SPECIALIST INFORMATION AND VARIETIES

The Cover Crop Programme 2019

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WWW.ZWISCHENFRUCHT.DE

SAATEN UNION
Züchtung ist Zukunft

Quality Varieties

Organic Seeds

viterra® blends

Cover crops from a reputable supplier

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 and varieties.

By registering the world's first nematode-resistant varieties, P. H. PETERSEN redefined a completely new scope for cover crops. Since then, the company has remained a market leader in Europe, standing for innovative products. Extensive contact with research institutes, specialist consultants and forward-thinking farmers ensures the efficiency and actuality of variety development and practically applicable solutions.

Today, the P.H. PETERSEN cultivation facility boasts around 60 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 15,000 m^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.

The products are successfully marketed in Germany and Europe in collaboration with SAATEN-UNION GmbH, of which P.H. PETERSEN Saatzucht Lundsgaard GmbH has been a shareholder for many years now.

Today, this multi-faceted family company is run by Matz Petersen, the third generation.

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P.H.PETERSEN
SAATZUCHT LUNDSGAARD

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Extra high-quality seeds

Ongoing quality controls during production and preparation guarantee that all delivered seeds exceed statutory norms.

Good reasons to use cover crops

In agriculture, the importance of maintaining and promoting soil fertility is increasingly seen as a success factor for financially viable and sustainable arable farming. Growing professional cover crops helps to encourage soil health and improve soil structure.

Choosing the right cover crop depends on the main crop's needs. New drivers are created by political and societal wants and needs. Cover crops contribute to achieving these aims in an environmentally-friendly way.

The potentials of cover crops

- **Ensure biodiversity**
- **Conserve nitrogen in the soil**
- **Ensure humus formation, "feed" the soil and therefore improve soil fertility**
- **Use and bind free nutrients over winter and protect against displacement into groundwater**
- **Reduce the nitrate burden of groundwater**
- **Improve the soil's ability to hold water**
- **Roots loosen the soil**
- **Support the habitats of soil dwellers such as earthworms**
- **Make spring soil preparation easier**
- **Regulate and reduce weeds and significantly reduce the use of chemical plant protection**
- **Control biological soil diseases**
- **Make crop rotation easier and disrupt the development cycles of pests**
- **Can be used as cattle feed and biomass**
- **Thanks to their high yield of flowers, they provide nectar for honey bees and encourage insect diversity**
- **Provide a habitat for small game**

What the experts say

'Since I've been regularly growing cover crops, the number of earthworms has clearly increased. To me, earthworms are a sign of good soil structure.'

Las-Peter Jacobsen, farmer, Schleswig-Holstein

'SILETTA NOVA oil radish before potatoes is standard for us. The good yields and the quality of the potatoes easily offset the extra effort for the cover crops.'

Harald Meyer, farmer, Lower Saxony

'The cultivation of cover crops is an intrinsic part of water protection. It's not uncommon for cover crops to take up 100kg or more of nitrogen per hectare, which is then protected from leaching.'

Daniela Biernoth, IGLU Lower Saxony

'Time and time again, farmers say that tillage for winter wheat after maize is easier if you use a good cover crop before the maize.'

Achim Schneider, Sales Consultant, Saaten-Union Hessen

'After careful sowing following ploughing, we gain excellent energy-rich fodder for our suckler cows with viterra® LUNDSGAARDER GEMENGE preceding silo maize'

Jan-Hendrik Rust, farmer, Mecklenburg-Western Pomerania

'I've sown viterra® RAPS without any tillage immediately after barley and have been surprised at how clean the crop remained right into spring.'

Felix Wierling, farmer, North Rhine-Westphalia

'The green forage rye PROTECTOR has become an essential part of our crop rotation, which focuses on biomass production.'

Klaus Kock, farmer, Schleswig-Holstein

'For many of our sugar beet farmers, there is no getting around the use of resistant mustard and oil radish varieties.'

Frithjof Pape, Nordzucker AG, Lower Saxony

'With viterra® TRIO, weeds and volunteer cereals can be efficiently suppressed until spring.'

Andreas Kornmann, Sales Consultant, Saaten-Union Swabia

Our cover crop recommendations

Recommended varieties

Nematode-resistant oil radish **from page 13**

level 1 AMIGO, COMET and more
level 2 DEFENDER, COMPASS, AGRONOM
and more

Nematode-resistant white mustard **from page 11**

ACCENT, VERDI, MASTER, PROFI,
and more

Nematode-neutral

Bristle oat PRATEX, CODEX **page 20**

Phacelia ANGELIA **page 22**

Greening-compatible blends

Nematode-reducing

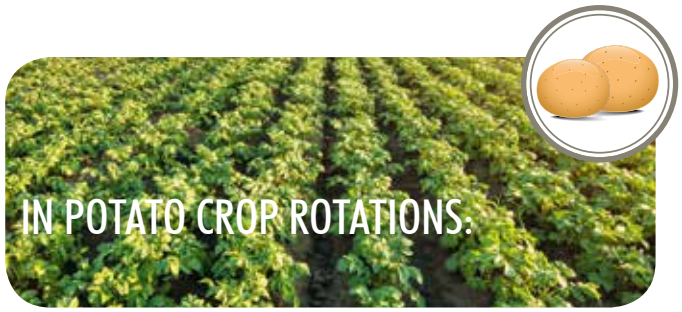
viterra® cover crop blends **page 34**

viterra® RÜBE

Nematode-neutral

viterra® cover crop blends **from page 34**

viterra® MULCH, viterra® UNIVERSAL,
viterra® BODENGARE, viterra® TRIO,
viterra® RAPS



Recommended varieties

Multi-resistant oil radish **page 17**

DEFENDER, CONTRA, ANGUS

Oil radish against internal rust spot **page 19**

SILETTA NOVA, BENTO

Oil radish SILETINA **page 22**

Bristle oat PRATEX and CODEX **page 20**

Sticky nightshade **page 19**

WHITE STAR and DIAMOND

Greening-compatible blends

viterra® cover crop blends **from page 34**

viterra® INTENSIV, viterra® POTATO

for your crop rotation

IN RAPESEED AND CEREAL CROP ROTATIONS:

Recommended varieties

Phacelia ANGELIA **page 22**

Bristle oat PRATEX, CODEX **page 20**

Ryegrass ALISCA, DIPLOMAT **page 27**

Rye **page 27**
OVID, MATADOR, PROTECTOR, TRAKTOR

Greening-compatible blends

viterra® cover crop blends **from page 34**

viterra® RAPS, viterra® BODENGARE,
viterra® UNIVERSAL, viterra® UNIVERSAL WINTER

In large-scale rapeseed crop rotation (25% and below)

viterra® cover crop blends **from page 34**

viterra® INTENSIV, viterra® MULCH, viterra® TRIO,
viterra® MAIS

IN MAIZE CROP ROTATIONS:

Recommended varieties

White mustard ALBATROS, CLASSIC, COVER **page 23**

Oil radish SILETINA, AKIRO **page 22**

Forage rape **Seite 25**
EMERALD, FONTAN 00, PRESTIGE 00, JUMBO 00

Winter turnip rape JUPITER **page 25**

Phacelia ANGELIA **page 22**

Bristle oat PRATEX, CODEX **page 20**

Ryegrass ALISCA, DIPLOMAT **page 27**

Rye **page 27**
OVID, MATADOR, PROTECTOR, TRAKTOR

Greening-compatible blends

viterra® cover crop blends **from page 34**

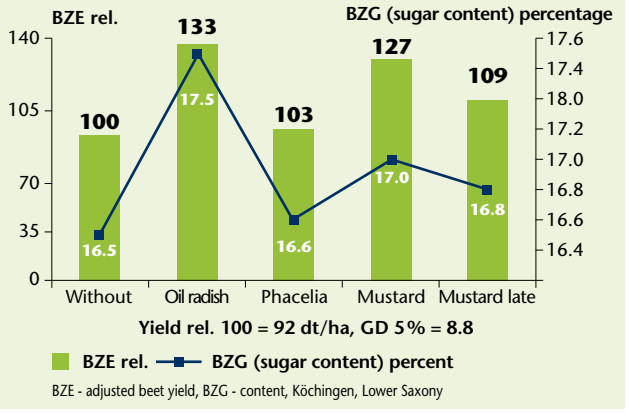
viterra® MAIS, viterra® WASSERSCHUTZ,
viterra® SCHNELLGRÜN, viterra® SCHNELLGRÜN
LEGUMINOSENFREI, viterra® UNIVERSAL WINTER,
viterra® BODENGARE, viterra® MULCH and more

Reducing beet cyst nematodes

Beet cyst nematodes (*heterodera schachtii*) are still the most important sugar beet pest from a business perspective. 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 tolerant or resistant sugar beets, resistant cover crops not only reduce the nematode population, but also promote the long-term beet and sugar yield, and therefore the viability of the beet business.

Brown cysts with eggs and larvae

Impact of cover crops in sugar beet crop rotations



BZE - adjusted beet yield, BZG - content, Köchingen, Lower Saxony

Source: dlz agrarmagazin, June 2010

Biological nematode control

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

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.

The following criteria are crucial for the best possible control:

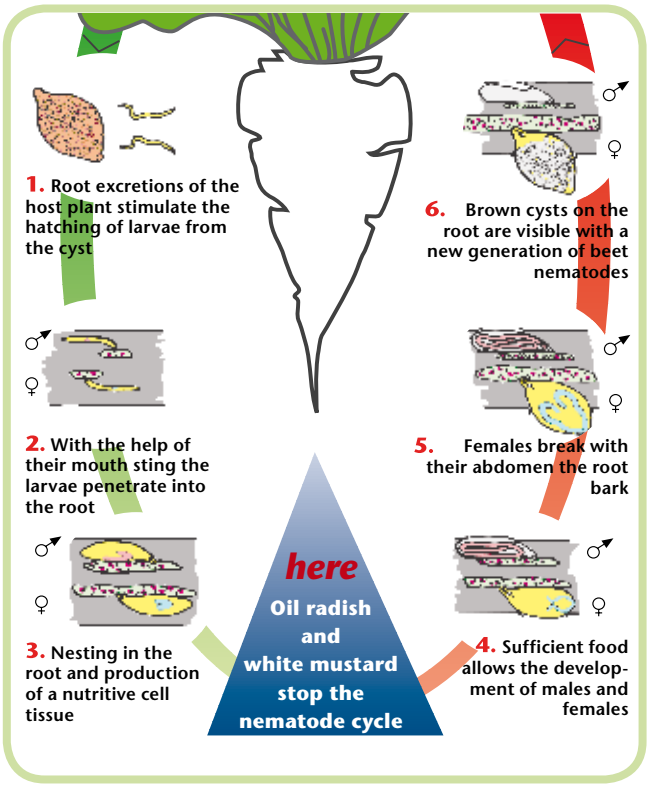
- **Timely sowing** of the resistant cover crop allows the use of warm soil conditions, encouraging the cyst nematodes to hatch.
- **Careful tillage**, which allows the roots of the resistant cover crops to penetrate as much soil as possible as quickly as possible. The larvae only have a limited radius of movement, so the plant root has to grow as closely as possible to the cysts in order to stimulate nematode larval hatching.
- **Sufficient plant density** of at least 160 resistant oil radish or white mustard plants per square metre. Cover crop blends that don't achieve this density cannot guarantee any reduction of nematodes.

Resistant cover crops are classified into resistance levels according to their reproduction rate (*population final* final population / *initial 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), the nematode population decreases by around 30 percent annually.

Beet nematode cysts can survive in soil for more than 10 years, and can even be found in deep layers of the ground.

Even after 40 years of using resistant cover crops, and even in stress situations, no resistance-breaking nematodes have developed.



The larvae use their mouth organs to actively penetrate the root

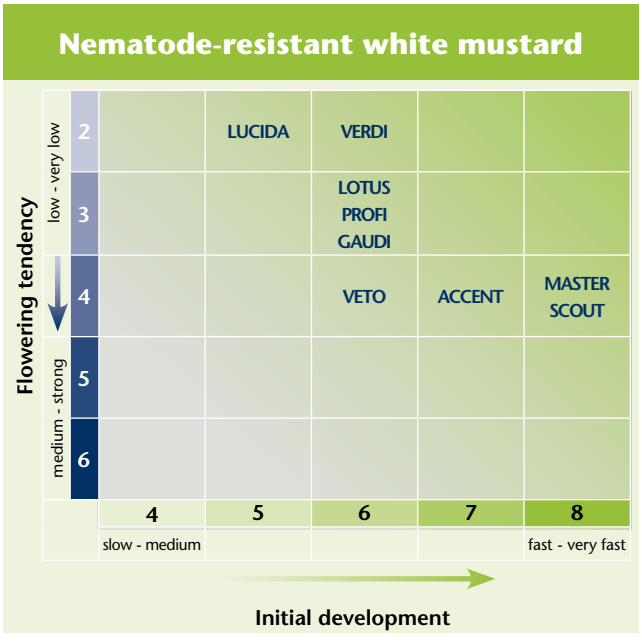
Nematode-resistant white mustard

Ensure the success of your crop with the right variety

The sowing period for white mustard begins later than that of oil radish. As white mustard reacts to long days with a stronger **flowering tendency**, it is especially important to sow low-blooming varieties when sowing early. LUCIDA begins to flower on average three weeks after level 5 varieties. This leaves more time for root development, increasing the chances of tackling beet nematodes.

When sowing later in mid September, good and rapid **initial development** is the most important selection criterium. Varieties such as ACCENT, SCOUT and MASTER are especially well suited here.

VERDI, a **variety newly registered** in France, combines the highest nematode resistance with a very low flowering tendency, so even early sowing can be used to reduce nematodes.



Resistance level 2 to sugar beet nematodes

Detailed variety descriptions and more varieties can be found at www.phpetersen.com or www.saaten-union.de

for healthy beets

Recommended variety: 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)
- Exceptionally low flowering tendency allows early sowing dates without the formation of mature seeds
- Easy sowing, fast ground cover and long vegetative growth phase

MASTER

RAPID START - STRONG FLOWERING DELAY

- Especially rapid initial development - highest classification in the Descriptive List
- Resistance level 2 in German official tests
- High resistance to late sowing: good yield can still be achieved when sowed up to mid September
- Weeds are effectively suppressed and valuable nutrients organically protected from displacement into deep soil layers

ACCENT

FIELD-TESTED HIGH LEVEL OF CONTROL

- Up to 90% reduction of nematodes in official tests - resistance level 2
- Quick and easy sowing, rapid and uninterrupted soil coverage
- Excellent erosion protection with nutrient preservation over winter
- Reliable freezing off and easy processing ensure unimpeded mulch sowing

SCOUT

HIGH LEVEL OF SOWING FLEXIBILITY THANKS TO LATE BLOOMING AND RAPID DEVELOPMENT

- Exceptionally rapid initial development (highest classification in the Descriptive List), for good late sowing tolerance with effective weed suppression
- Delayed initial blooming for long vegetative growth with effective nematode protection
- Recommended in water protection areas

LUCIDA

THE LATEST WHITE MUSTARD WITH HIGH NEMATODE RESISTANCE

- LUCIDA's especially low flowering tendency pushes the sowing window forwards
- Long vegetative growth phase for successful nematode control
- Stable, leafy growth for long-lasting ground shade and weed suppression

PROFI

PROFESSIONAL NEMATODE CONTROL

- The generous ground shade provided by PROFI white mustard intensively promotes weed suppression and tilth.
- Late flowers allow long vegetative development and long-lasting hatching stimulation
- A broad, dense root system increases soil activity and promotes water retention

Variety	Profile
VETO	A good grower for good nutrient conservation
CLINT NEW	Impresses with exceptional initial growth

Variety	Profile
TOPAS NEW	Late bloomer, very suited to direct sowing
GAUDI	A treat before sugar beet

Nematode-resistant oil radish

High-performance varieties ensure your success

Criteria for selecting a variety

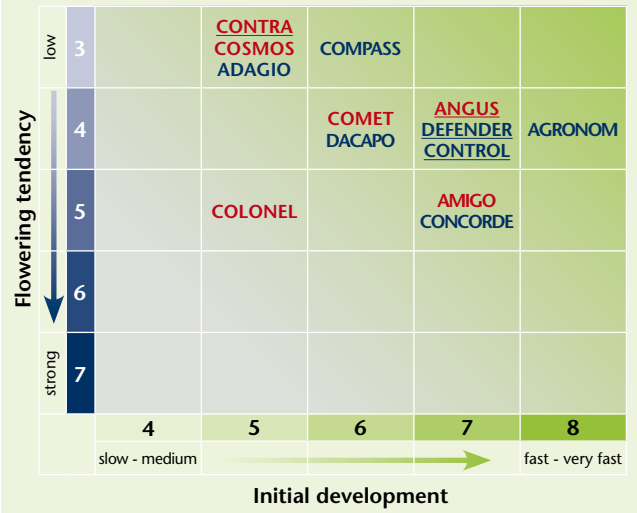
Nematode resistance, initial development and flowering tendency are important criteria when choosing a variety:

- High level of nematode resistance with dense root penetration for effective reduction of the nematode population
- Rapid initial development for efficient weed suppression and tilth maintenance
- Low flowering tendency for early sowing

Expert tip:

When sowing early - late July to early August - late blooming varieties (flowering tendency of 3 to 4) should be favoured, as they have a long vegetative growth phase before flowering. From mid August, varieties with faster initial development are suitable, as a good crop can still be achieved despite shorter days and less favourable weather.

Nematode-resistant oil radish



Resistance level 1 to beet cyst nematodes
Resistance level 2 to beet cyst nematodes
Underlined varieties also tackle *meloidogyne chitwoodi*

for healthy beets

Recommended variety: Nematode-resistant oil radish

AMIGO NEW

THE NEW GENERATION OF NEMATODE CONTROL AT THE HIGHEST LEVEL

- Beet cyst nematode control at the highest level, over 90% reduction in *heterodera schachtii* (resistance level 1)
- AMIGO encourages beet cyst nematodes to hatch and actively reduces the population to under the damage threshold
- Improved initial development with fast ground cover for excellent tilth and effective weed suppression
- Dense root system fixes nutrients and prevents displacement into deep soil layers
- Plenty of organic mass promotes humus balance and activates soil life

AGRONOM NEW

THE SPECIALIST FOR BEET CULTIVATION

- Fastest initial development and ground cover with delayed flowering of all oil radish varieties listed in Germany
- Resistance to beet cyst nematodes in the upper area of resistance level 2
- Offers good flexibility regarding sowing window
- Strong root penetration of the soil and good nutrient storage offer optimal starting conditions for the following crop

COMET

BEST PERFORMANCE AGAINST BEET CYST NEMATODES

- Highest level 1 in nematode resistance, over 90% reduction in beet cyst nematodes in official tests
- Tetraploid variety with especially strong and leafy initial development for effective ground shade
- Thorough suppression of any weeds that could potentially host nematodes
- Mid-late flowering for a long vegetative growth phase
- COMET's deep, finely structured root system covers the entire soil volume
- High yield of green plant matter for adding to organic mass, especially important at light, sandy sites

Resistant oil radish varieties for nematode control

COSMOS

LATE FLOWERS AND HIGHEST LEVEL OF RESISTANCE

- Low flowering tendency allows early sowing
- COSMOS is the ideal variety for effective nematode control in tight beet rotations
- Low growth for energy-saving mulching

Resistant oil radish varieties for nematode control

COMPASS

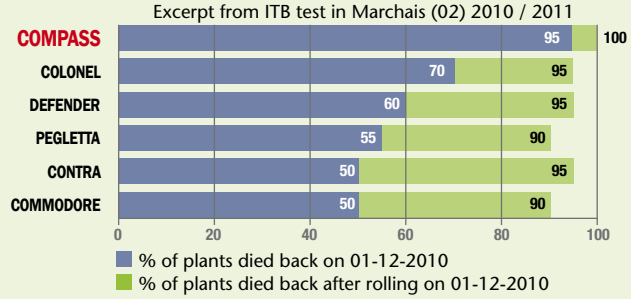
Leichter abfrierend

THE OIL RADISH THAT FREEZES OFF MORE EASILY

- High resistance to beet cyst nematodes in the upper area of resistance level 2+
- Freezes off more easily and faster than traditional oil 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

Sensitivity to frost

Excerpt from ITB test in Marchais (02) 2010 / 2011



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 crop in spring proves good weed suppression.

COMPASS before winter

COMPASS after winter

More resistant oil radish varieties for nematode control

Resistance level 2	Profile
ADAGIO	Top variety for reliable nematode control
CONCORDE	Promotes beet yield and quality
DACAPO	For active biological nematode control

Multi-resistant varieties DEFENDER, CONTRA, ANGUS and CONTROL are also resistant to beet cyst nematodes. They are described in more detail on page 17.

Multi-resistant oil radish

As well as beet cyst nematodes, other nematodes are increasingly becoming a problem for main cultures. Crop rotations with a high proportion of root crops and vegetables on light soil are especially affected.

In addition to beet cyst nematodes, multi-resistant oil radish varieties also reduce other nematodes and have been tested for their impact on many diseases of the following crop.

High amounts of organic substances serve as a basic food source for soil dwellers. Dense root penetration of the soil improves soil structure and the balance of air and water. Microbial processes to promote soil health are benefitted.

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
Oil radish	Varieties				Varieties		Varieties	Varieties	Frequency
Tillage radish									
White mustard	Varieties								
Brown mustard									
Forage rape, turnip rape									
Bristle oat PRATEX									
Ryegrass									
Phacelia									
Buckwheat									
Egyptian clover									
Persian clover									
Common vetch									
Flax									

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

Multi-resistant oil radish

Against nematodes

Beet cyst nematodes

- Over 90% reduction of *heterodera schachtii* possible
- Tackles *heterodera betae*
- No formation of resistance-breaking nematodes
- Controls even in deeper soil layers

Root-knot nematodes

- Resistance to *meloidogyne chitwoodi* officially tested
- Prevents the development of *M. fallax*
- for crop rotation with potatoes, vegetables and flowering bulbs

Northern root-knot nematodes

- Efficient control of *meloidogyne hapla*
- For organic crop rotation with a high proportion of clover and carrot growing
- Also protects potatoes and sugar beet

Southern root-knot nematodes

- *Meloidogyne incognita* and *M. javanica* are effectively reduced
- in greenhouse cultures and in peppers, tomatoes and peppers

Stem and bulb nematodes

- No multiplication of *ditylenchus dipsaci* as cover crop
- in beet, vegetable and flowering bulb rotations

Lesion nematodes

- Bad host plant for *pratylenchus* nematodes
- on sandy soil as a cover crop
- For crop rotation with potatoes, oil rape, cereals, vegetables and flowering bulbs

Against diseases

Viral corky ring spot

- Reduces viral internal rust spot (tobacco rattle virus) in potatoes
- Suppresses free *trichodorus* nematodes that transfer the virus
- Tackles weeds through rapid ground cover

Rhizoctonia rot

- Reduction of yield and quality loss 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 soil aeration
- Promotes natural antagonists

Pythium

- Reduces damage caused by *pythium*fungi
- In crop rotation with peas, potatoes and flowering bulbs

Clubroot

- No build-up of the clubroot pathogen *plasmodiophora brassicae* In crop rotations with oil rape and cabbage

Cereal crop rotation diseases

- Good disruption of the disease cycles in cereal crop rotation (e.g. blackleg)

for healthy crop rotation

Recommended variety: Multi-resistant oil radish

DEFENDER

TOP VARIETY FOR VEGETABLE AND ARABLE FARMING

- Disrupts disease cycles in vegetable, potato, sugar beet and cereal crops
- Up to 90% reduction of beet cyst nematodes (resistance level 2+)
- No multiplication of stem nematodes *(ditylenchus dipsaci)*
- Efficient reduction of root-knot nematodes and free-living nematodes
- Reduces viral internal rust spot in potatoes
- Strong initial development and rapid ground cover for thorough weed suppression
- Deep-reaching, fine root system improves soil structure
- **DEFENDER has proven its top position in countless tests and practice cultivations.**

CONTRA

FOR THE BEST RESISTANCE

- Officially tested resistance to *meloidogyne chitwoodi* and resistance level 1 in tackling beet cyst nematodes
- Controls the dangerous vegetable pest *meloidogyne hapla* (northern root-knot nematode)
- The specialist for vegetable crop rotation

ANGUS NEW

MULTI-RESISTANT POWERHOUSE

- Multi-resistance - effective control of various nematodes and diseases e.g. *heterodera schachtii* and root-knot nematodes
- Rapid ground shade for effective suppression of secondary growth and weeds
- Fast, healthy initial development, increases organic substance and supports soil fertility
- Deep, dense root system helps tackle soil compaction and improves infiltration capacity

CONTROL

EFFECTIVE CONTROL OF VARIOUS NEMATODES AND DISEASES

- CONTROL is sure to impress with its rapid initial development and suppression of potential host plants for diseases and nematodes
- Direct sowing suitability

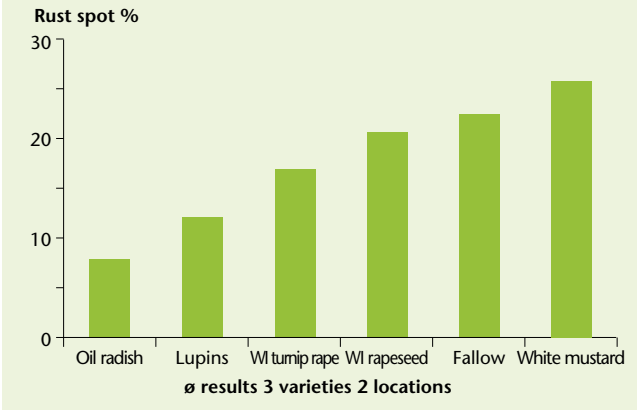
Specialists in potato crop rotations

Oil radish against viral corky ring spot

Oil radish is an excellent cover crop in potato farming, as it has a positive impact on soil structure and humus formation.

Free *trichodorus* nematodes can transfer the Tobacco Rattle Virus (TRV) using their mouth organs, and this then causes internal rust spot in potatoes. Some oil radish varieties prevent viral corky ring spot in potatoes, as they disrupt the transfer of the virus by nematodes as a preceding culture.

Impact of green manuring on viral corky ring spot in potatoes



Source: Der Kartoffelbau

Recommended variety: Oil radish against viral corky ring spot

SILETTA NOVA

REDUCES CORKY RING SPOT 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 organic matter vitalises soil activity, keeps nutrients in the topsoil and provides valuable humus
- The deep root system creates optimal soil conditions and reduces soil compaction
- **SILETTA NOVA contributes to long-term, sustainable potato yields**

BENTO

PROMOTES POTATO YIELD AND QUALITY

- Reduces viral internal rust spot
- Excellent vegetative growth
- High level of organic matter as additional contribution to humus formation
- Ideal protection from wind and water erosion and improvement of soil structure thanks to dense root penetration of the soil
- The pragmatist knows: closes early and flowers late!

Even multi-resistant oil radish varieties DEFENDER and CONTRA and the nematode-resistant oil radish COLONEL reduce viral corky ring spot in potatoes.

Sticky nightshade against potato cyst nematodes

Sticky nightshade is resistant to *globodera rostochiensis* (pathotypes 1 to 4) and *globodera pallida* (pathotypes 2 and 3) and is part of the solanaceaen family (nightshades). Sow: Mid May to mid July. Seeds also available primed and pelleted.

Recommended varities: Sticky nightshade

WHITE STAR

- Dense root penetration to control globodera

DIAMOND

- Strong growth and strong control

Bristle oat against pratylenchus

Bristle 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 impact on quality and yield. Not only do 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 cultivation crops and weeds, which makes control even more difficult.

Uses for bristle oat

1. Nematode reduction

Tackles migratory root nematoedes (*pratylenchus penetrans*) without any breeding of trichodoridus species - especially important in sandy and light soil for potato and vegetable production. Sowing density: 80 - 100 kg/ha

2. Erosion protection

As erosion protection in autumn sowing - very rapid and leafy development with good weed suppression (allelopathy). Bristle oat freezes off reliably, offering optimal conditions for mulching and direct sowing of the following crop. Sowing density: 25 - 50 kg/ha

3. Biomass production

For the production of biomass - also for the soil, as silage or fresh fodder and for biogas. Sowing density: 50 - 125 kg/ha

4. Cover crop blends

All-purpose blend partner that is ideal for combining

Recommended variety: Bristle oat to control pratylenchus

PRATEX

CONTROLLING *PRATYLENCHUS PENETRANS*

- Tackles lesion nematodes *pratylenchus penetrans* without any multiplication of trichodoridus species
- Easily cultivated with simple sowing and as a cover crop without sacrificing the main crop
- Has very rapid initial development and good competition against weeds that could be potential multipliers for pratylenchus.
- High production of organic mass, dense root penetration of soil
- Cover crop that freezes off well

More bristle oat varieties

	Profile
CODEX	The late bristle oat

	Profile
TRADEX	Highest yield of dry mass

Promote soil fertility

Soil needs protection and care

As the largest production factor, soil is incredibly important in farming.

The increasing sealing of fertile arable land is making it harder and harder to provide the population with sustainably produced food. Fertile soil is becoming an ever more scarce and valuable commodity that must reliably provide high yields.

The loosening of compaction and stabilisation of the soil's structure by the roots of **cover crops help to redevelop soil with structural damage.** To this end, deep-rooting varieties with taproots, such as oil radish or oil flax, are especially suitable. Flat and densely rooting varieties such as bristle oat, however, ensure a stable structure in the topsoil and good tilth.

The organic substance and root exudates of the cover crops serve as a **basic source of nutrition for soil dwellers**. As well as earthworms, known as important soil processors, it is mostly fungi and bacteria that promote soil vitality and must therefore be fed.

High resistance to environmental influences as well as a high level of soil regeneration can only be achieved when the soil's physical, chemical and biological properties are in balance.

Healthy soil is the foundation of vital plants. By **reducing soil erosion** and **nutrient displacement** as well as **increasing humus**, soil life and soil fertility, planting cover crops makes a considerable contribution to soil protection and ensuring the basis of farming for generations to come.

Green manure and mulch sowing

Phacelia

As a neutral plant for beet nematodes and clubroot, phacelia is a suitable cover crop for beet crop rotation 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.

Recommended variety: Phacelia for green manuring

ANGELIA

STRIKING AND ATTRACTIVE FLOWERS

- 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

- Dense growth
- Drought-tolerant

Oil radish for green manuring

As a deep-rooting cover crop with rapid ground coverage, oil radish can be sown up to the beginning of September. Oil radish provide long-term soil shade, ensuring good soil tilth and weed suppression. The abundance of organic matter supports humus formation and promotes positive soil microorganisms.

Recommended variety: Oil radish for green manuring

AKIRO

- Promotes soil structure and activates soil life
- Leafy initial development with rapid ground shade, promoting the formation of valuable tilth
- Competes well with weeds

SILETINA

- Biologically highly effective green manure
- Reliable and easy to grow - even when sown late and in unfavourable soil conditions
- Especially rapid initial development for effective weed suppression

White mustard for greening

White mustard is an undemanding greening plant that quickly achieves ground coverage and can be sown until the end of September (e.g. ALBATROS white mustard).

More benefits are its drought tolerance and reliable freezing off, making for ideal mulching conditions for maize. Late-blooming varieties such as COVER and CLASSIC are ideally suited to agricultural blends with other varieties.

Recommended variety: White mustard for greening

ALBATROS

THE CLASSIC AMONG THE HIGH-QUALITY VARIETIES

- Rapid and strong initial development even when sown late
- Valuable above-ground greens and dense, deep roots form a stable, humus-rich soil structure
- Reliable freezing off in winter - plant remains 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 smooth mulch sowing - especially in maize rotations**

CLASSIC NEW

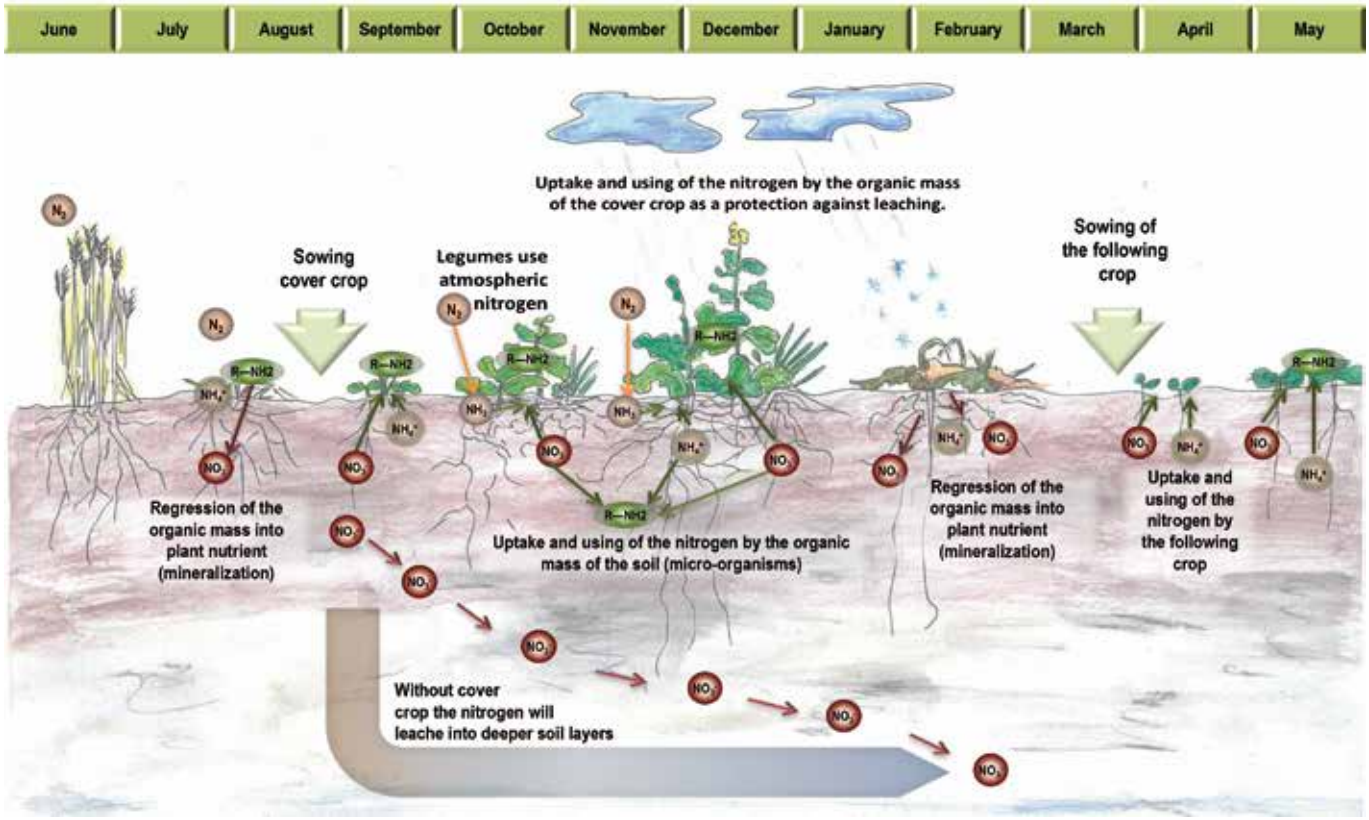
THE RAPID STARTER WITH LATE BLOOMS

- Especially long vegetative growth phase due to good initial development and late flowers
- Excellent weed suppression
- Large amounts of organic matter counteract humus depletion, promote soil life and store nutrients for the following crop
- Recommended for water protection, mulch sowing and agricultural blends

COVER

- Intensive healthy initial development for a flexible sowing window

Water protection and nutrient conservation



Avoid displacement early on

Nitrogen is an essential nutritional element for plants and plays an important role in agriculture today. Nitrogen enters the soil via mineral and organic fertilisers or the binding of atmospheric nitrogen.

The nitrate (NO_3) that is very mobile in the soil can easily be taken up by plants, but it can also be easily leached away in unfavourable conditions. Large amounts of nitrate from fertilisation or the mineralisation of organic substances, weakly absorbent soils, and high levels of precipitation encourage movement into deeper layers of the soil and the groundwater.

Levels of erosion loss over bare ground are considerably higher over the winter months than in summer due to increased precipitation. Once the nitrate has made its way into deeper layers of soil, many plants can no longer reach it.

As well as transport via seepage water, nutrients can also make it into surface water through erosion. The level of precipitation and relief as well the soil's infiltration capacity and structural stability play a role here.

The solution - growing cover crops

Cover crops use free nutrients to form biomass and their good root penetration supports the soil's structural stability and ability to store water. The organic matter and shade prevent erosion and encourage biological activity in the soil.

The different root shapes in viterra® cover crop blends intensively cover the soil's volume and ensure good nutrient uptake. Nitrogen and other water-soluble nutrients are efficiently protected from leaching up until spring. Due to the high biological activity of the soil, they are available again to the subsequent crop in mineralised form. Vigorously growing cover crops are particularly suitable for water protection with their dense root systems and a certain level of resistance to cold temperatures.

Forage rape

Forage rape is a tasty winter fodder for cattle. It offers very good green matter and dry matter yields with high a 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.

Recommended variety: Winter forage rape

FONTAN 00

FAST-GROWING AND EFFICIENT SUPPLIER OF FEED

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

EMERALD

- Tasty, with high fodder value
- Effective green manure

PRESTIGE 00

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

Summer forage rape

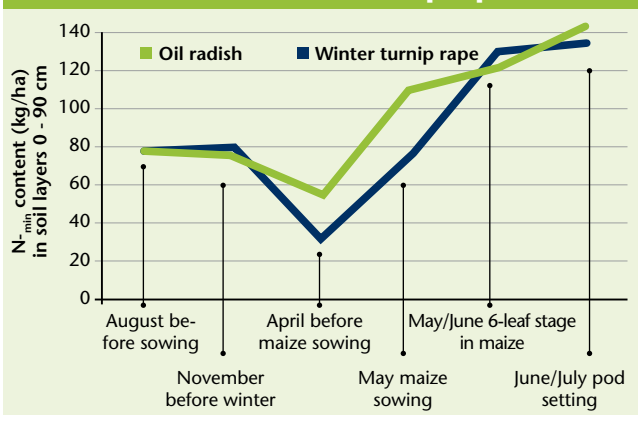
JUMBO 00

- Favourable leaf/stalk ratio
- Relatively frost-tolerant
- Good lodging resistance

Winter turnip rape

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.

Nitrogen storage and release: A comparison of oil radish and winter turnip rape



Source: Richter, 1992 -96

Recommended variety: Winter turnip rape

JUPITER

- Green fodder or fresh fodder
- 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

Biomass and fodder

Forage rye

Over the last few years, tight crop rotation with a high proportion of maize has caused a decrease in humus and therefore made our soils less able to provide a reliable yield. Innovative farmers recognised forage rye as a supplement to biomass crop rotations a few years ago. Forage rye is suitable for use in fodder and biogas. It tillers more strongly and quickly begins to grow vigorously in spring so it can be harvested before the maize. Dense root penetration helps stabilise humus.

Recommended variety: Forage rye for biomass

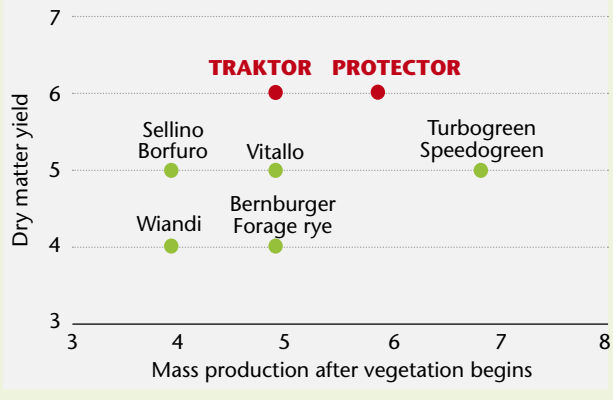
PROTECTOR

EUROPE'S LEADING FORAGE RYE

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

PROTECTOR – Top forage rye

Yield performance of winter rye varieties in cover crop cultivation



Source: from data from the Descriptive Variety List 2018

Recommended variety: Forage rye for biomass

TRAKTOR NEW

MODERN FORAGE RYE FOR BIOMASS AND EROSION PROTECTION

- Modern forage rye for biomass and erosion protection
- Top performance in dry matter yield
- Good weed suppression and protection from wind and water erosion

Forage/WPS rye

GENERATOR
- For early use in WPS

LUNATOR
- High-yield forage rye with improved stability

Summer forage rye

SU VERGIL NEW
- Newly approved
- High grain yield and improved stability

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

Greening rye

MATADOR
- Can be sown late, offers erosion protection
- Ideal as an overwintering cover crop after maize and before maize
- Efficient water protection measure

Wild rye

JOHAN
- Ideally suited to gameland blends

Annual and Italian ryegrass

As a fast-growing cover crop after the cereal harvest, luscious crops form just 6-8 weeks after the preceding crop is harvested. It can be used as fresh fodder or ensilaged and used in biogas plants. The dense roots provide additional organic matter to improve humus and stabilise the soil's structure.

Recommended variety: Annual ryegrass

ALISCA tetraploid
- Medium late - very flexible harvest window
- High-yield and healthy

DIPLOMAT diploid
- Early and fast
- Upright growth for easy cutting

Cover crop diversity

Tillage radish

With their striking, large radishes, these tillage radishes make more space in the top layers of soil. This encourages air exchange in the soil and lets more precipitation infiltrate the ground. Nutrients are stored in the radishes over winter, and these are made available to the subsequent crop as they rot over winter.

Tillage radish is well suited as a component in cover crop blends.

Recommended variety: Tillage radish

STINGER NEW

TILLAGE RADISH TO IMPROVE SOIL

- Strong, distinct radishes
- Leafy initial development and low growth height
- The roots form large holes in the soil, encouraging spring soil warming.

MINER NEW

- Intermediary radish variety: fast development, forms radishes
- Burrows into the soil and improves soil structure
- Binds freely available nitrogen in autumn and prevents displacement
- Freezes off more easily

Indian mustard - brown mustard

High levels of glucosinolates in the leaves and grains make this species (*brassica juncea*) excellently suited to use in biofumigation to combat soil-bound diseases.

Recommended variety: Brown mustard

TERRAFIT

- Fast young growth, earlier onset of flowering
- Very high ingredient content

ENERGY

- Fast initial development, medium-early flowering
- High isothiocyanate content

Oil flax

This traditional plant for oil production is also excellently suited to growing as a cover crop. Oil flax is a perfect neutral plant in cover crop blends.

Recommended variety: Oil flax

JULIET
- Easy and reliable cover crop

ZOLTAN
- Undemanding with fine but deep-reaching tap-roots

Marrow stem kale

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

Recommended variety: Marrow stem kale

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

CAMARO
- Protein-rich feed source for agriculture and gameland

ANGLIAN GOLD
- Fodder kale for game blends with exceptional frost resistance

Common buckwheat

Common buckwheat (*fagopyrum esculentum*) is a fast-growing cover crop that freezes off reliably. Thanks to its early flowers and seed ripeness, buckwheat is often used in gameland blends. Because of its early seed ripeness and the difficulty of control, we do not recommend buckwheat for use in sugar beet crop rotations.

Recommended variety: Buckwheat

HAJNALKA
- Robust and neutral regarding subsequent crop

Legumes as cover crops

Small-grain legumes

As an undemanding small-grain legume, clover is often used as a cover crop. In cover crop blends, the other plants benefit from clover's nitrogen production. Clover flowers are also attractive nectar sources for honey production.

Recommended variety: Persian and Egyptian clover

Persian clover **FELIX**

- A honey plant with good root growth

Egyptian clover **OTTO**

- High value as a preceding crop and fodder

Medicago/alfalfa

This deep-rooting legume is known as the "queen of forage plants", as it is persistent and winter-hardy while delivering a very protein-rich fodder.

Seradella

With its low TKW (thousand kernel weight), seradella is especially well suited as a sole cover crop in light soils, for fodder or as an addition to blends to produce nitrogen.

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.

Recommended variety: Crimson clover **BOLSENA**

- For increasing nitrogen, loosening soil and use as fodder

Recommended variety: Field beans for green manuring

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
- 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
- Improves stability as an additional component in cereal-legume WPS blends
- Also suitable as an additional component in a blend with winter rapeseed

Large-grain legumes

There are many advantages to large-grain legumes. As well as a high nitrogen binding capacity as a preceding crop, increased humus content resulting from high levels of root and harvest residue, they also improve soil tilth (taprooters).

Blue lupin

As a large-grain legume, the blue lupin introduces additional nitrogen into crop rotations when used as a cover crop, as its pronounced taproot penetrates deep layers of the soil.

Recommended variety: Blue lupin

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

Common vetch and winter vetch

The heavily branched root system and the striking flowers, which are an important source of nutrition for wild bees, make common vetch a contributor in freezing-off cover crop blends.

Winter vetch is mostly found in winter-hardy biomass blends such as viterra® LUNDSGAARDER GEMENGE and viterra® WICKROGGEN.

Recommended variety: Common vetch and winter vetch

Common vetch NEON NEW

Common vetch ARGON NEW

Winter vetch LATIGO

- Excellent for green manuring and fodder

Sowing and use at a glance

Variety	Sowing window			Fodder use	Green manure	Erosion protection	Use in blends	Sowing density Pure seed kg/ha	Page
	July	Aug	Sept						
Nematode-resistant white mustard									
LUCIDA Level 2*, **VERDI** H 1,									11
CLINT Level 2* NEW **TOPAS** Level 2* NEW									11
PROFI Level 2*, **GAUDI** Level 2*					✓	✓	✓	**20 - 25**	11
VETO Level 2*, **ACCENT** Level 2*,									11
MASTER Level 2*, **SCOUT** Level 2*									11
Nematode-resistant oil radish									
AMIGO Level 1* NEW									13
COMET Level 1*, **COSMOS** Level 1*									13
ADAGIO Level 2+*, **DACAPO** Level 2*					✓	✓	✓	**25 - 30**	14
AGRONOM Level 2* NEW									13
COMPASS Level 2+*									14
CONCORDE Level 2*									14
Multi-resistant oil radish									
ANGUS Level 1* NEW									17
CONTRA Level 1*					✓	✓	✓	**25 - 30**	17
CONTROL Level 2+*									17
DEFENDER Level 2+*									17
Oil radish									
BENTO, **SILETTA NOVA**					✓	✓	✓	**18 - 25**	19
AKIRO, **SILETINA**									22
White mustard									
ALBATROS					✓	✓	✓	**15 - 20**	23
COVER, **CLASSIC**									23
Taproot-forming oil radish									
MINER, **STINGER**					✓	✓	✓	**6 - 8**	28
Bristle oat									
PRATEX, **CODEX**, **TRADEX**				✓	✓	✓	✓	**80**	20
Nematode-neutral phacelia									
ANGELIA, **AMERIGO**					✓	✓	✓	**10 - 12**	22
Summer forage rape									
JUMBO				✓	✓	✓		**10 - 20**	25
Winter forage rape									
EMERALD, **FONTAN OO**,									
PRESTIGE OO				✓	✓	✓	✓	**8 - 20**	25
Marrow stem kale									
GRÜNER ANGELITER				✓	✓	✓	✓	**3 - 5**	29
ANGLIAN GOLD, **CAMARO**									29

Fertilisation according to local experience.

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

Sowing and use at a glance

Variety	Sowing window			Fodder use	Green manure	Erosion protection	Use in blends	Sowing density Pure seed kg/ha	Page
	July	Aug	Sept						
Forage rye **PROTECTOR**, **LUNATOR** **GENERATOR**, **TRAKTOR**				✓	✓	✓		40 - 130	26 27
Summer forage rye **OVID**, **SU VERGIL** NEW					✓	✓	✓	90 - 120	27
Greening rye **MATADOR**					✓	✓	✓	90 - 12 0	27
Wild rye **JOHAN**				✓	✓	✓	✓	140 - 150	27
Winter turnip rape **JUPITER**				✓	✓	✓	✓	8 - 20	25
Annual ryegrass **ALISCA** tetraploid, **DIPLOMAT** diploid				✓	✓	✓	✓	35 - 45	27 27
Sticky nightshade **WHITE STAR**, **DIAMOND**					✓			3	19
Brown mustard **ENERGY**, **TERRAFIT**					✓	✓	✓	10-12	28
Oil flax **JULIET**, **ZOLTAN** NEW					✓		✓	30 - 35	29
Broad bean **AVALON** NEW					✓	✓	✓	40 grains/ m²	31
Persian clover **FELIX**				✓	✓		✓	15 - 20	30
Egyptian clover **OTTO**				✓	✓		✓	30 - 35	30
Crimson clover **BOLSENA**				✓	✓		✓	25 - 35	30
Buckwheat **HAJNALKA**					✓	✓	✓	50 - 60	29
Common vetch **ARGON** NEW, **NEON** NEW Winter vetch **LATIGO**				✓	✓		✓	80 - 160	31
Blue lupin **ILDIGO** NEW					✓		✓	80 – 160	31
Seradella				✓	✓		✓	30 - 50	30
Lucerne				✓	✓	✓	✓	25 - 30	30

Fertilisation according to local experience.

Cover crop blends 2019

viterra®
Strong varieties.
Strong blends.
Strong soil.

www.saaten-union.de
www.viterra-mischung.de

SAATEN UNION
Züchtung ist Zukunft

Soil fertility blends

Biomass blends

Special blends

Organic blends

Sowing and use

	Blend	Special feature	Suitable for crop rotation with							Contents as abbreviation	Seed quantity kg/ha	Sowing window								Page
			Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures			Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	
Soil fertility blends	**INTENSIV**	Health mix	+	+	+	+	++	+	++	HS, OR	40 - 50									36
	POTATO	Boosts potatoes	+	+	+	+	++			OR, HS, LN, WIS, LUB	50									36
	MULCH	Frost-sensitive blend without clover	++	+	+	++	+	+	+	HS, OR	40 - 50									37
	RÜBE	Professional against nematodes	+	+		++		+		OR, SF	20 - 25									37
	TRIO	Frost-sensitive blend with clover	+	+	+	++				PHA, AKL, OR,	18									38
	MAIZE	Fast-growing blend without legumes	++	+		+		+		LND, PHA, OR, HS, SOL	20									38
	SCHNELLGRÜN	Suitable for late sowing, with clover	++	+						SF, AKL, LND, SFB	15									39
	SCHNELLGRÜN LEGUMINOSENFREI	Suitable for late sowing, without clover	++	+				++		SF, LN, LND, SFB	15									39
	UNIVERSAL	Crucifer-free and fast-growing	+	+	++	+				PHA, HS, AKL, PKL	25									40
	UNIVERSAL LEGUMINOSENFREI	Crucifer-free and fast-growing	+	+	++	+		++		PHA, HS, LN, SOL	25									40
	UNIVERSAL WINTER	Crucifer-free and evergreen	++	+	++			+		WV, PHA, HS	25 - 45									41
	BODENGARE	Legume-rich for better soil fertility	++	+	++	+				PKL, PHA, AKL, WIS, EF, LUB, SOL	50									41
	RAPS	Frost-sensitive blend without crucifers	+	++	++	+				PHA, LN, AKL, PKL	15									42
	WASSERSCHUTZ	For effective groundwater protection	++	++				+	+	RAW, WR, KOF	10 - 12									42
Biomass blends	**GRANOPUR**	Summer cereal mix for WPS use before winter	++	++	+	+	+	+	+	TIS, RS, HS, HA	135 - 150									43
	GRANOLEG	Summer legume mix for WPS use before winter	++	++	+	+				TIS, RS, HA, EF, HS	135 - 150									43
	WICKROGGEN	Evergreen WPS blend, for use in spring	++							RW, WIW	100									44
	LUNDSGAARDER GEMENGE	Evergreen, greening-compatible with possible use as fodder	++	++	++	+				WV, IKL, WIW, EF	50									44
	FUTTER	Grass-clover blend for harvest after winter	++	++	+	+	+		+	WV, IKL	35									45
	SUMMER FEED	Forage blend for harvest in year of growing	++	++	++	+		+		WV, WEI, PKL	25									45
	SUMMER FEED A2	Forage blend for harvest in year of growing	++	++	++	+		+		WV, WEI	25									45
Special blends	**BIENE**	Annual bee/honey fallow	++	+	++	+				PHA, PKL, WKL, AKL, IKL, ESP, WIS, EF, RBL, BOR, LUB, SOL	25									46
	MULTIKULTI	Annual bee and flowering blend	++	+		+				PHA,PKL, AKL, LN, SF, IKL, SD, OR, WIS, LUB, SOL, BOR	25									46
	UNTERSAAT	For sustainable maize cultivation	++							WV, WD	10 - 15									47
	HORRIDO	Biennial gameland pasture blend	+	+						WKL, PKL, WV, SD, AKL, BW, PHA, RAW, HS, KOF, WR, LN, SOL, OR, WIW	25 - 30									47
	BIOFUMIGATION	For biofumigation, tackles soil-borne pests					+	++	++	SFB, OR	15									48
	BLÜHZAUBER	The flowering meadow	**Not recommended for gameland**							Over 40 flowering varieties	5 - 7g/m²									48

AKL Egyptian clover, BOR borage BW buckwheat, EF field pea, ESP sainfoin HA oat, HS black/bristle oat, IKL crimson clover, KOF marrow steam kale, LN linseed, LUB blue lupin, LND camelina, OR oil radish, PHA phacelia, PKL Persian clover, RAW winter forage rape, RBL marigold, ROT red fescue, RS spring rye, RW population winter rye, SD seradella, SFB Indian mustard, SF white mustard, SOL sunflower, TIS spring triticale, WD perennial rye grass, WIE annual ryegrass, WIS common vetch, WIW winter vetch, WKL white clover, WR winter turnip rape, WV Italian ryegrass

+ = suitable for appropriate crop rotations / **++** = especially suitable and recommended for appropriate crop rotations / **G =** greening-compatible (as of January 2019) / sowing as part of greening until 01.10.

viterra® INTENSIV

... THE HEALTH BLEND

- Controls migratory root nematodes (pratylenchus) and reduces corky ring spot in potatoes with multi-resistant oil radish DEFENDER and bristle oat PRATEX
- Fast-growing with intensive weed suppression
- Plenty of organic matter vitalises soil life
- The fibrous roots of PRATEX and taproots of DEFENDER complement each other in root penetration of the entire soil
- In trials, water protection advisors were won over by **viterra® INTENSIV** and its very low N_{min} content in late autumn

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
INTENSIV	+	+	+	+	++	+	++
Seed proportions	56 % bristle oat PRATEX 44 % multi-resistant oil radish DEFENDER						
Sow	Mid July to early September						
Sowing density	40 - 50 kg/ha						

ALSO AVAILABLE AS AN ORGANIC BLEND (see page 50)

viterra® POTATO NEW

... A BOOST FOR POTATOES

- Substantial blend to improve soil and enrich humus in potato crop rotations
- Blue lupin ILDIGO and oil radish SILETTA NOVA penetrate large volumes of soil rapidly with their deep roots, improving the structure of the soil.
- Oil radish SILETTA NOVA and bristle oat PRATEX have rapid initial development and offer soil protection as well as tilth.
- Blue lupin and common vetch provide nitrogen, while oil radish and bristle oat quickly convert nitrogen into organic matter.
- Excellent erosion protection, not winter-hardy

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
POTATO	+	+	+	+	++		
Seed proportions	44% oil radish SILETTA NOVA 18% bristle oat PRATEX 18% flax JULIET 16% common vetch 4% blue lupin ILDIGO						
Sow	Early-mid July to mid August						
Sowing density	50 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® MULCH

...FROST-SENSITIVE BLEND WITHOUT CLOVER

- Blend with oil radish COMPASS, which freezes off easily, and frost-sensitive bristle oat PRATEX
- Especially recommended for direct and mulch sowing, especially before maize and sugar beets
- The root channels allow rapid deep root formation in maize
- Activates soil life, loosens and aerates soil for optimal maize crop
- **viterra® MULCH** binds nitrogen over winter and protects it from displacement
- Bristle oat promotes mycorrhizal fungi, which stabilise the soil, benefitting the subsequent maize crop

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
MULCH	++	+	+	++	+	+	+
Seed proportions	55% bristle oat PRATEX, 45 % nematode-resistant oil radish COMPASS						
Sow	Mid July to early September						
Sowing density	40 - 50 kg/ha						

viterra® RÜBE

... PROFESSIONAL AGAINST NEMATODES

- Blend of two nematode-resistant oil radishes (AMIGO and COMPASS) and white mustards (VERDI and MASTER).
- Sufficient plant density of more than 160 plants/m² allows active nematode control at the highest level
- Better growing security and better pest control thanks to complementary varieties and dense roots
- **viterra® RÜBE** is suited to mid-early to late sowing and suitable for any site conditions
- Oil radish roots penetrate deep into the lower layers of soil to reduce nematodes even deep down

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
RÜBE	+	+		++		+	
Seed proportions	30 % nematode-resistant oil radish COMPASS 26% nematode-resistant oil radish AMIGO 24% nematode-resistant white mustard VERDI 20% nematode-resistant white mustard MASTER						
Sow	Mid July to early September						
Sowing density	20 - 25 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® TRIO

... FROST-SENSITIVE BLEND WITH CLOVER

- **viterra® TRIO** including oil radish COMPASS, Egyptian clover and phacelia ANGELIA for easy freezing off
- Beet cyst nematodes cannot multiply due to resistant oil radish COMPASS and neutral plants
- Fast initial development and dense penetration of soil with thick and thin roots
- Bees and insects use the late phacelia flowers
- Delicate mulch base offers good erosion protection until spring sowing

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
TRIO	+	+	+	++			
Seed proportions	56 % phacelia ANGELIA 21 % nematode-resistant oil radish COMPASS 23 % Egyptian clover						
Sow	Early-mid July to late August						
Sowing density	18 kg/ha						

viterra® MAIS

... FAST-GROWING BLEND WITHOUT LEGUMES

- Fast ground cover with vigorously growing components
- Combination of deep and flat roots for thorough root penetration and stabilisation of soil structure
- The root channels allow rapid deep root formation in maize
- Soil loosening and aeration for optimal maize crops
- Bristle oat promotes mycorrhizal fungi to stabilise soil structure
- Good processor of slurry and other nutrients, excellent erosion and water protection
- Improves image thanks to sunflowers and phacelia flowers

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
MAIS	++	+		+		+	
Seed proportions	36% camelina 29% phacelia ANGELIA 22% oil radish SILETINA 2% bristle oat PRATEX 1% sunflower						
Sow	Mid July to late August						
Sowing density	20 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® SCHNELLGRÜN

... SUITABLE FOR LATE SOWING

- Fast greening thanks to especially fast-growing components: ALBATROS white mustard and ENERGY brown mustard make for excellent tolerance to late sowing
- Brown mustard contains valuable glucosinolates, which break down into isothiocyanates to tackle soil-borne diseases
- Non-hardy varieties make mulch sowing the following crop much easier in spring
- Ideal before maize and also suitable as a cover crop after early maize harvests
- Low demands on the seedbed and scatter capability make for cheap and easy sowing

Optimised formula 2019

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
SCHNELLGRÜN	++	+					
Seed proportions	43% white mustard ALBATROS 24% Egyptian clover 18% camelina 15% brown mustard ENERGY						
Sow	Early August to mid-late September						
Sowing density	15 kg/ha						

viterra® SCHNELLGRÜN LEGUMINOSENFREI

... SUITABLE FOR LATE SOWING AND LEGUME-FREE

- Fast greening thanks to especially fast-growing components
- ALBATROS white mustard and ENERGY brown mustard make for excellent tolerance to late sowing
- Brown mustard contains valuable glucosinolates, which break down into isothiocyanates to tackle soil-borne diseases
- Non-hardy varieties make mulch sowing the following crop much easier in spring
- Ideal before maize and also suitable as a cover crop after early maize harvests
- Low demands on the seedbed and scatter capability make for cheap and easy sowing

Optimised formula 2019

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
SCHNELLGRÜN LEGUME-FREE	++	+				++	
Seed proportions	39% white mustard ALBATROS 21% flax 21% cameline 19% brown mustard ENERGY						
Sow	Early August to mid-late September						
Sowing density	15 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® UNIVERSAL

... CRUCIFER-FREE AND FAST-GROWING

- Can easily be added 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
- Binds nitrogen left in the soil and other nutrients in zones around the roots
- **viterra® UNIVERSAL** is also offered **as viterra® UNIVERSAL LEGUMINOSENFREI** for rapeseed and legume crop rotations
- Phacelia and clover flowers attract countless insects

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
UNIVERSAL	+	+	++	+			
Seed proportions	49% phacelia ANGELIA 27% bristle oat PRATEX 18% Egyptian clover 6% Persian clover FELIX						
Sow	Early July to early September						
Sowing density	25 kg/ha						

viterra® UNIVERSAL LEGUMINOSENFREI NEW

... CRUCIFER-FREE AND FAST-GROWING

- Can easily be added to legume crop rotations, disrupts disease cycles
- Thanks to drought-tolerant components, suitable for universal use
- Quick shade retains tilth and ensures good weed suppression
- Binds nitrogen left in the soil and other nutrients in zones around the roots
- **viterra® UNIVERSAL LEGUMINOSENFREI** is also available as **viterra® UNIVERSAL** with clover
- Phacelia is an excellent meadow plant for bees

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
UNIVERSAL LEGU-FREI	+	+	++	+		++	
Seed proportions	49% phacelia ANGELIA 28% bristle oat PRATEX 22% flax ZOLTAN 1% sunflower						
Sow	Early July to early September						
Sowing density	25 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® UNIVERSAL WINTER

... CRUCIFER-FREE AND EVERGREEN

- As an evergreen cover crop with the option of using as your own initial spring fertiliser
- Free from crucifers so can easily be used in oil rape crop rotations
- Various blend partners allow a broad spectrum of use
- Evergreen ryegrass increases erosion protection and stabilises soil structure up to the subsequent crop
- Binds nitrogen remaining in the soil and protects groundwater

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
UNIVERSAL WINTER	++	+	++			+	
Seed proportions	46% Italian ryegrass 44% phacelia ANGELIA 10% bristle oat PRATEX						
Sow	Early July to mid September						
Sowing density	25 - 45 kg/ha						

viterra® BODENGARE

... LEGUME-RICH FOR BETTER SOIL FERTILITY

- Promotes soil structure, revegetation and crumb formation to improve soil fertility
- Existing tilth encourages aeration and water flow, preventing capping
- Enriches plant life and habitats for many insects and beneficial organisms
- High proportion of legumes collects additional nitrogen
- After early preceding crop as a summer cover crop for soil regeneration, free from grasses
- Crucifer-free, especially suitable for oil rape crop rotation
- Binds nitrogen remaining in the soil and protects groundwater

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
BODENGARE	++	+	++	+			
Seed proportions	33% Persian clover FELIX 25% phacelia ANGELIA 23% Egyptian clover 13% common vetch 3% summer field pea 2% blue lupin ILDIGO 1% sunflower						
Sow	Mid June to mid August						
Sowing density	50 kg/ha						

ÖKO

ALSO AVAILABLE AS AN ORGANIC BLEND (see page 50)

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® RAPS

... FROST-SENSITIVE BLEND WITHOUT CRUCIFERS

- Crucifer-free blend of phacelia ANGELIA, oil flax JULIET, Persian and Egyptian clover
- Undemanding blend, no relation to main cultures (type rotation): Ideal for cereal and rapeseed crop rotation
- Dense root penetration improves the soil's structure and encourages air exchange in the soil
- Phacelia and flax flowers offer nectar for bees and other insects
- Components that reliably freeze off allow easy sowing of the subsequent culture
- No limitations in N fertilisation thanks to low proportion of legumes, <30% (e.g. Lower Saxony)

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
RAPS	+	++	++	+			
Seed proportions	53% phacelia ANGELIA 23% oil flax 8% Persian clover 16% Egyptian clover						
Sow	Early July to late August						
Sowing density	15 kg/ha						

viterra® WASSERSCHUTZ

... FOR EFFECTIVE GROUNDWATER PROTECTION

- High nitrogen absorbency capacity and good nutrient storage potential in the winter-hardy varieties
- Winter forage rape EMERALD and winter turnip rape JUPITER quickly root into deep soil layers and absorb freely available nutrients
- These nutrients are released at the following maize's main growth time from June
- Marrow stem kale variety ANGLIAN GOLD is winter hardy and makes the blend an attractive source of nutrition for game as an especially tasty variety
- Suitable for AUM AL 2.2: 'Cultivation of winter hardy cover crops' in Lower Saxony

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
WASSERSCHUTZ	++	++				+	+
Seed proportions	43% Winter forage rape EMERALD 39% Winter turnip rape JUPITER 18% marrow stem kale ANGLIAN GOLD						
Sow	Mid July to late September						
Sowing density	10 - 12 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® GRANOPUR

...WPS 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
- As a purely cereal-based blend, **viterra® GRANOPUR** is also very well suited to potato crop rotation

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
GRANOPUR	++	++	+	+	+	+	+
Weight percentages	40 % spring triticale 20 % spring rye OVID, 20 % bristle oat PRATEX 20 % oat						
Sow	Late March to late May or early July to early August						
Sowing density	135 - 150 kg/ha						
Harvest window	June/July when sown in spring October/November when sown in summer						
Harvest	From existing crop to kernel dough stage						

viterra® GRANOLEG

Optimised formula 2019

...WPS BEFORE WINTER

- For biomass production after whole plant silage or an early cereal harvest with cutting before winter
- **viterra® GRANOLEG** contains common vetch, which provides additional nitrogen for stressed soil and keeps crop greener for longer (optimised harvest window)
- Increased cultivation reliability thanks to a balanced composition of various cereal components
- Good shade promotes tilth and keeps soil life thriving

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
GRANOLEG	++	++	+	+			
Weight percentages	30% spring triticale, 20% spring rye OVID, 20% oat, 20% summer field pea 10% bristle oat PRATEX						
Sow	Late March to late May or early July to early August						
Sowing density	135 - 150 kg/ha						
Harvest window	June/July when sown in spring October/November when sown in summer						
Harvest	From existing crop to kernel dough stage						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® WICKROGGEN

...WINTER-HARDY WPS BLEND

- Winter-hardy biomass legume blend
- For high-yield WPS use with high protein and energy content
- 25 - 40 t/ha WPS FM-yields possible depending on location
- Winter-hardy vetch delivers additional nitrogen
- Excellent erosion protection
- Prevents nitrogen displacement over winter

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
WICK-ROGGEN	++	+	+	+			
Weight percentages	90 % winter rye MATADOR 10 % winter vetch						
Sow	Mid September to mid October						
Sowing density	100 kg/ha						
Harvest window	Dough stage, mid to late June						
Harvest	From standing crop, side knives recommended						

viterra® LUNDSGAARDER GEMENGE

...WINTER-HARDY, GREENING-COMPATIBLE WITH POSSIBLE FODDER USE

- Suitable as a winter cover crop for green manuring and soil improvement or for fodder production
- Balanced combination of nitrogen collectors and consumers has a positive impact on plant growth and soil life
- Italian ryegrass uses growth phases over winter, while winter vetch and winter field pea are valuable protein components in fodder
- High agricultural value thanks to large array of flowers

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
LUNDSGAARDER GEMENGE	++	++	++	+			
Seed proportions	52 % Italian ryegrass, 43 % crimson clover, 4 % winter vetch, 1 % field pea						
Sow	Late August to mid September or in spring as an undersown crop with maize						
Sowing density	50 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						

ÖKO

ALSO AVAILABLE AS AN ORGANIC BLEND (see page 51)

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® FUTTER

...GRASS-CLOVER BLEND FOR HARVEST AFTER WINTER

- Stable yield for fodder and biogas
- Suitable for dual-culture use systems in combination with maize or millet
- Nutrient uptake before the winter pause and in early spring prevents loss
- Organic substances from roots and stubble improve humus balance and ensure good pre-crop value
- Not recommended for dry sites and soils with low water storage capacity

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
FUTTER	++	++	+	+	+		+
Seed proportions	54 % Italian ryegrass 46 % crimson clover						
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						
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						

viterra® SOMMERFUTTER/ SOMMERFUTTER A2

...FORAGE BLEND FOR HARVESTING IN YEAR OF GROWING

- Provides additional quality fodder when used as a summer cover crop
- Annual ryegrass provides sufficient structure, the Persian clover provides a high protein content
- The vigorous Italian ryegrass allows winter greening after the harvest
- High preceding crop value thanks to good root penetration and tilth
- The blend is also available without Persian clover as **viterra® SOMMERFUTTER A2**

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
SOMMERFUTTER	++	++	++	+			
Seed proportions	23 % Italian ryegrass (tetraploid), 29 % annual ryegrass (diploid/tetraploid), 48 % Persian clover						
Sow	late June to late July (for greening, up to late Aug)						
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						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® BIENE

... ANNUAL BEE/HONEY FALLOW

- Crucifer-free blend of 12 components for honey plants/fallow greening application (article 45, paragraph 2 of the EU regulation no. 1307/2013)
- Use of fallow land with honey plants
- Flowering blend with long flowering phase for good biodiversity and positive impact on agricultural image
- Roots penetrate different soil levels and stabilise soil structure
- Grass-free for easy control in subsequent culture
- Unproblematic from a plant cultivation perspective, as free from buckwheat, cornflowers and field poppies

Optimised formula 2019

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
BIENE	++	+	++	+			
Seed proportions	25% phacelia 24% Persian clover 19% white clover 12% Egyptian clover 9% crimson clover 4% sainfoin 2% common vetch 1% summer field pea 1% marigold, 1% borage 1% blue lupin, 1% sunflower						
Sow	Early March to late May						
Sowing density	25 kg/ha						

viterra® MULTIKULTI

...ANNUAL BEE AND FLOWERING BLEND

- Blooming blend for good biodiversity and versatile usage
- Roots penetrate different soil levels and stabilise soil structure
- Grass-free for easy control in subsequent culture
- Effective protection from erosion and drying out
- As a cover crop after WPS or cereal harvest or as border greening for maize and other cultures
- Blend of 12 components for honey plants/fallow greening application (article 45, paragraph 2 of the EU Act regulation no. 1307/2013)

Optimised formula 2019

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
MULTIKULTI	++	+		+			
Seed proportions	35% phacelia ANGELIA, 10% Persian clover, 18% Egyptian clover, 14% white mustard GAUDI, 4% crimson clover, 5% seradella 7% oil radish AGRONOM, 3% common vetch, 1% blue lupin, 1% sunflower 1% borage, 1% summer field pea						
Sow	Early April to late August						
Sowing density	25 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® UNTERSAAT

...FOR SUSTAINABLE MAIZE CULTIVATION

- Grass blend of Italian (tetraploid) and German (diploid) ryegrass for undersowing in maize crops
- After the maize harvest, the grass continues to develop and binds freely available nitrogen
- The humus balance is stabilised in tight maize crop rotations
- Effective protection from wind and water erosion over winter
- Vigorous Italian ryegrass combined with late German ryegrass ensures good reliability
- The soil's load capacity is increased and road pollution reduced by harvest

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
UNTERSAAT	++						
Seed proportions	51 % Italian ryegrass (tetr.) 49 % German ryegrass (diploid, late, fodder variety)						
Sow	6-8 weeks after sowing maize in the maize's 6-8 leaf stage						
Sowing density	10 - 15 kg/ha						

viterra® HORRIDO

Special blends

Optimised formula 2019

...BIENNIAL GAMELAND PASTURE BLEND

- Suitable for all small native game
- Flowers attract lots of insects
- Tasty grains for wild birds
- Winter-hardy components offer grazing and cover for rabbits, deer and other small game even in winter and during frosts
- Suitable as a cover crop for ecological priority zones as part of greening

Cultivation tip: Sow part of the area with a double gap between cereals to create attractive free space for pheasants and partridges.

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
HORRIDO	+	+					
Seed proportions	20% white clover, 16% Persian clover 13% Italian ryegrass, 11% seradella 9% Egyptian clover, 7% buckwheat, 6% phacelia, 5% winter forage rape, 4% bristle oat, 2% marrow stem kale, 2% turnip rape, 2% flax, 1% sunflower 1% oil radish, 1% winter vetch						
Sow	March to June						
Sowing density	25 - 30 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® BIOFUMIGATION

... AGAINST SOIL-BORNE PESTS

- For controlling soil-borne diseases such as fusarium and rhizoctonia by using biologically active plant substances (principle of biofumigation)
- Fast-growing blend for crop rotations that only leave a short time for cover crops
- Formation of leafy biomass
- At the time of full flowering (7-8 weeks after sowing), chop the plants as finely as possible and work into the soil
- Phytosanitary effect

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
BIO-FUMIGATION					+	++	++
Weight percentages	50% brown mustard ENERGY, 50% Multi-resistant oil radish DEFENDER						
Sow	Early May to mid September						
Sowing density	15 kg/ha						

viterra® BLÜHZAUBER

... THE FLOWERING MEADOW

- Visually pleasing with a range of more than 40 flowering varieties with different colours and petal shapes
- Source of pollen and nectar for bees, bumble bees, butterflies and many other insects
- Continuous flowering period from late May into autumn
- Improves the image of agricultural landscapes

Cultivation tip: Sawdust or sand can be added to increase volume and improve seed distribution.

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
BLÜHZAUBER	NOT RECOMMENDED FOR ARABLE FARMING						
Varieties	Marigold, Mexican aster, California poppy, yellow toadflax, baby blue eyes, leucanthemum, field poppy, sunflower... and many more						
Sow	April to mid June						
Sowing density	5 - 7 g/m²						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® organic blends are a valuable basis for good crop rotation in organic farming.

One main focus of **viterra® organic blends** is optimising the flow of nutrients within crop rotations. Symbiotic nitrogen binding, nutrient conservation and the encouragement of soil microbiology come into effect.

In organic farming, efficient weed suppression is especially important. The vigorously-growing components in reliable **viterra® organic blends** meet these needs.

As well as the targeted use of individual blends to control nematodes or produce fodder, all **viterra® organic blends** encourage soil life and contribute to increasing soil fertility.

Sowing and use of organic blends

	Special feature	Suitable for crop rotations with							Seed quantity	Sowing window				
		Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures		Jun	Jul	Aug	Sept	Oct
INTENSIV ÖKO	Health blend	+	+	+	+	++	+	++	40 - 50 kg/ha		■	■	■	
BODENGARE ÖKO	Nitrogen supplier	++	+	++	+				60-70 kg/ha	■	■	■		
DEPOT ÖKO	Nutrient reservoir	++	++				++		25 kg/ha		■	■		
LUNDSGAARDER GEMENGE ÖKO	Winter-hardy blend for fodder use	++	++	++	+				50 kg/ha			■	■	
WINTER-QUARTETT ÖKO	Frost-hardy blend	++	++						50 o. 80 kg/ha	■	■	■	■	■
WICKROGGEN ÖKO	Fodder/WPS use	++	+	+	+				100 kg/ha				■	■
WICKROGGEN FUTTER ÖKO	Can also be used as fodder	++	+	+	+				100 - 120 kg/ha				■	■

Certification
All **viterra® organic blends** meet the requirements of EU Act 834/2007. The blends are checked by our testing body DE-Öko-003. You can download the certificate at **www.phpetersen.com** or **www.saaten-union.de**.

viterra® INTENSIV ÖKO

...THE HEALTH BLEND

- Controls migratory root nematodes *(pratylenchus)* and reduces viral corky ring spot in potatoes with multi-resistant oil radish DEFENDER and bristle oat PRATEX
- Fast-growing with intensive weed suppression
- Plenty of organic matter vitalises soil life
- The fibrous roots of PRATEX and taproots in DEFENDER complement each other in root penetration of the entire soil
- As the nematode-resistant oil radish DEFENDER is used, the blend is also suitable as a cover crop preceding sugar beet

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
INTENSIV ÖKO	+	+	+	+	++	+	++
Weight percentages	70% bristle oat PRATEX 30% multi-resistant oil radish DEFENDER						
Sow	Mid July to early September						
Sowing density	40 - 50 kg/ha						

viterra® BODENGARE ÖKO

...THE NITROGEN SUPPLIER

- Delivers essential nitrogen through symbiotic nitrogen binding for plant growth
- Increased availability of main and trace nutrients through stabilisation in the soil
- Stimulates the activity of soil life with resulting soil bioengineering for improved soil fertility
- Complementary and varied root types encourage soil quality and structure
- After an early preceding crop as a summer cover crop for soil regeneration
- Crucifer-free, so especially suitable for oil rape crop rotation

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
BODENGARE ÖKO	++	+	++	+			
Weight percentages	40% common vetch 28% field pea, 22% blue lupin ILDIGO 6% Egyptian clover, 3% phacelia ANGELIA 1% bristle oat PRATEX						
Sow	Mid June to mid August						
Sowing density	60-70 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

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
- Excellent root penetration of the soil by deep and flat rooters stabilises soil structure and improves the soil's infiltration capacity
- Especially suited to crop rotations with legumes as the main crop

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
DEPOT ÖKO	++	++				++	
Seed proportions	46% bristle oat PRATEX 30% oil radish SILETINA 10% white mustard 10% phacelia ANGELIA 4% sunflower						
Sow	late July to late August						
Sowing density	25 kg/ha						

viterra® LUNDSGAARDER GEMENGE ÖKO

... WINTER-HARDY GRASS AND LEGUME BLEND FOR FODDER USE

- Suitable as a winter cover crop for green manuring and soil improvement or for fodder production
- Balanced combination of nitrogen collectors and consumers has a positive impact on plant growth and soil life
- Italian ryegrass uses growth phases over winter
- Winter vetch and winter field pea are valuable protein suppliers in fodder
- Increase of agricultural value thanks to large quantity of flowers

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
LUNDSGAARDER GEMENGE ÖKO	++	++	++	+			
Weight percentages	31 % Italian ryegrass, 29 % crimson clover, 20 % winter vetch, 20 % winter field pea						
Sow	Late August to mid September or in spring as an undersown crop with maize						
Sowing density	50 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						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

viterra® WINTERQUARTETT ÖKO NEW

... FOR FLEXIBLE WINTER GREENING AND FODDER USE

- Frost-hardy blend interacting components for fodder, soil improvement and soil protection: **viterra® WINTERQUARTETT ÖKO** can also be used as fresh fodder, late pasture and silage
- For winter greening with a long growth phase for vegetated soil to stimulate soil microbiology and increase soil fertility
- The flat, loose working in of green manure in spring maintains soil structure and creates ideal sowing conditions for maize
- For grazing and fodder use with balanced, tasty components in high quality suitable for feed

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
WINTERQUARTETT ÖKO	++	++					
Weight percentages	67% winter rye INSPECTOR 13.5% Italian ryegrass 11.5% crimson clover 8% winter forage rape EMERALD						
Sow	June to October: suitable for early and late sowing						
Sowing density	50 kg/ha for winter greening 80 kg/ha for fodder use						

viterra® WICKROGGEN ÖKO & WICKROGGEN FUTTER ÖKO

... WINTER-HARDY BLEND FOR FODDER PRODUCTION OR GREEN MANURING

- Winter-hardy blend including high-yield, stable and healthy population rye INSPECTOR and winter vetch
- Winter vetch binds nitrogen from the air, contributing to the following crop's nutrient supply
- Additional fodder source with high protein and energy content
- Winter-hardy vetch provides nectar and pollen, increasing biodiversity
- **viterra® WICKROGGEN ÖKO** helps to keep plots free from weeds and improves soil structure
- As **viterra® WICKROGGEN FUTTER ÖKO**, the blend also contains crimson clover and Italian ryegrass, which supply additional yield over summer after a WPS harvest and ensure ongoing greening up to the following crop

RECOMMENDATION	SUITABLE FOR CROP ROTATIONS WITH						
	Maize	Cereals	Rapeseed	Sugar beet	Potatoes	Legumes	Intensive cultures
WICKROGGEN ÖKO	++	+	+	+			
Weight percentages	**WICKROGGEN ÖKO:** 90% winter rye INSPECTOR, 10% winter vetch **WICKROGGEN FUTTER ÖKO:** 67% winter rye INSPECTOR 13% Italian ryegrass 12% crimson clover 8% winter vetch						
Sow	Mid September to mid October						
Sowing density	100 - 120 kg/ha						

The weight proportion of the individual components may vary slightly due to different TKWs. If unavailable, varieties may be replaced by varieties of equal value. Suitable for fulfilling AUM requirements.

Extra high-quality seeds

Multiplication			
Only officially approved basic seeds are sown	Selection of suitable regions and plots	Intensive specialist propagation support	Field inspections by independent reviewers

Cleaning			
The latest, high-performance cleaning facilities	Efficient and gentle processing	Experienced and trained staff	High-performance packaging plant

Control and certification			
In-house quality management from multiplication to delivery	Official certification system	Organic certification in accordance with EU regulation no. 834/2007	QSS tested & certified

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.

QSS-Zertifikat 05.10.2019

Organic seeds

ÖKO

Natural cover crops

The demand for organically grown foods has grown significantly over the last few years. The number of organic farms has grown, along with the demand for suitable organic varieties with special characteristics.

SAATEN-UNION offers varieties as well as blends for use as cover crops and in forage production.

The purity and germination of these high-quality seeds exceed the legal norm and form the basis for successful arable farming - in organic much more than conventional farming.

As well as our viterra® organic blends (see p. 50), our organic seed portfolio also includes single crop seeds for the following cultures:

- Forage rye (e.g. PROTECTOR)
- Spring rye (e.g. OVID)
- Bristle oat (e.g. PRATEX)
- Oil radish (e.g. SILETINA)
- White mustard (e.g. ACCENT)
- Phacelia (e.g. ANGELIA)
- Common vetch (variety on request)
- Buckwheat (variety on request)

The single crop seeds and organic blends in the viterra® range fulfil the requirements of EU regulation no. 834/2007 and have been checked by our control body DE-Öko-003.

You can download our certificates at www.phpetersen.com or www.saaten-union.de. Do you need other organic varieties? Please contact us.

Cultivation recommendation

A professional, clean order is a main requirement for sure success, even in years with bad weather. Ploughing and intense cultivation not only facilitate good volunteer grain control, but also make it easier for cover crops to develop quickly and evenly. In dry areas, it has proven beneficial to select water-friendly processing methods (flat processing, possibly with subsoiling). Despite a high-workload phase, sufficient attention should be paid to seedbed preparation, as the whole cultivation process (including all related costs) could otherwise be at risk.

Sowing the cover crop

In practice, various sowing methods are used. These range from more intense seed drilling to ploughing to classic mulch sewing to cheaper options such as direct sowing or dispersing seed using scattering tools. The risk of poor field emergence increases significantly with the cheaper methods.

The safest option is seed drilling after careful seedbed preparation. Depending on the blend, the seeds should be sown at 1-4 cm deep. Especially when using blends or fine seeds, we recommend using the same sowing methods as for a main crop.

Poor sowing conditions can be somewhat compensated by using more seed. The foundations for the positive effects that can be achieved with cover crops (page 4) are even, dense plants. Therefore, the recommended sowing quantities should be used even in favourable sowing conditions.

Fertilisation

Cover crops generally manage with a poor nutrient supply. It is critical, however, if straw from the previous crop remains on the plot and requires any existing nitrogen for rotting. A mineral or organic fertiliser can really help promote initial development.

Subsequent processing

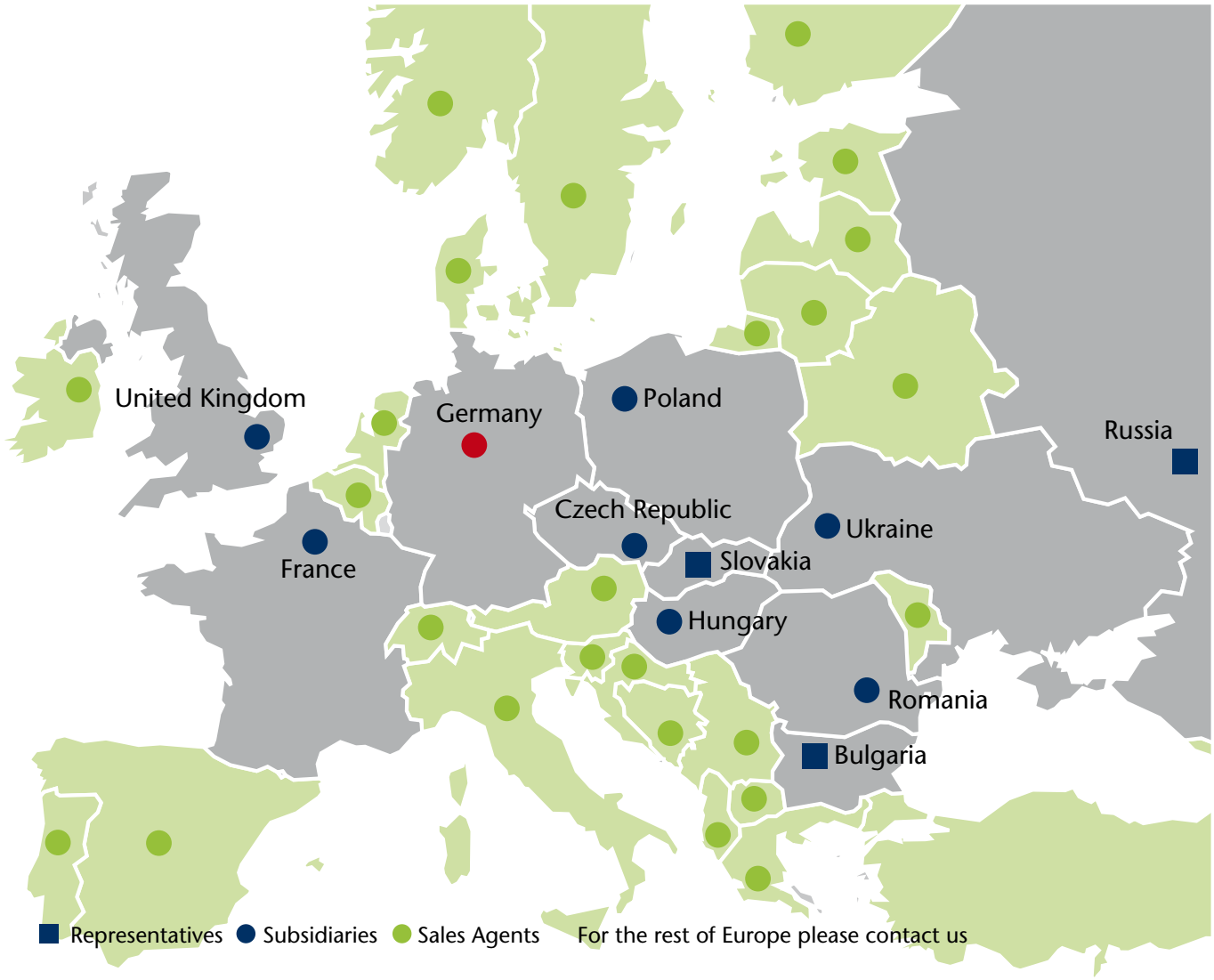
Depending on the cover crop, the remaining mulch layer may be very different in spring. If there is brittle, fragile material and there was previous deep soil preparation in summer/autumn, mulch sowing can be carried out directly or after minimal soil preparation. If cover crops have not frozen off, chemical or intense mechanical measures (e.g. ploughing) may be used.

Use ground frost to roll cover crop plants

If the ground is frozen, it is possible to prepare cover crop stock without sacrificing the soil structure that has been created. Rolled stock is weaker, dies off more easily and is easier to process in spring. Good impact can be achieved with a Cambridge roller and a speed of 8-11 km/h. Dense stock requires a suitably slower speed, while the tempo can be increased if stock is sparse. It is important that each individual plant is broken by the roller. During rolling, the frozen stems are broken by the roller, the supply of nutrients is disrupted, and the plants struggle to recover even in warmer temperatures. Aftertreatment with total herbicides is generally not needed; mechanical processing as part of seedbed preparation in spring is usually sufficient.

For your notes

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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SAATEN UNION
Züchtung ist Zukunft

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