTO
2% summer field pea RUBIN

viterra® BODENGARE

Also available as an organic product

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

Sowing
Mid June to mid August

Sowing density
45 - 50 kg/ha

Legume proportion according to DüV:
61 seed %, 89 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	

Optimised 2023 blend

viterra® BODENGARE seed proportions:

34% phacelia ANGELIA
22% Persian clover FELIX
22% Balansa clover
8% Egyptian clover OTTO
5% common vetch ARGON/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

Also available as an organic product

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

Sowing
July to mid August

Sowing density
120kg/ha to 150kg/ha

Legume proportion according to DüV:
100%

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® 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

Sowing
Early July to late August

Sowing density
15kg/ha

Legume proportion according to DüV:
24 seed %, 12 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	

Optimised 2023 blend

viterra® RAPS seed proportions:

52% phacelia ANGELIA
24% linseed ZOLTAN
12% Balansa clover
8% Persian clover FELIX
4% Egyptian clover OTTO

SortenGreening®

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.

GLÖZ 5 **GLÖZ 6** **GLÖZ 7**

SortenGreening®

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

N-GEWINN approx. **25 - 55 kg/ha** For your crop rotation

N-GEWINN approx. **45 - 90 kg/ha** For your crop rotation

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'

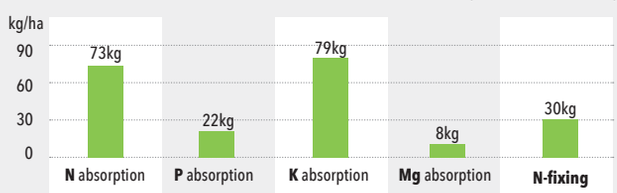
Stock benefits in a number of ways:

- 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

***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).*

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



⊕ **plus increased growth reliability**

⊕ **plus less weed competition**

⊕ **plus more soil fertility**

⊕ **plus freezing off reliably**

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 K20 (Kornkali 60%)*
79kg K x 0.6 x 1.25€ → 59€/ha

207€/ha

Source for nutrient contents: Bayrisches Landesamt für Landwirtschaft: nutrient contents of secondary crops and cover crops

* Valid as of December 2022

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

Maize	XX
Cereals	XX
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

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.

viterra® UNTERSAAT GRAS FRÜH NEW

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

Sowing
Shortly before or with maize seed

Sowing density
8 - 10 kg/ha

Legume proportion according to DüV:
0%

Packaging unit:
15kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	XX
Cereals	
Rapeseed	
Sugar beet	
Potatoes	
Legumes	

viterra® UNTERSAAT GRAS FRÜH seed proportions:

90% red fescue
10% meadow fescue

Undersowing guide

viterra® UNTERSAAT GRAS

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

Sowing
6-8 weeks after maize sowing, at 6-8-leaf stage in maize

Sowing density
10 - 15 kg/ha

Legume proportion according to DüV:
0%

Packaging unit:
15kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	XX
Cereals	
Rapeseed	
Sugar beet	
Potatoes	
Legumes	

viterra® UNTERSAAT GRAS seed proportions:

50% Italian ryegrass (tetraploid)
50% German ryegrass (diploid, mid-late, fodder variety)

Undersowing guide

Intersowing guide

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

Sowing
Together with rapeseed (two-tank system) or shortly before

Sowing density
8 - 10 kg/ha

Legume proportion according to DüV:
100%

Packaging unit:
15kg paper sack or 500kg BigBag

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

Optimised 2023 blend

viterra® BEISAAT FEIN seed proportions:

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

Intersowing guide

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

Sowing
Together with rapeseed (two-tank system) or shortly before

Sowing density
35kg/ha

Legume proportion according to DüV:
100%

Packaging unit:
15kg paper sack or 500kg BigBag

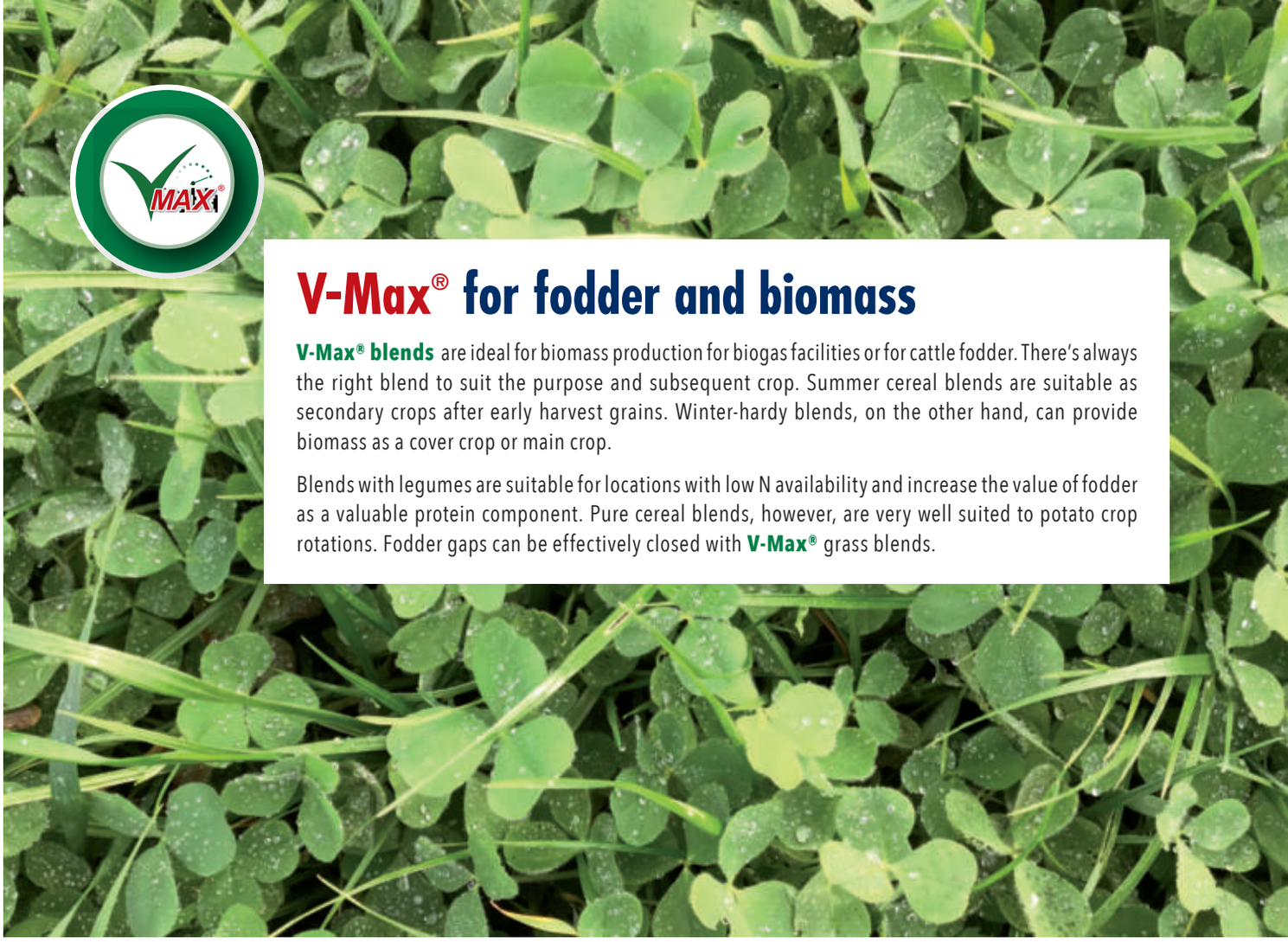
Suitable for subsequent crop	
Maize	
Cereals	✗
Rapeseed	✗✗
Sugar beet	
Potatoes	
Legumes	

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.

Also available as an organic product

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	

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

Packaging unit:
25kg paper sack or 500kg BigBag

Optimised 2023 blend

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

Potential yield*:
40 - 60 dt TM/ha

Potential yield*:
65 - 80 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

Maize	XX
Cereals	XX
Rapeseed	X
Sugar beet	X
Potatoes	XX
Legumes	X

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% saia oat PRATEX
25% oat
23% spring triticale

Potential yield*:
75 - 80 dt TM/ha

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

Maize	XX
Cereals	XX
Rapeseed	X
Sugar beet	X
Potatoes	
Legumes	

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% saia 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.

Also available as an organic product

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

Also available as V-Max® WICKROGGEN FUTTER with ryegrass for additional uses

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

Suitable for subsequent crop

Maize	XX
Cereals	X
Rapeseed	X
Sugar beet	X
Potatoes	
Legumes	

Legume proportion according to DüV:
9 seed %, 10 weight %

Packaging unit:
25kg paper sack or 500kg BigBag

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

Potential yield*:
80 - 110 dt TM/ha

Also available as an organic product

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

Suitable for subsequent crop

Maize	XX
Cereals	X
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

Legume proportion according to DüV:
11 seed %, 23 weight %

Packaging unit:
25kg paper sack or 500kg BigBag

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

Potential yield*:
65 - 80 dt TM/ha

V-Max® SOMMERFUTTER

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

Sow:
Late June to late July (for greening, up to late August)

Sowing density: 25 - 30 kg/ha

Harvest window: October

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	XX
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

Legume proportion according to DüV:
47 seed %, 28 weight %
Packaging unit:
20kg paper sack or 500kg BigBag

V-Max® SOMMERFUTTER weight proportions:
36% Italian ryegrass (tetraploid)
36% annual ryegrass (diploid/tetraploid)
28% Persian clover FELIX

Potential yield*:
30 - 40 dt TM/ha

V-Max® SOMMERFUTTER 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

Sow:
Late June to late July (for greening, up to late August)

Sowing density: 40 - 45 kg/ha

Harvest window: October

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	XX
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	X

Legume proportion according to DüV:
0%
Packaging unit:
15kg paper sack or 500kg BigBag

V-Max® SOMMERFUTTER A2 weight proportions:
67% Italian ryegrass (tetraploid)
33% annual ryegrass (diploid/tetraploid)

*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

Maize	XX
Cereals	XX
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

Legume proportion according to DüV:
46 seed %, 51 weight %
Packaging unit:
20kg paper sack or 500kg BigBag

V-Max® FUTTER weight proportions:
51% crimson clover
49% Italian ryegrass

According to the recommendation of the North German Chamber of Agriculture

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

Suitable for subsequent crop

Maize	XX
Cereals	XX
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

Legume proportion according to DüV:
56 seed %, 37 weight %
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

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 NEW

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

Sowing
Mid July to early September

Sowing density
40 - 50 kg/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® 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

Sowing
Late 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	
Maize	✗✗
Cereals	✗✗
Rapeseed	
Sugar beet	
Potatoes	
Legumes	✗✗

Optimised 2023 blend

viterra® DEPOT ÖKO weight proportions:

45% saia oat PRATEX
23% oilseed radish SILETINA
15% white mustard ALBATROS
12% phacelia ANGELIA
5% sunflower

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

Sowing
July to early September

Sowing density
15kg/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	✗✗

Optimised 2023 blend

viterra® SPRINT ÖKO weight proportions:

43% buckwheat
35% white mustard ALBATROS
10% summer forage rape JUMBO
12% phacelia ANGELIA

The following products are also available as organic blends:

V-Max®
LUNDSGAARDER GEMENGE ÖKO

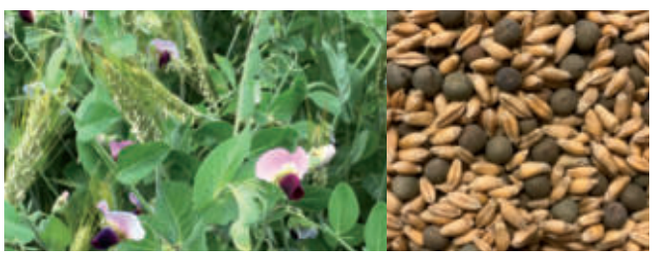
Winter-hardy blend for fodder and soil fertility

Description on page 55

V-Max®
WICKROGGEN FUTTER ÖKO

Winter-hardy blend for fodder or green manure

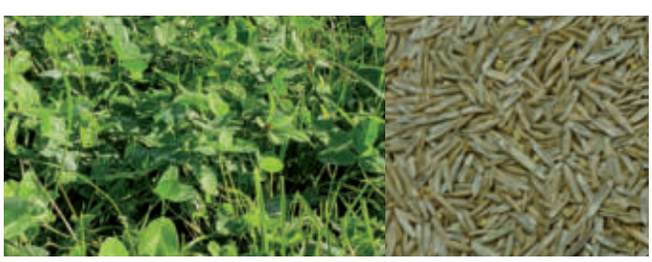
Description on page 57



V-Max®
ERBSENTRITICALE ÖKO

Winter-hardy blend for WPS and grain use

Description on page 57



V-Max® KLEEGRAS ÖKO

Clover blend for perennial cultivation

Description on page 59

viterra® POTATO ÖKO

The boost for potatoes

Description on page 41

viterra® BODENGARE ÖKO

A powerhouse for main crops

Description on page 48

viterra®
HÜLSENFRUCHTGEMENGE ÖKO

The nitrogen supplier

Description on page 49

*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.

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

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)

Sowing
From early April to mid August

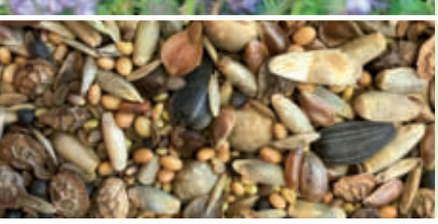
Sowing density
20 - 25 kg/ha

Legume proportion according to DüV:
60 seed %, 44 weight %

Packaging unit:
25kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	
Cereals	
Rapeseed	For fallow land
Sugar beet	
Potatoes	
Legumes	



viterra® BUNTBRACHE seed proportions:

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

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

Sowing
From early April to mid August

Sowing density
12.5kg/ha

Legume proportion according to DüV:
52 seed %, 38 weight %

Packaging unit:
12.5kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	✗✗
Cereals	✗
Rapeseed	✗✗
Sugar beet	✗
Potatoes	
Legumes	

viterra® BIENE ECO seed proportions:

20% white clover	8% alfalfa	4% chicory
20% Phacelia ANGELIA	6% sainfoin	1% mallow
18% red clover	6% buckwheat	1% sunflower
12% dill	4% marigold	<1% borage

*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.

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

Maize	XX
Cereals	X
Rapeseed	XX
Sugar beet	X
Potatoes	
Legumes	

viterra® BIENE seed proportions:

31% Egyptian clover OTTO
28% Persian clover FELIX
18% Phacelia ANGELIA
9% dill
6% alfalfa
3% serradella
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

For gardeners and nature fans

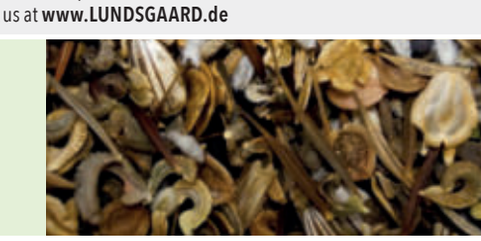
Our online shop for small orders.
Visit us at **www.LUNDSGAARD.de**

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



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

Sowing
March to late July

Sowing density
25 - 30 kg/ha

Legume proportion according to DüV:
52 seed %, 20 weight %

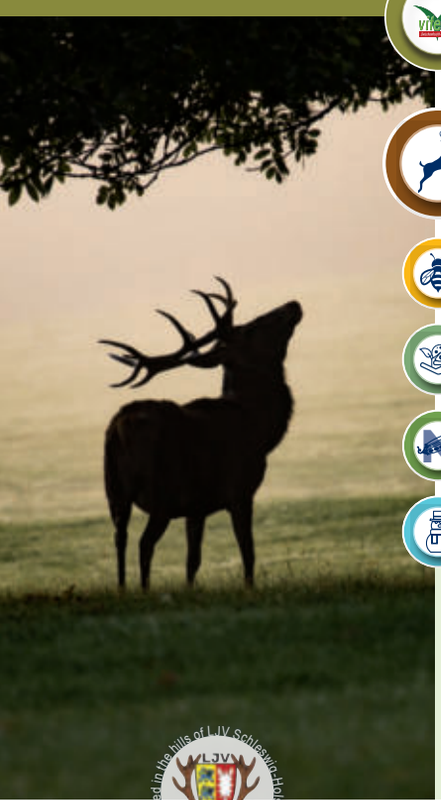
Packaging unit:
10kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	✗
Cereals	✗
Rapeseed	
Sugar beet	
Potatoes	
Legumes	

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% marrow stem kale GRÜNER ANGELITER



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 scatted by hand, sand can be mixed in to prevent segregation.

Sowing
March to late July

Sowing density
25kg/ha

Legume proportion according to DüV:
100%

Packaging unit:
10kg paper sack or 500kg BigBag

Suitable for subsequent crop

Maize	✗✗
Cereals	✗✗
Rapeseed	✗✗
Sugar beet	
Potatoes	
Legumes	

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 crop cultivation recommendations

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 over winter 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.

Low sowing density		**Right** sowing density	
✘ Dense individual plants	✘ Weed multiplication	✓ Frost sensitivity	✓ Soil loosening
✘ Frost tolerance	✘ Green bridges	✓ Erosion protection	✓ Nutrient reservoir
✘ Gaps in stock	✘ Nutrient loss	✓ Pest reduction	✓ Humus formation

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 twitch 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.

Optimal nutrient use with cover crops

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.

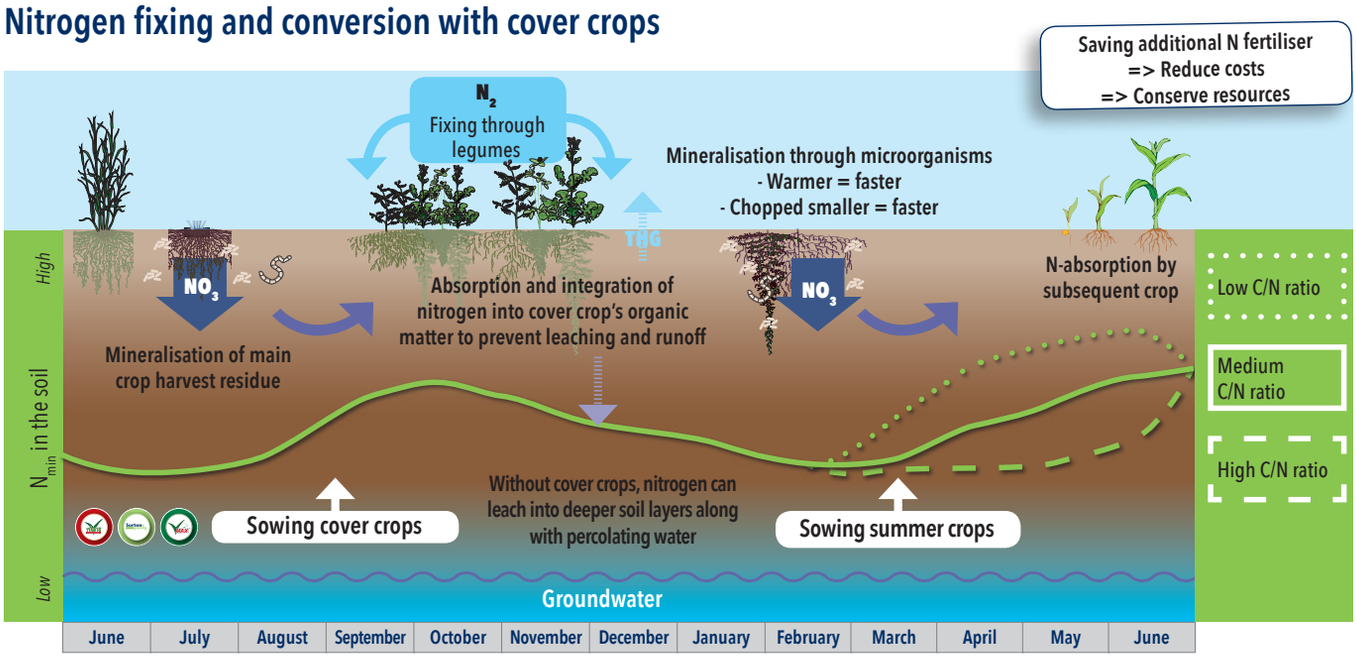
Bringing additional nitrogen into the system

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



Cover crops and the Fertilisation Act

Table: Legume content and N-profit for subsequent crop

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

Legume content		Blend	N-profit for subsequent crop (kg N/ha)
Seed %	Weight %		
22%	6%	viterra® SCHNELLGRÜN	25 - 50
0%	0%	viterra® INTENSIV	40 - 70
0%	0%	viterra® MAIS	25 - 40
0%	0%	viterra® MULCH	30 - 55
0%	0%	viterra® RÜBE	30 - 55
0%	0%	viterra® SCHNELLGRÜN LEGUMINOSENFREI	15 - 30
0%	0%	viterra® UNIVERSAL LEGUMINOSENFREI	25 - 40
0%	0%	viterra® WASSERSCHUTZ	30 - 50
0%	0%	viterra® KARTOFFEL ÖKO	40 - 70
0%	0%	viterra® DEPOT ÖKO	25 - 40
0%	0%	viterra® SPRINT ÖKO	25 - 40

Your N-profit with cover crops!

Questions about fertilisation?

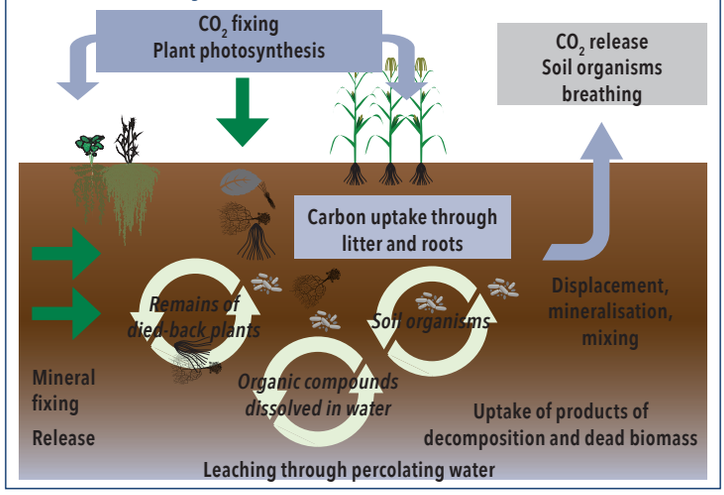
Find out more at
https://www.saaten-union.de/aus-der-praxis/duengung-zur-und-nach-der-zwischenfrucht-was-gilt-es-zu-beachten/

Climate conservation and carbon farming

Carbon farming is a term describing agricultural methods that capture atmospheric carbon (CO_2) 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.

The carbon cycle



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 CO_2 (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.

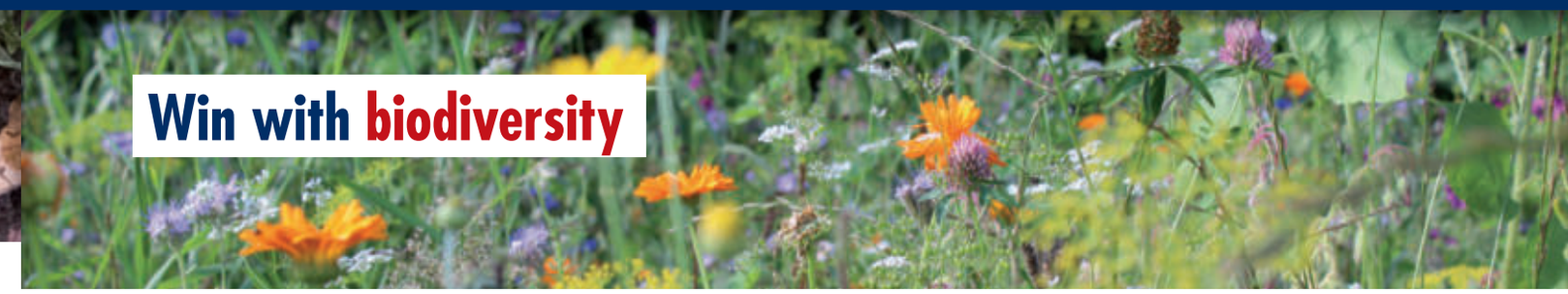
Many of these practices come under the term 'regenerative agriculture'. Here too, the aim is to improve soil health as well as the resilience of agriculture in the face of climate change, reducing emissions and increasing the fixing of organic carbon in the soil.

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 CO_2 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® UNTERSAAT GRAS FRÜH, viterra® UNTERSAAT GRAS and viterra® UNTERSAAT 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



Win with biodiversity

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 boars are a problem, hunting aisles with flowering blends may be helpful.
- Surround rest stops as a magnet for visitors

Funding programmes

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 Europan Community each country has different Ecoschemes.

Additional product information and knowledge

Simply scan the QR code or find out more at
www.saaten-union.de/downloadcenter

Download centre

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

Order form for our cover crop blends

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.

Complete cover crop product list: this complete product list is also available to download in the download centre.

Rootstock: the most important cover crops at a glance. Order your copy at service@saaten-union.de or download one in the download centre. You'll also find **special brochures** with additional information on **flowering blends**, **wild blends** and **organic blends.**

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.

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

Field signs for PR work: for field signs, please contact your responsible sales advisor at SAATEN-UNION.

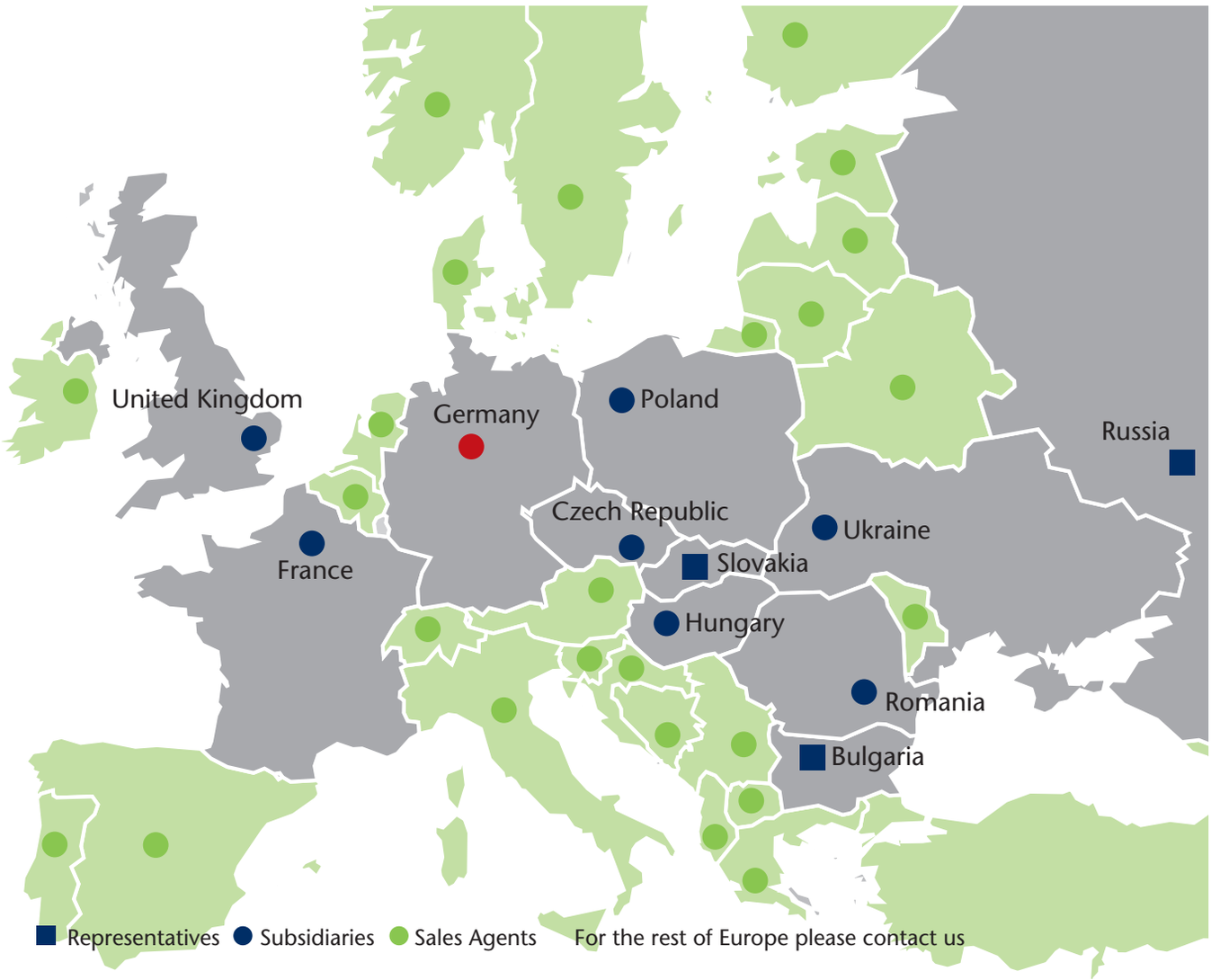
Or get in touch via
service@saaten-union.de

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**

YOUR GROWING SUCCESS



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.

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Züchtung ist Zukunft

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