SPECIALIST INFORMATION AND VARIETIES

Cover Cropping

A guide to varieties, blends and their benefits

FURTHER INFORMATION:
WWW.ZWISCHENFRUCHT.DE

SAATEN UNION
Züchtung ist Zukunft

Quality varieties

Organic seed

viterra®-blends






Cover crops from the specialist

In northern Schleswig-Holstein, P. H. PETERSEN develops cover crops, cereals, legumes and special varieties as well as seed blends in the highest seed qualities. With the registration of the world first nematode-resistant variety, P. H. PETERSEN redefined a completely new scope for cover crops. Since then, the company remains the market leader in Europe and stands for innovative products. Extensive contact with research institutes, specialist consultants and progressive thinking farmers ensures the efficiency and actuality of variety development and practically applicable solutions.

Today, the P. H. PETERSEN breeding facility includes around 50 ha of breeding nurseries, performance test and reproduction of pre basic crops. Climate-regulated greenhouses are available throughout the year for VCU facilities and breeding trials. Samples are processed and tested in our own in-laboratory. The storage and processing plants in Lundsgaard, Schleswig-Holstein and Sárbogárd, Hungary, with over 15.000 sqm each, use state-of-the-art cleaning and processing facilities and efficient packaging systems. Dedicated staff bring their experience in top quality seed into every working area.

The products are successfully marketed in Germany and Europe in collaboration with SAATEN-UNION GmbH, the long-term partner of P. H. PETERSEN Saatzucht Lundsgaard GmbH.

Today the wide-ranging family business is in the third generation and run by Mr. Matz Petersen.

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P. H. PETERSEN
SAATZUCHT LUNDSGAARD

Contents

Seed in extra-quality

Continuous quality controls during production and processing guarantee supply of seeds exceeding the legal standard.

Good reasons for the use of 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. Professional cover crop cultivation promotes soil health and improves soil structure.

Selecting the suitable catch crop depends on the requirements of the main crop. New incentives are set in acordance with political and economical aims and demands. Cover crops contribute to the environmentally-friendly implementation of these targets.

Advantages of a cover crop

- **Higher yield of organic material as an additional contribution to humus formation**
- **Protection of the soil against wind and water erosion**
- **Control of soil diseases and nematodes**
- **Increased biodiversity**
- **Binding of nitrogen and other nutrients through winter, and protection against displacement into deep soil layers**
- **Activation of antagonists and promotion of the positive soil fauna**
- **Effective weed regulation and prevention of troublesome volunteer plants**
- **Improvement in the soil composition and soil structure**
- **Late forage for bees and insects**
- **Source of fodder and biogas**
- **Good preparation for mulch and direct seeding processes**

What the experts say

"The number of earthworms has clearly increased since I have been regularly growing cover crops. For me, earthworms are a sign of a good soil structure."

Las-Peter Jacobsen, Farmer Schleswig-Holstein

"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-Vorpommern

"The oil radish SILETTA NOVA before potatoes is the 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

"I have 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 component of our crop rotation, which focuses in biomass production."

Klaus Kock, Farmer Schleswig-Holstein

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

Daniela Biernoth, IGLU Lower Saxony

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

Frithjof Pape, Nordzucker AG Lower Saxony

"Time and again, farmers say tillage for winter wheat after maize is easier if there was a good cover crop before the maize."

Achim Schneider, Marketing consultant Saaten-Union Hessen

"With viterra® TRIO the weeds and volunteer cereals can be efficiently suppressed until spring."

Andreas Kornmann, Marketing consultant Saaten-Union Bavaria

Our cover crop recommendation

IN SUGAR BEET CROP ROTATIONS:

Recommended varieties

Nematode-resistant oil radish **from page 12**

Level 1 COLONEL, AMIGO and others
Level 2 DEFENDER, COMPASS, AGRONOM and others

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

ACCENT, VERDI, MASTER, PROFI, and others

Nematode-neutral

Bristle oat PRATEX, CODEX **page 20**

Phacelia ANGELIA **page 22**

Greening-compatible blends

Nematode-reducing

viterra® cover crop blends **page 36**

viterra® RÜBE

Nematode-neutral

viterra® cover crop blends **from page 36**

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

IN POTATO CROP ROTATIONS:

Recommended varieties

Multi-resistant oil radish **page 17**

DEFENDER, CONTRA, ANGUS

Oil radish against corky ring spot **page 19**

SILETTA NOVA, BENTO

Oil radish SILETINA **page 21**

Bristle oat PRATEX and CODEX **page 20**

Sticky nightshade **page 18**

WHITE STAR and DIAMOND

Greening-compatible blends

viterra® cover crop blends **from page 36**

viterra® INTENSIV

for your crop rotations

IN OILSEED RAPE 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 36**

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

In wide oilseed rape crop rotations (25 % and fewer)

viterra® cover crop blends **from page 36**

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

IN MAIZE CROP ROTATIONS:

Recommended varieties

White mustard ALBATROS, CLASSIC **page 23**

Oil radish SILETINA, COVER, AKIRO **page 22**

Forage rape **page 25**
EMERALD, FONTAN, PRESTIGE, JUMBO

Winter turnip rape JUPITER **page 25**

Phacelia ANGELIA **page 22**

Bristle oat PRATEX, CODEX **page 20**

Ryegrass ALISCA, DIPLOMAT **page 27**

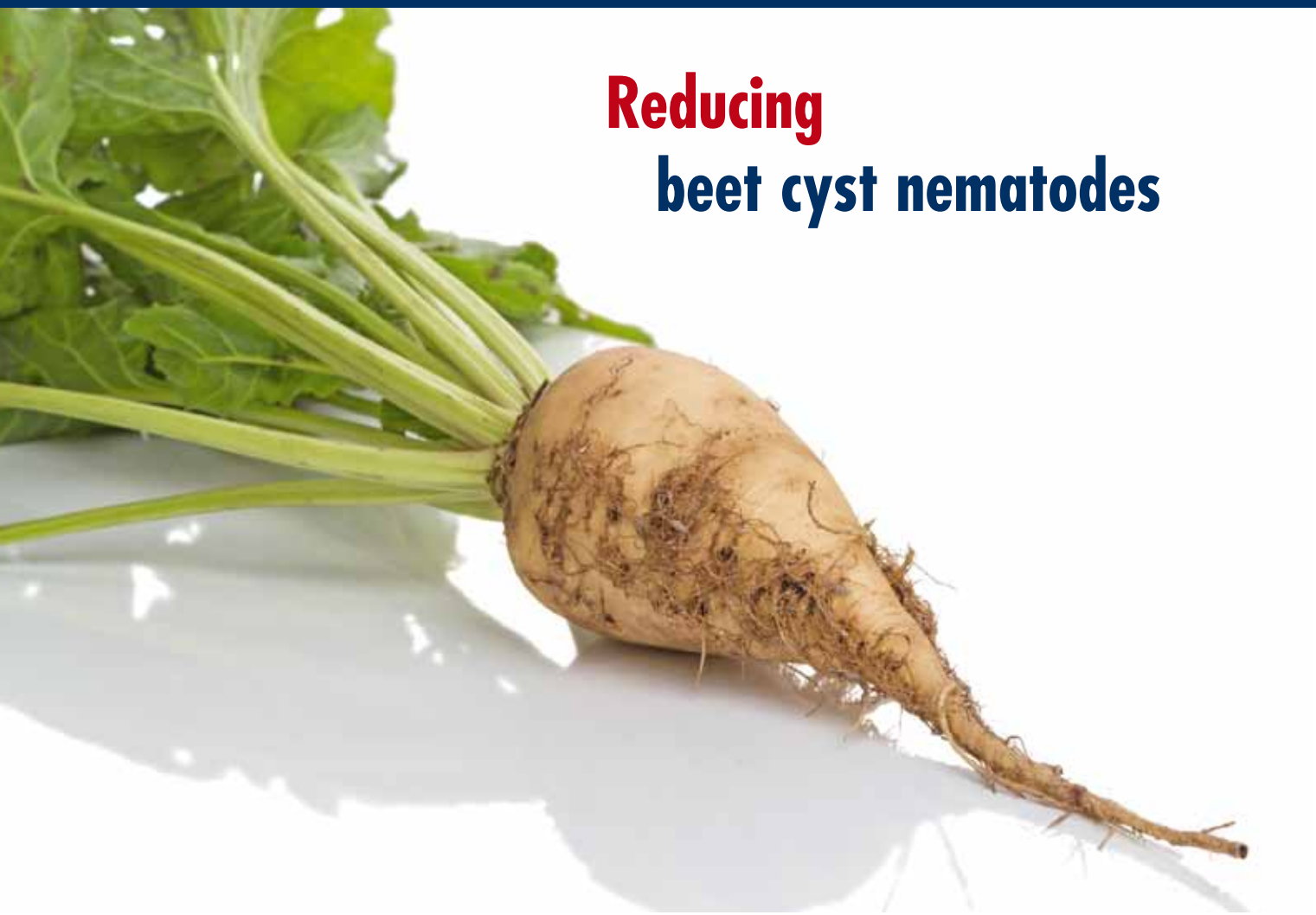
Rye **page 27**
OVID, MATADOR, PROTECTOR, TRAKTOR

Greening-compatible blends

viterra® cover crop blends **from page 36**

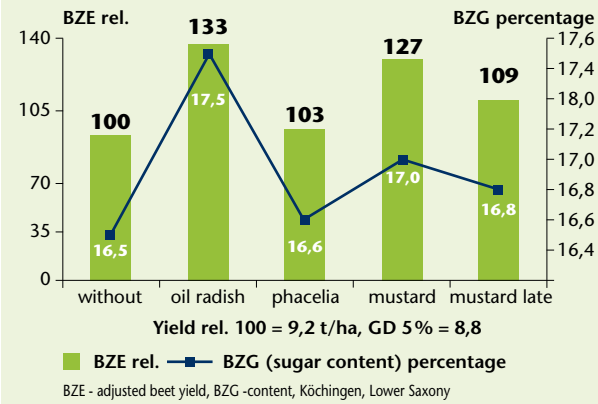
viterra® MAIS, viterra® WASSERSCHUTZ, viterra® SCHNELLGRÜN, viterra® SCHNELLGRÜN LEGUMINOSENFREI, viterra® UNIVERSAL WINTER, viterra® BODENGARE, viterra® MULCH and others

Reducing beet cyst nematodes



Beet cyst nematodes (*Heterodera schachtii*) are still the most economically important pest of sugar beet. Therefore, fighting the nematode in affected areas remains a high priority. Particularly in short sugar beet crop rotations, resistant cover crops help keep the nematodes below the damage threshold and creating consequently optimum growing conditions.
Whilst growing tolerant or resistant sugar beet, resistant cover crops do not only reduce the nematode population, but also support sustainable beet and sugar yields, promoting an economically favourable crop.

Effect of cover crops in sugar beet crop rotations



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

Source: dlz agrarmagazin, June 2010

Cyst with eggs and larvae.

Biological nematode control

Resistant oil radish and white mustard activates the hatching of the larvae and their migration to the roots. However, in contrast to the host plants, in resistant plants the formation of the nurse cell system is restricted. The nematode cannot feed itself sufficiently, and the majority of the hatchlings die prematurely. As the females require around 40-times more nutrition during their development than the males, the sex-ratio becomes skewed in resistant plants: (e. g. 100 (to 1000) males to 1 female). The lack of females leads to population decline.

The following criteria are crucial for the successful nematode control:

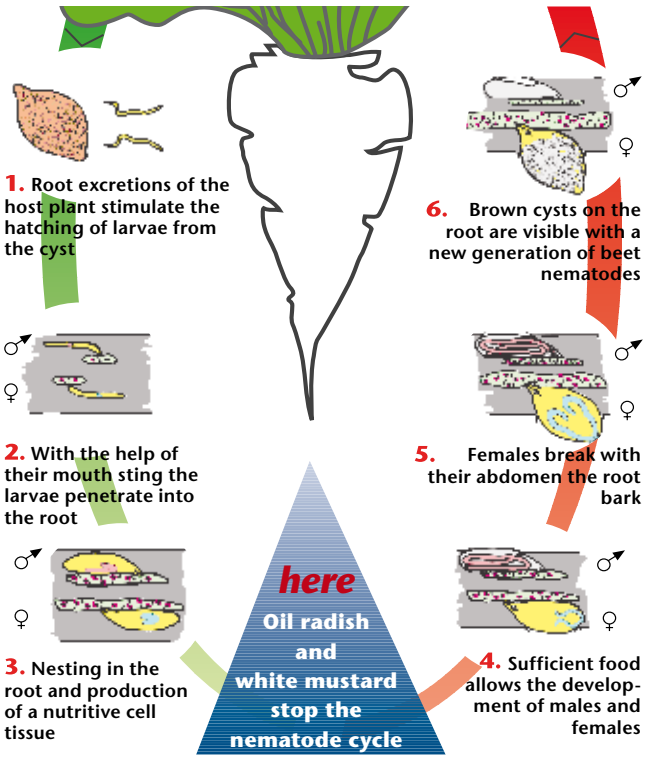
- **Timely sowing** of the resistant cover crop allows utilisation of warm soil conditions, which encourage the cyst nematodes to hatch.

- **Careful tillage,** which allows the roots of the resistant cover crops to penetrate a large soil volume as quickly as possible. The larvae only have a limited radius of movement, consequently the plant root closest to the cysts must grow in order to stimulate hatching of the nematode larvae.

- **Sufficient plant density** of at least 160 resistant oil radish or white mustard plants per square metre. This is essential for successful nematode reduction.

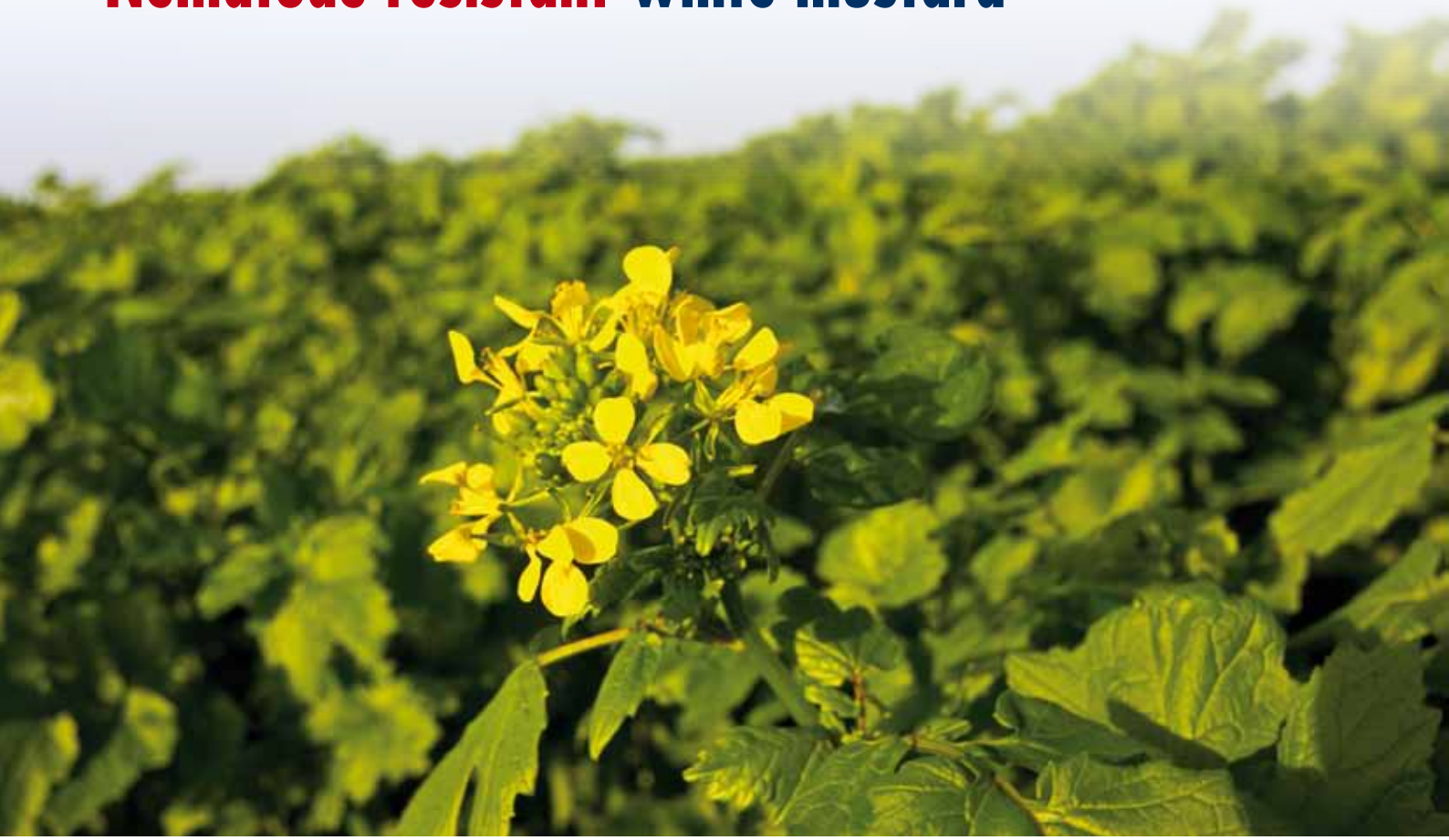
Resistant cover cops are classified according to their reproduction rate (Population final / Population initial). Here, resistance level 1 represents a reduction of over 90 % (reproduction rate <0.1). Plants that can act as a host plant for the nematodes increase the nematode numbers around 4-times in the same time period. Among the plants that are not host plants (neutral plants, e.g. Phacelia), the nematode population decreases annually by around 30 %. The cysts of the beet nematodes are able to survive in the soil for more than 10 years.

Even after cultivation of resistant cover crops for over 30 years, no resistance-breaking nematodes have developed.



Larvae use their stylets in order to enter the root.

Nematode resistant white mustard

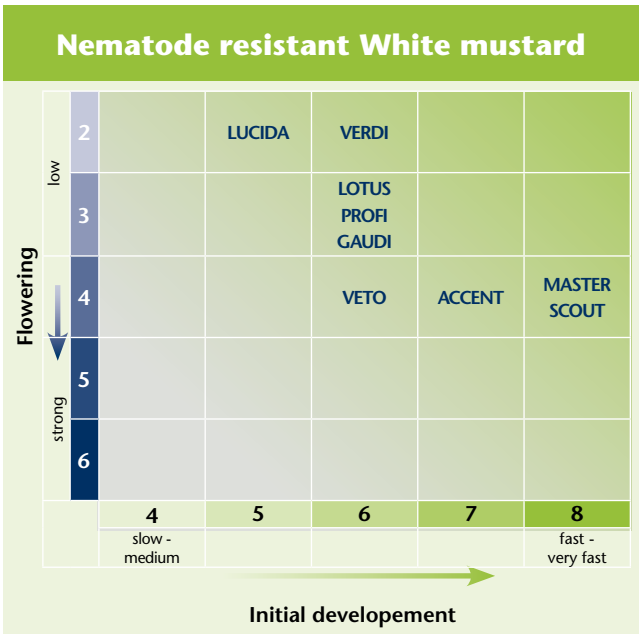


Ensure your cultivation success with the suitable variety

The sowing period for white mustard begins later than that of oil radish. White mustard has a stronger **flowering tendency** under long day conditions, highlighting the importance of growing varieties with a lower flowering tendency when sowing early. LUCIDA begins flowering on average three weeks after the onset of flowering of level 5 varieties. This provides more time for root development and thus a higher chance of beet nematode control.

For later sowing times in mid September, good and rapid **initial development** is the most important selection criterion. Varieties such as ACCENT, SCOUT or MASTER are particularly suitable for this.

VERDI, the **newly registered variety** listed on the French national catalogue, combines the highest nematode resistance with a very low flowering tendency, so that early sowing dates can also serve for nematode control.



Resistance level 2 against beet cyst nematodes

ACCENT

FIELD-TESTED HIGH CONTROL LEVEL

- Up to 90 % nematode reduction in official tests - Resistance level 2
- Quick and easy sowing, rapid and uninterrupted soil coverage
- Excellent erosion protection with nutrient preservation during winter
- Guaranteed freezing off and easy processing ensure trouble-free mulch sowing

RECOMMENDATION NEMATODE CONTROL

VERDI NEW

A CLASS OF ITS OWN

- Tested in France and assigned to the resistance class H1 (reduction of sugar beet nematodes by over 90 %)
- Extremely low tendency to flower allows early sowing dates without risk of seed ripening
- Easy to sow, quick ground cover and long vegetative growing phase

RECOMMENDATION FAST STARTER

MASTER

FAST START – DELAYED FLOWERING

- Particularly fast initial development – highest level in the Descriptive Variety List
- Resistance level 2 in official German tests
- Very good late sowing capacity: Good crops can still be achieved with sowing dates up to mid September
- Weeds are effectively controlled and valuable nutrients are organically protected from leaching into deeper soil layer

Resistant white mustard varieties

Late flowering	Profile
VERDI NEW	A class of its own - Resistance level H1
GAUDI	Perfect before sugar beets
LOTUS	Late flowering with very good suitability for direct sowing
LUCIDA	Latest white mustard with very low flowering tendency
PROFI	Professional nematode control

Fast starter	Profile
VETO	Fast-growing for good nutrient preservation
ACCENT	Field-tested high control level
MASTER	Rapid start - strong delay of flowering
SCOUT	Enormous sowing flexibility: Fast and effective

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

Nematode-resistant oil radish

VARIETY RECOMMENDATION

COLONEL

NEMATODE CONTROL AT THE HIGHEST LEVEL

- Highest resistance to beet cyst nematodes, more than 90 % nematode reduction in official tests
- COLONEL effectively reduces high nematode densities below the damaging threshold and can diminish a low infestation even further
- The healthy and rapid initial development ensures thick leaf coverage and effective weed suppression, even at late sowing times
- The characteristic change from the vegetative to the generative growing phase increases the frost susceptibility

AMIGO NEW

THE NEW GENERATION OF NEMATODE CONTROL AT THE HIGHEST LEVEL

- Beet cyst nematode control at the highest level, a reduction of more than 90 % of *Heterodera schachtii* (resistance level 1)
- AMIGO promotes the hatching of the beet cyst nematodes and actively reduces their population below the damage threshold
- Improved initial development with fast soil coverage for excellent creation of tilth and effective weed control
- Dense root system binds nutrients and protects them from displacement into deeper soil layers
- The abundant organic matter positively influences the humus balance and activates the soil organisms

for sugar beet health

VARIETY RECOMMENDATION

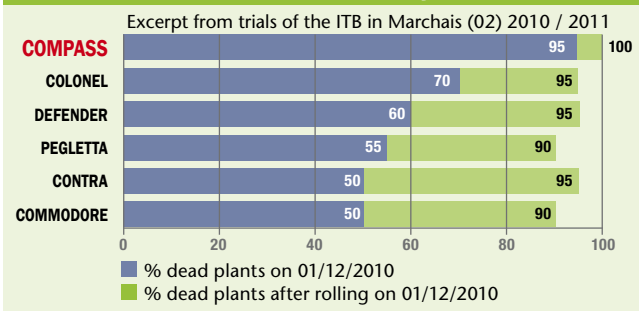
COMPASS

Freezes off more easily

THE OIL RADISH THAT FREEZES OFF MORE EASILY

- High resistance to beet cyst nematodes in the upper region 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 and costs for processing, perfect for mulch and direct sowing of the follow-on crop

Frost sensitivity



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 the frozen ground, a process that is both soil and environmentally-friendly. A clean crop in spring proves good weed suppression.

COMPASS before winter

COMPASS after winter

AGRONOM NEW

FOR BEET CULTIVATION

- High resistance to beet cyst nematodes in the in the upper region of resistance level 2
- Fastest initial development and ground cover combined with most delayed onset of flowering of all oil radish varieties listed in Germany
- Offers great flexibility in terms of sowing
- Intensive root penetration of the soil and good nutrient conservation offer optimal conditions for the following crop

Criteria for variety selection

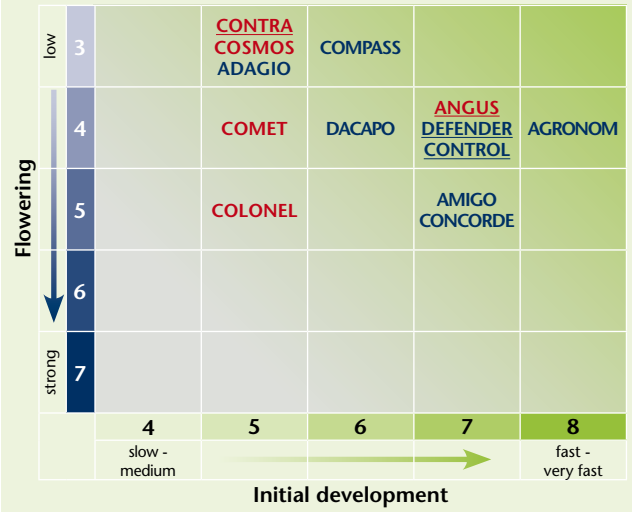
Nematode resistance, initial growth and flowering tendency are important criteria for variety selection:

- High nematode resistance = intensive rooting for effective reduction of the nematode population
- Fast initial development = efficient weed suppression and maintenance of soil tilth
- Low flowering tendency = early sowing times

Tip:

With early sowing times - end of July to early August - late flowering varieties are to be preferred (inclination to flower 3 to 4) because they have a long vegetative phase up to flowering. From mid-August, varieties with a fast initial development are suitable as they can form a good crop even in decreasing daylength and poorer weather conditions.

Nematode resistant oil radish



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

Underlined varieties also fight *Meloidogyne chitwoodi*

Resistant oil radish varieties

Resistance level 1	Profile
COLONEL	Nematode control on the highest level
AMIGO NEW	The new generation of nematode control at the highest level
COMET	Best performance against beet cyst nematodes
COSMOS	Late and highest resistance level

Resistance level 2	Profile
ADAGIO	Top variety for reliable nematode control
AGRONOM NEU	The expert for beet cultivation
COMPASS	The easily freezing-off oil radish
CONCORDE	Stimulates yield and quality of beets
DACAPO	For active biological nematode control

The multi-resistant varieties such as DEFENDER, CONTRA and ANGUS are also resistant to beet cyst nematodes. They are described in more detail on page 17.

Multi-resistant oil radish

Besides beet cyst nematodes, other nematodes are also increasingly becoming a problem for main crops. Crop rotations with a high proportion of root crops and vegetable cultivation on light soils are particularly affected.

Multi-resistant oil radish varieties reduce beet root nematodes as well as other nematodes, and have been tested for their controlling effect against many crop rotation diseases.

High levels of organic substances serve as a nutritional basis for beneficial soil organisms. The intensive root penetration of the soil improves the soil structure as well as air and water balance. Microbial processes promoting soil health are encouraged.

Preceding crop effect of different cover crops:

	Sugar beet		Potatoes						Oilseed rape
	Heterodera schachtii	*Ditylenchus dipsaci*	*Rhizoctonia*	*Trichodorus spp.*	*TRV*	*Pratylenchus spp.*	*Meloidogyne chitwoodi*	*Meloidogyne hapla*	Club root
Oil radish	Varieties				Varieties		Varieties	Varieties	Planting frequency
Tillage radish									
White mustard	Varieties								
Indian mustard									
Forage rape, turnip rape									
Bristle oat PRATEX									
Ryegrass									
Phacelia									
Buckwheat									
Egyptian clover									
Persian clover									
Common vetch									
Linseed									

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

Multi-resistant oil radish

Against nematodes

Beet cyst nematodes

- More than 90 % reduction in *Heterodera schachtii* possible
- Control of *Heterodera betae*
- No formation of resistance-breaking nematodes
- Control even in deep soil layers

Root-knot nematodes

- Resistance against *Meloidogyne chitwoodi* officially tested
- Prevents the development of *Meloidogyne fallax*
- For crop rotations with potatoes, vegetables and flower bulbs

Northern root-knot nematode

- Efficient control of *Meloidogyne hapla*
- For organic crop rotations with a high proportion of clover and carrots
- Also protects potatoes and sugar beets

Southern root-knot nematode

- *Meloidogyne incognita* and *M. javanica* are effectively reduced
- In green house cultures and in peppers, tomatoes and pumpkins

Stem and bulb eelworm

- No multiplication of *Ditylenchus dipsaci*
- In beet, vegetable and flower bulb crop rotations

Lesion nematodes

- Bad host plant for *Pratylenchus* nematodes
- In sandy soils as a cover crop
- For crop rotations with potatoes, oilseed rape, cereals, vegetables and flower bulbs

Against diseases

Viral corky ring spot

- Reduces viral corky ring spot in potatoes
- Suppresses free *Trichodorus* nematodes which may carry the virus
- Combats weeds by fast soil coverage

Rhizoctonia rot

- Reduction of yield and quality caused by *Rhizoctonia*
- Against *Rhizoctonia* canker and dry core in potatoes
- Against *Rhizoctonia* root and crown rot in beets

- In lettuce, cabbage and many other cultures, such as maize, grass, beans and flower bulbs
- Promotes structure, pore volume and soil aeration
- Promotes natural antagonists

Pythium

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

Club root

- No build-up of the club root pathogen *Plasmodiophora brassicae* in cover crop cultivation in crop rotations with oilseed rape and cabbage

Cereal crop rotation diseases

- Good breaking of the disease cycles in cereal crop rotations (e.g. take-all)

DEFENDER

TOP VARIETY FOR VEGETABLE AND ARABLE FARMING

- Interrupts the disease cycle in vegetable, potato, sugar beet and cereal crop rotations
- Up to 90 % reduction of beet cyst nematodes (resistance level 2+)
- No multiplication of Ditylenchus dipsaci
- Efficient reduction of root-knot nematodes and free-living nematodes
- Reduces viral corky ring spot in potatoes
- Strong initial development and fast soil coverage for efficient weed suppression
- Deep reaching, finely branched root system improves the soil structure
- **In many trials and cultivations, DEFENDER was able to prove its prime position**

CONTRA

FOR HIGHEST RESISTANCE DEMANDS

- Officially tested resistance to *Meloidogyne chitwoodi* and resistance level 1 in the control of beet cyst nematodes
- Control of the dangerous vegetable pest *Meloidogyne hapla* (Northern root-knot nematode)
- The specialist for vegetable crop rotations

ANGUS NEW

THE POWERFUL MULTI-RESISTANT

- Multi-resistance - effective control of a range of nematodes and diseases, e.g. *Heterodera schachtii* and root-knot nematodes
- With its rapid soil shading it ensures effective suppression of volunteer plants and weeds
- Fast, healthy initial development, increases the organic substance and supports soil fertility
- Deep and intensive rooting system helps to eliminate soil compaction and improves the permeability and air exchange

Multi-resistant oil radish varieties

Resistance level 1	Profile
ANGUS NEW	The powerful multi-resistant
CONTRA	For highest resistance demands

Resistance level 2	Profile
DEFENDER	Top variety for vegetable and arable farming
CONTROL	Late flowering with a very good suitability for direct sowing

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

Specialists for potato crop rotations

Sticky nightshade against potato cyst nematodes

Potato cyst nematodes present a serious threat in intensive potato cultivation and lead to severe economic damage. Sticky nightshade is resistant to Globodera rostochiensis (pathotypes 1 to 4) and Globodera pallida (pathotypes 2 and 3) and belongs to the family of Solanaceae (nightshades).

The root excretions stimulate the larvae present in the soil to hatch; the hatched larvae die off.

Sowing: mid-May to mid-July.

Optionally, seeds are also available primed and pelleted.

WHITE STAR

- Intensive root penetration against Globodera

DIAMOND

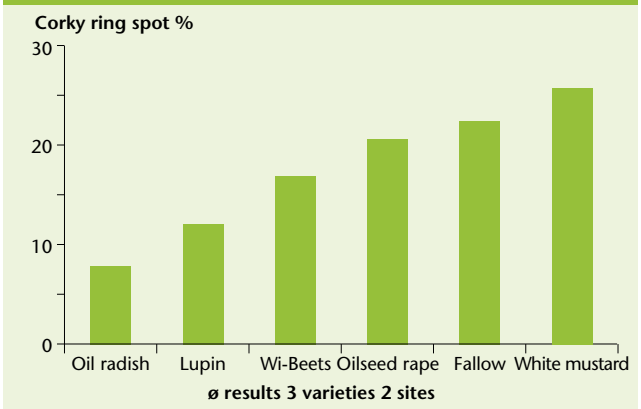
- Strong growth and good control against potato cyst nematodes

Oil radish against corky ring spot

Oil radish is an excellent cover crop in potato cultivation, as it positively influences the soil structure and humus balance.

The free-living *Trichodorus* nematodes can transmit the Tobacco Rattle Virus (TRV) through their stylets, causing corky ring spot in potatoes. Some oil radish varieties reduce corky ring spot in potatoes when planted as a preceding crop to potatoes by reducing the number of nematodes, and thus interrupting the transmission path of the virus.

Influence of green manure on corky ring spot in potatoes



Source: Der Kartoffelbau

BENTO

PROMOTES QUALITY AND YIELD OF POTATO CROPS

- Reduces viral corky ring spot
- Pronounced vegetative growth
- Professionals know: Closes early and flowers late!

The multi-resistant oil radish varieties DEFENDER and CONTRA, as well as the nematode-resistant oil radish COLONEL reduce viral corky ring spot in potato crops.

VARIETY RECOMMENDATION

SILETTA NOVA

REDUCES CORKY RING SPOT IN POTATOES

- Reliable and proven
- SILETTA NOVA reduces the risk of virus transmission by *Trichodorus* nematodes
- The fast and especially leafy soil shading supresses weeds in which the virus could multiply
- The organic matter boosts the beneficial organisms in the soil, retains nutrients in the topsoil and provides valuable humus
- The deep-reaching root system creates the perfect soil conditions and loosens compacted soil
- SILETTA NOVA contributes to ensuring sustainable and long-term potato yields

Bristle oat against Pratylenchus

Bristle oat (*Avena strigosa*) is a commonly used cover crop as it is an undemanding crop due to its low input requirements.

Cultivated for nematode reduction, erosion protection, biomass production or in cover crop blends, it covers a wide range of application areas.

Particularly in light soils, the damage caused by Pratylenchus can lead to considerable reductions in 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 host plants includes not only weeds but also cultivation crops which makes successful control even more difficult.

Uses for bristle oat

1. Nematode reduction

Control of migratory root nematodes (*Pratylenchus penetrans*) without breeding of *Trichodoridus* species - particularly important in sandy and light soils for potato and vegetable production. Sowing density: 80 – 100 kg/ha

2. Erosion protection

It offers erosion protection in autumn sowing – very fast and leafy development with good weed suppression (allelopathy). Bristle oat freeze off reliably and thus offer optimal conditions for mulch 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 partner that is very suitable for blends

VARIETY RECOMMENDATION

PRATEX

CONTROL OF *PRATYLENCHUS PENETRANS*

- Controls migrating root nematodes Pratylenchus penetrans without mulitplication of *Trichodoridus* species
- Can be cultivated with a simple sowing technique
- Extremely fast initial development and high competitive strength against weeds that could be potential multipliers of Pratylenchus
- High organic mass production, intensive root penetration of the soil
- Guaranteed freeze-off of the cover crop

CODEX NEW

THE LATE-RIPENING BRISTLE OAT

- Long vegetative growing phase
- Suppression of weeds and volunteer cereals.
- Dense fibrous roots and luscious aerial parts protect the soil and form effective erosion protection
- Freezes-off reliably and is suitable as cover crop and in oilseed rape crop rotations

Promotion of soil fertility

Make your soil healthy

A fertile soil is the key to increasing sustainable agriculture.

Due to the increase in intensive farming practices it is becoming more and more difficult to maintain a guaranteed supply of sustainably produced food for human nutrition. Fertile soil is becoming an increasingly scarce and valuable commodity, which must remain to deliver high yields.

The break up the roots and stabilisation of compacted soil is carried out by **cover crops who helps to rehabilitate soils with structure-damage**. To do this, deep rooting varieties with tap roots, such as oil radish or oil linseed are particularly suitable. Flat and intensive rooting varieties, such as bristle oat ensure a stable crumb structure in the topsoil and good soil tilth.

The organic substance and root secretions of the cover crops serve as the **basic nutrition for the soil organisms**. Besides the earthworm, known as an important soil processor, there are primarily fungi and bacteria, which **promote soil vitality** and must also be sustained.

High resistance to environmental influences as well as high regeneration ability of the soil can only be achieved if the physical, chemical and biological soil properties are balanced. **Healthy soils are the prerequisite for healthy crops**.

Cover crops have a **positive effect on humus content**, **soil life and fertility**. They also contribute enourmously towards **reducing soil erosion and nutrient leaching** - this in turn protecting the **sustainability of the soil**.

Green manure and mulch sowing

Phacelia

As a neutral plant for beet cyst nematodes and club-root, Phacelia is one of the cover crops suitable for beet crop rotations with oilseed rape. Phacelia also benefits cereal rotations with its drought tolerance characteristics.

As a popular plant for bees, it enhances the image of the landscape in flowering blends or as a pure culture. The crop freezes off reliably and protects the soil from damage through erosion.

VARIETY RECOMMENDATION

ANGELIA

STRIKING AND ATTRACTIVE FLOWERS

- High-yielding honey plants
- Leaves an easy to work with and dark fine-stemmed mulch layer promoting soil warming in spring
- Additional organic substance stabilises the humus content
- Unlocks organically-bound phosphorus

AMERIGO

- Dense growth
- Drought-tolerant

Oil radish for green manure

As a deep rooting cover crop with fast soil coverage, oil radish can be sown until the beginning of September. Oil radish shades the soil for a long time and in doing so ensures good soil quality and weed suppression.

The abundantly created organic matter supports humus formation and promotes positive microorganisms in the soil.

AKIRO

- Promotes soil structure and activates the soil life
- Leafy initial development with faster soil shading promotes the valuable tilth
- High competitive strength against weeds

SILETINA

- Biologically highly-effective green manure
- Reliable and easy to cultivate - even when sown late and at unfavourable soil conditions
- Fast initial development, for effective weed suppression

White mustard for greening

White mustard is an undemanding greening plant, which provides fast soil coverage and can be sown up to the end of September (e.g. white mustard ALBATROS).

Other advantages include its drought tolerance and reliable freezing-off, which create ideal mulch sowing conditions for maize. Late-flowering varieties such as COVER or CLASSIC are especially suitable for agricultural blends with other species.

COVER

- Intensive and healthy initial development for a flexible sowing period

CLASSIC NEW

THE FAST STARTER - LATE FLOWERING

- Particularly long vegetative growing phase due to good initial development and late flowering
- Excellent weed suppression
- Large amounts of organic matter counteract the humus depletion, promote soil organisms and keep nutrients for the following crop
- Recommended for water protection, mulch seeding and agricultural blends

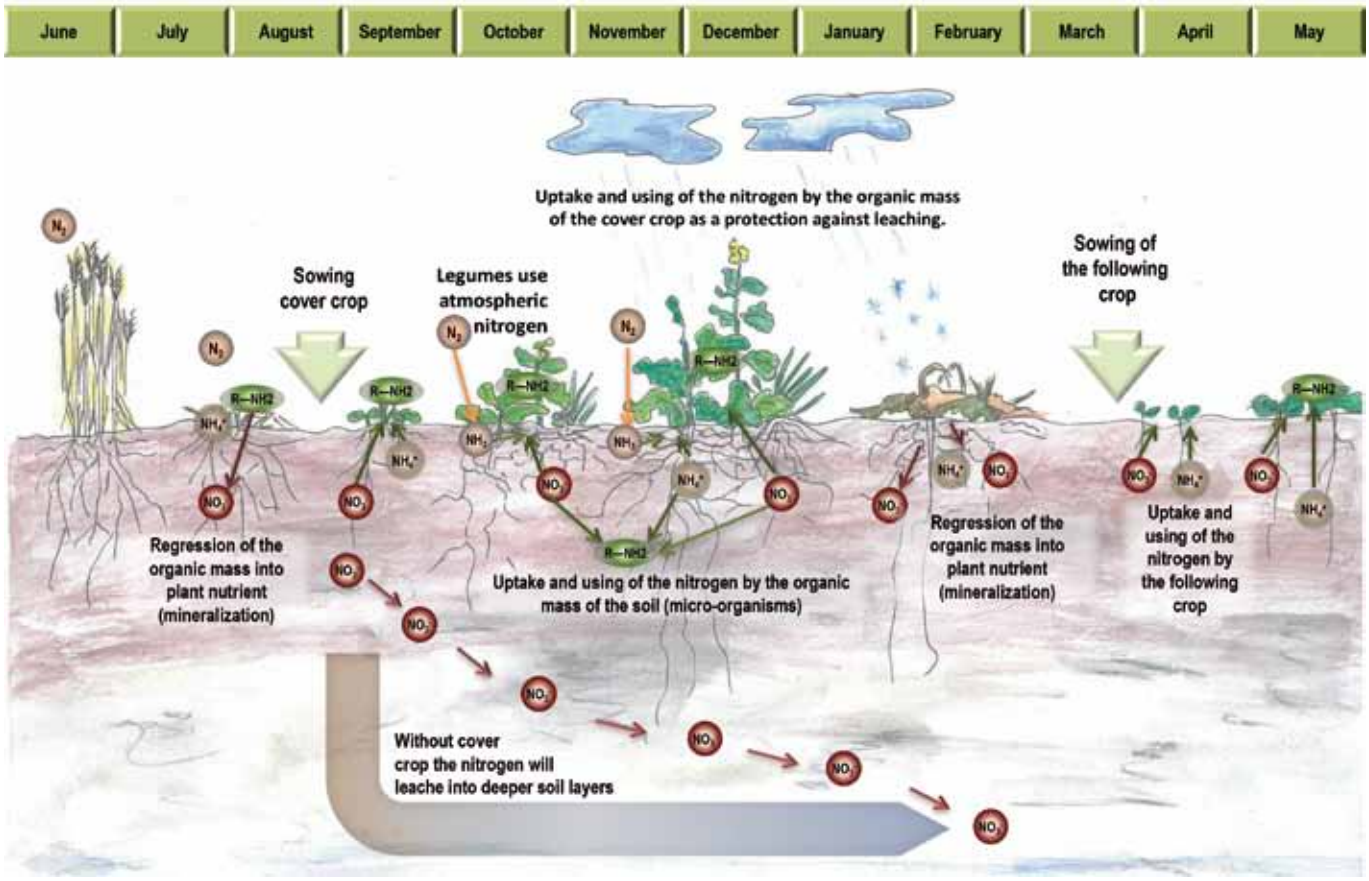
VARIETY RECOMMENDATION

ALBATROS

THE CLASSIC AMONG THE QUALITY VARIETIES

- Fast, strong initial development even at late sowing dates
- Valuable aerial green matter and intensive, deep-reaching roots form a stable and humus-rich soil structure
- Reliable freezing-off in winter - plant remains ensuring good erosion protection
- The nutrients preserved in the organic matter are protected against leaching in winter and are available again in summer
- **Field-tested for trouble-free mulch sowing – especially in maize crop rotations**

Water protection and fodder



Preventing early displacement

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 the plants, however under unfavourable conditions it can also be easily leached. Large amounts of nitrate from fertilisation or mineralisation of organic substances, weakly absorbent soils, and high levels of precipitation favour movement into the deeper soil strata and the ground water.

The leaching losses are much higher in uncultivated areas during the winter months than in summer, due to higher levels of precipitation. Once the nitrate has penetrated the deeper soil layers it can no longer be reached by many plants.

Besides transport via seeping water, nutrients can also enter the surface waters through erosion. Here, the level of precipitation and landform configuration as well as the infiltration capacity and structural stability of the soils play a crucial role.

The solution – cover crop cultivation

With good root penetration cover crops use the free nutrient for biomass formation to encourage the structural stability and water retention of the soil. The organic matter and shade prevent erosion, and promote the biological activity of the soil.

The different root forms in viterra® cover crop blends intensively cover the soil volume and ensure good nutrient uptake. Nitrogen and other water-soluble nutrients are thereby efficiently protected against leaching up until spring. Through 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 intensive root system and a certain degree 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 protein content. As green manure, the organic matter helps humus formation and promotes optimal soil quality. The high capacity of nutrients binding makes both the winter and summer forage rape an excellent water protection species. The network of fine roots covers large areas of soil, stabilises the soil structure and promotes air exchange in the soil.

Winter forage rape

EMERALD

- Tasty, with high fodder value
- Effective green manure

PRESTIGE 00

- Fast growing with many leaves
- Early and late sowing compatible

VARIETY RECOMMENDATION

FONTAN 00

FAST GROWING AND EFFICIENT FODDER SUPPLIER

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

Spring forage rape

JUMBO 00

- Favourable leaf/stalk ratio
- Relatively winter-hardy
- Good lodging resistance

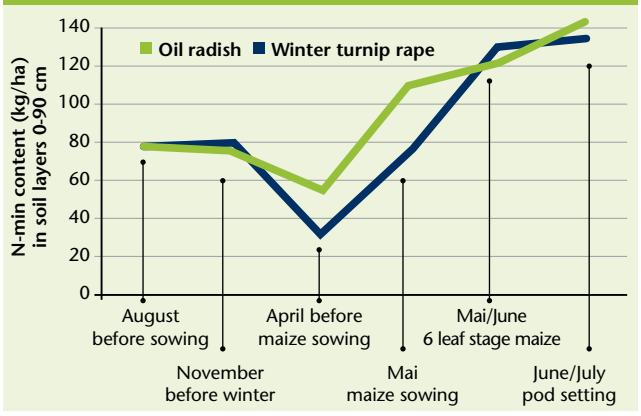
Winter turnip rape

Winter turnip rape is a winter-hardy green manure for erosion protection. The crop is nitrate binding with intensive rooting and high potential for nitrate return to the subsequent crop. It can also be cut, as well as grazed-off.

JUPITER

- Green fodder as well as fresh fodder
- Suitable for late sowing to mid September
- When sown early, first use after 6-8 weeks possible
- High nutrient uptake capacity
- Effective water protection measures

Nitrogen storage and release. Comparison of oil radish and winter turnip rape



Source: Richter, 1992 -96

Biomass and erosion protection

Forage rye

Short crop rotations with a high focus on maize in the last years have caused a drop of the humus content and with it reduced yield stability of our soils. Innovative farmers already realised some years ago that they could use forage rye as a supplement for biomass crop rotations. Forage rye is suitable for fodder and biogas use. It tillers well and quickly begins to form biomass in spring, so that it can be harvested in time before maize. The intensive rooting supports the stabilisation of the humus balace.

VARIETY RECOMMENDATION

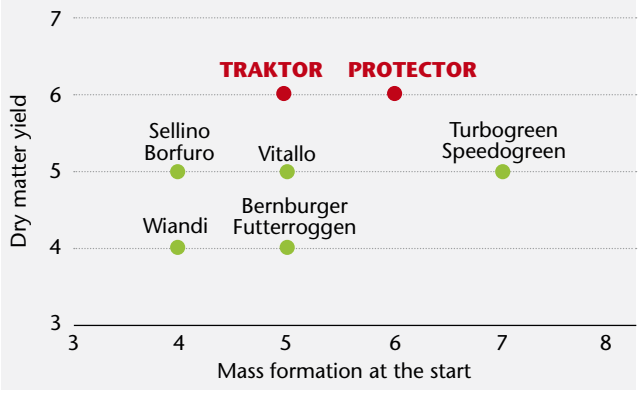
PROTECTOR

TOP FORAGE RYE

- Long term on top position in the German evaluation test
- Suitable for biomass and as fodder with beneficial time/performance factor
- Dual use: for livestock and biogas
- Distinctive winter growth, excellent erosion protection
- Very good late sowing capacity: to end October for greening after maize

PROTECTOR – Top forage rye

Yield performance of winter rye varieties in cover crop cultivation



Source: from data of the Descriptive Variety List 2017

Forage rye

TRAKTOR NEW

- Modern green cut rye for biomass and erosion protection
- Highest performance concerning dry matter yield
- Good weed suppression and protection from wind and water erosion

GENERATOR

- For early use as whole plant silage

Greening rye

MATADOR

- Late sowing compatible erosion protection
- Ideal as winter cover crop after and before maize
- Efficient measure in water protection

Wild rye / *secale multicaule*

JOHAN

- Excellently suited for use in cultivated deer pasture blends

Spring rye

OVID

- Robust population rye
- Use as main crop for grain production or as a second crop for whole plant silage

Annual ryegrass

As a fast growing cover crop after cereal harvest, luscious crops already form 6-8 weeks after harvest of the preceding crop. It can be used as fresh fodder or ensilaged and used for bio-gas plants. The dense roots provide additional organic matter for improving the humus content and stabilisation of the soil composition.

ALISCA tetraploid

- Medium late - high flexibility in the harvest date
- High yield and healthy

DIPLOMAT diploid

- Early and fast
- Upright growth for unproblematic cutting

Diversity of cover crops

Tillage radish

With their striking large radishes, these plants make themselves more space in the upper soil layers. This promotes air exchange in the soil and increases the rain infiltration capacity of the soil. Nutrients are stored during the winter in the radish, which makes them available for the following crop.

Taproot-forming oil radish is well suited as a component in cover crop blends.

MINER NEW

- Intermediate radish type: fast development and taproot-forming
- Digs into the soil and improves the soil structure
- Binds freely-available nitrogen in autumn and protects it from displacement
- Not winter-hardy - freezes-off completely during frost

STINGER NEW

- Sturdy, well-formed taproot body
- Initial development with many leaves and low growth
- The roots leave large holes in the ground, which promote soil warming in spring

Indian mustard - brown mustard

High levels of glucosinolates in the leaves and grains make this species (*Brassica juncea*) excellently suited to use in biofumigation technology to combat soil-bound diseases. Furthermore, Indian mustard has an antibacterial effect.

Due to its low maintenance and good agricultural properties, Indian mustard is utilised more and more as a classic cover crop as well as in seed blends.

TERRAFIT

- Fast juvenile growth, early onset of flowering
- Very high ingredient content (ITC)

ENERGY

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

TERRAPLUS

- Particularly late flowering

Oil linseed

The traditional plant for oil extraction is also exceptionally well-suited as a cover crop.

JULIET

- Uncomplicated and reliable cover crop

Oil linseed is an optimal neutral plant in cover crop blends.

ZOLTAN NEU

- Undemanding with fine, but deep-reaching taproot

Marrow stem kale

Marrow stem kale is used as cattle fodder, game cover and in winter-hardy cover crop blends.

GRÜNER ANGELITER

- Very high biomass yield with balanced leaf proportion
- High content of vitamin, nutrient and protein
- Reliable fodder until autumn

CAMARO

- Protein-rich fodder source for agriculture and cultivated deer pastures

ANGLIAN GOLD

- Marrow stem kale for especially winter-hardy blends

Common buckwheat

The common buckwheat (*Fagopyrum esculentum*) is a fast-growing and reliably freezing-off cover crop. Due to its early flowering and seed ripeness, buckwheat is often used in cultivated deer pasture blends. Because of the early seed ripeness and the difficult control, we do not recommend buckwheat for use in sugar beet crop rotations.

Sowing and use at a glance

Variety	sowing dates			fodder use	green manure	erosion protection	use in blends	sowing density pure seed kg/ha	page
	July	Aug	Sep						
White mustard nematode-resistant									
LUCIDA Level 2*, **VERDI** H 1 NEW									11
LOTUS Level 2* **PROFI** Level 2*,					✓	✓	✓	**20 - 25**	11
GAUDI Level 2*									11
VETO Level 2*, **ACCENT** Level 2*,									11
MASTER Level 2*, **SCOUT** Level 2*									11
Oil radish nematode-resistant									
COLONEL Level 1*, **AMIGO** Level 1* NEW									12
COMET Level 1*, **COSMOS** Level 1*									14
ADAGIO Level 2+*, **DACAPO** Level 2*					✓	✓	✓	**25 - 30**	14
AGRONOM Level 2* NEW									13
COMPASS Level 2+*									13
CONCORDE Level 2*									14
Oil radish multi-resistant									
ANGUS Level 1* NEW									17
CONTRA Level 1*									17
CONTROL Level 2+*					✓	✓	✓	**25 - 30**	17
DEFENDER Level 2+*									17
MERKUR Level 2+*									17
Oil radish									
BENTO, **SILETTA NOVA**									19
SILETINA					✓	✓	✓	**18 - 25**	22
AKIRO									22
White mustard									
ALBATROS					✓	✓	✓	**15 - 20**	23
COVER, **CLASSIC** NEW									23
Tillage radish									
MINER NEW, **STINGER** NEW					✓	✓	✓	**6 - 8**	28
Bristle oat									
PRATEX, **CODEX** NEW				✓	✓	✓	✓	**80**	20
Phacelia nematode-neutral									
ANGELIA, **AMERIGO**					✓	✓	✓	**10 - 12**	22
Spring forage rape									
JUMBO				✓	✓	✓		**10 - 20**	25
Winter forage rape									
EMERALD, **FONTAN OO**,									
PRESTIGE OO				✓	✓	✓	✓	**8 - 20**	25

Fertilisation according to local experience

* The resistance level relates to resistance to *Heterodera schachtii* and have been determined during official tests in Germany.

Variety	sowing dates			fodder use	green manure	erosion protection	use in blends	sowing density pure seed kg/ha	page
	July	Aug	Sep						
Marrow stem kale **GRÜNER ANGELITER** **ANGLIAN GOLD**, **CAMARO**				✓	✓	✓	✓	3 - 5	29 29
Forage Rye **PROTECTOR**, **GENERATOR**, **TRAKTOR** NEW				✓	✓	✓		40 - 130	26 27
Spring rye **OVID**					✓	✓	✓	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	18
Indian mustard **ENERGY**, **TERRAFIT**, **TERRAPLUS**					✓	✓	✓	10-12	28
Linseed **JULIET**, **ZOLTAN** NEW					✓		✓	30 - 35	29
Field bean **AVALON** NEW					✓	✓	✓	40 grains/m²	33
Persian clover **FELIX**				✓	✓		✓	15 - 20	32
Egyptian clover **OTTO**				✓	✓		✓	30 - 35	32
Crimson clover				✓	✓		✓	25 - 35	32
Buckwheat					✓	✓	✓	50 - 60	29
Common / winter vetch				✓	✓		✓	80 - 160	33
Medicago sativa / alfalfa **ILDIGO** NEW					✓		✓	80 – 160	33
Seradella				✓	✓		✓	30 - 50	32
Lucerne				✓	✓	✓	✓	25 - 30	32

Fertilisation according to local experience

Legumes as cover crops

Small-grain legumes

Due to its undemanding nature, the small-grained clover is often used as cover crop. In cover crop blends, the partners benefit from the nitrogen production of the clover. Clover flowers are attractive nectar donors for bees.

Persian clover FELIX

- Honeyplant and good growth of the root system

Egyptian clover OTTO

- High feed value and valued as preceding crop

Medicago sativa / alfalfa

The deep-rooting legume is also known as “queen of the forage plants”, as it is persistent and winter-hardy and delivers a very protein-rich fodder.

Seradella

With its low thousand kernel weight, seradella is particularly well suited as cover crop for light soils, for fodder or as nitrogen enriching component in blends.

Crimson clover

The winter-hardy crimson clover is well suited as partner in grass blends for biomass production. Through symbiosis, crimson clover delivers additional nitrogen, roots intensively and thus has an excellent preceding crop effect.

Large-grain legumes

There are many advantages of large-grain legumes. Besides the high nitrogen binding capacity, large-grain legumes have a high value as preceding crop, and increased humus content resulting from the high amount of root and harvest residues, they improve the soil tilth (taprooters).

Field bean for green manure

AVALON NEU

EXTREMELY SMALL-GRAINED – IDEAL AS A COVER CROP

- Very low thousand kernel weight (300 - 350 g) allows shallow sowing depth and sowing with other cover crops in a blend
- High N-fixation through symbiosis with rhizobia
- Strong taproot with high root mass for intensive root penetration and improvement of the soil structure
- Large round leaves for good weed suppression and improvement of the soil tilth
- Improves the lodging resistance when part of grain-legume mixes for whole plant silage
- Also suitable as an additional component in a blend with winter oilseed rape

Blue bitter lupin

As a large grain legume, the blue bitter lupin introduces additional nitrogen into the crop rotation when used as a cover crop, and with its pronounced taproot, it supports root penetration of deeper soil layers.

ILDIGO NEW

- Strong development

Common vetch and winter vetch

The strongly branched root system and the visually striking flowers, which are an important source for wild bees, turn the common vetch into a valued blend partner for cover crop blends that freeze-off.

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

Seed in extra-quality

Seed quality

Multiplication			
Only officially tested certified pre-basic/basic seed is sown	Selection of suitable regions and plots	Intensive professional support from the breeder	Field inspections by independent inspectors

Cleaning			
Most modern and high-performance cleaning plants	Efficient and gentle processing	Experienced and trained personnel	High performance packaging plant

Monitoring and certification			
In-house quality management at every processing step	Official certification system	Organic-certified according to EU regulation No. 834/2007	QCS tested and certified

QUALITY IS OUR P.H.PETERSEN TOP PRIORITY

Seed production takes place under constant quality control. Modern cleaning and processing plants, and high-performance packaging systems guarantee that only seeds in extra-quality above the legal standard are distributed.

Organic cover crops

Organic seed

The demand for ecologically produced foods has grown in recent years. The number of organic farms has grown as well as the demand for suitable varieties with specific characteristics in ecological quality.

SAATEN-UNION offers varieties as well as blends in the areas of cover crops and forage production.

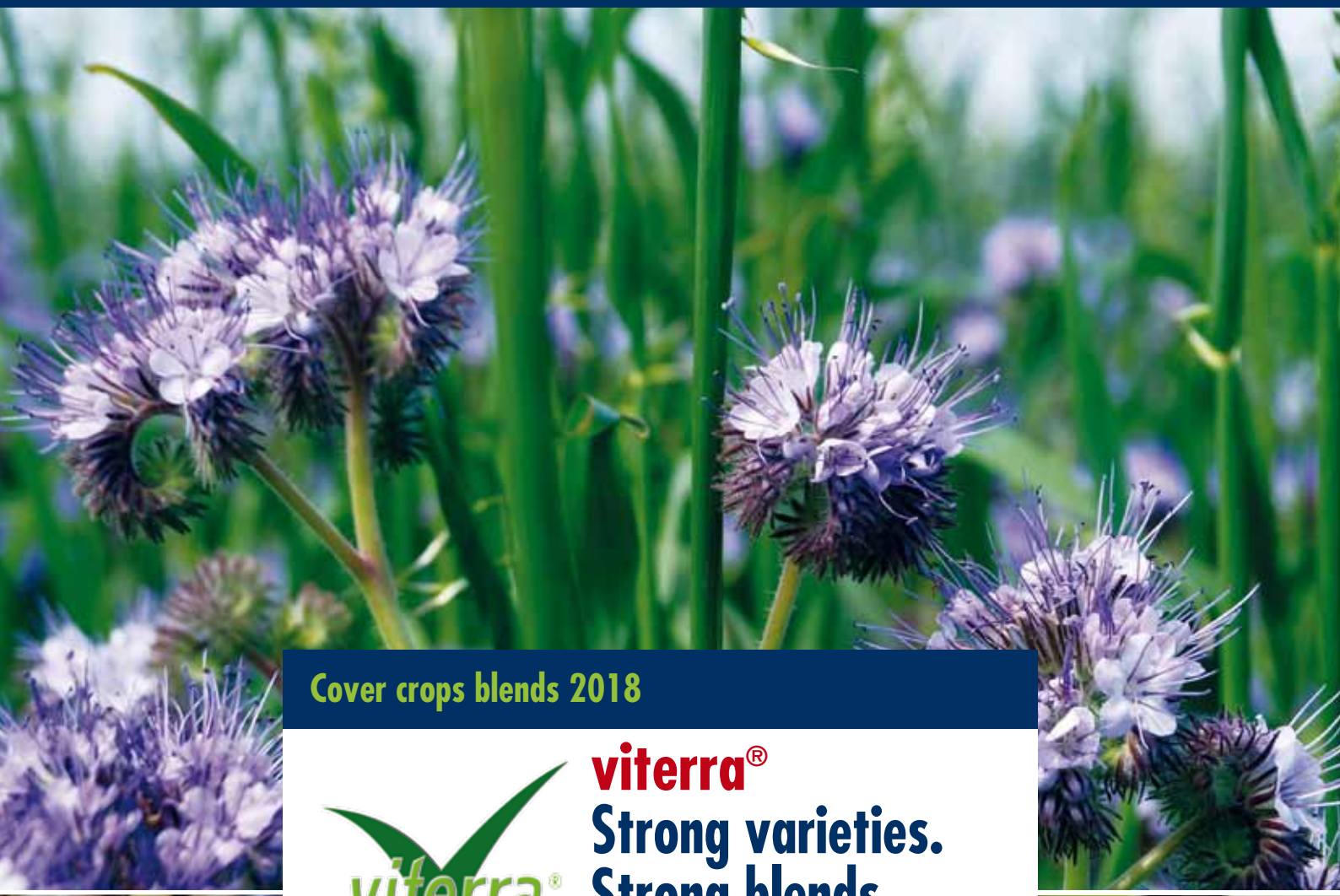
The purity and germination of the high quality seed exceed the legal standard and are the basis for successful arable farming.

In addition to the four viterra® organic blends (from p. 49), our ecological seed portfolio also contains single crop seeds of 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
- Buckwheat

The single crop seeds as well as the organic blends from the viterra® programme fulfil the requirements of the EC regulation 834/2007 and are tested by the responsible supervision department DE-Öko-003.

Our certificates are available for you to download from www.phpetersen.com or www.saaten-union.com. Do you require further varieties in organic quality? Please contact us.



Cover crops blends 2018

viterra®
Strong varieties.
Strong blends.
Strong soil.

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

SAATEN UNION
Züchtung ist Zukunft

Sowing and use

	Blend	Special feature	Suitable for crop rotations with: Maize	Cereals	Oilseed rape	Sugar beets	Potatoes	Legumes	Intensive cultures	Contains as abbreviation	Seed quantity	Sowing times	Page
Soil fertility blends¹	INTENSIV	Health mix	+	+	+	+	++	+	++	HS, OR	40-50 kg/ha	Jun–Jul	38
	MULCH	Frost-sensitive blend without clover	++	+	+	++	+	+	+	OR, HS	40-50 kg/ha	Jun–Jul	38
	RÜBE	Professional against nematodes	+	+		++		+		OR, SF	20-25 kg/ha	Jun–Jul	39
	TRIO	Frost-sensitive blend with clover	+	+	+	++				OR, AKL, PHA	20-25 kg/ha	Jun–Jul	39
	MAIS	Fast-growing blend without legumes	++	+	+			+		OR, HS, PHA, SOL	20 kg/ha	Jun–Jul	40
	SCHNELLGRÜN	Suitable for late sowing with clover	++	+						SF, SFB, AKL	15 kg/ha	Jul–Aug	40
	SCHNELLGRÜN LEGUMINOSENFREI	Suitable for late sowing without clover	++	+				++		SF, SFB, LN	15 kg/ha	Jul–Aug	40
	UNIVERSAL WINTER	Crucifer-free, wintergreen	++	+	++			+		HS, WV, PHA	25-45 kg/ha	Jun–Jul	41
	UNIVERSAL	Crucifer-free, fast-growing	+	+	++	+				HS, AKL, PHA	25 kg/ha	May–Jul	41
	BODENGARE	Legume-rich, crucifer-free	++	+	++	+				LUB, WIS, EF, AKL, PKL, PHA, SOL	50 kg/ha	May–Jul	41
	RAPS	Frost-sensitive blend without crucifers	+	++	++	+				PHA, LN, PKL, AKL	15 kg/ha	May–Jul	42
	WASSERSCHUTZ NEW	With crucifers, without legumes, without grasses, winter-hardy	++	++				+	+	WFR, FK, MSK, WR	10-12 kg/ha	Jun–Jul	42
Biomass blends	GRANOPUR	Spring cereal blend for whole crop silage use before winter	++	++	+	+	+	+		TIS, RS, HS, HA	135 - 150 kg/ha	Apr–Jun	43
	GRANOLEG	Spring cereals-legumes-blend for whole crop silage use before winter	++	++	+	+				TIS, RS, HA, WIS, HS	135 - 150 kg/ha	Apr–Jun	43
	WICKROGGEN	Winter-hardy whole crop silage blend	++	+	+	+				RW (P), WIW	100 kg/ha	Aug–Sep	44
	WICKROGGEN TURBO	With hybrid rye which raises the whole crop silage yield further	++	+	+	+				RW (H), RW (P), WIW	100 kg/ha	Aug–Sep	44
	LUNDSGAARDER GEMENGE	Winter-hardy, greening compatible with possible forage use	++	++	++	+				WV, IKL, WIW, EF	50 kg/ha	May–Jul	44
	FUTTER	Grass-clover blend for harvest after winter	++	++	+	+	+		+	WV, IKL	40 kg/ha	Jun–Aug	45
	SOMMERFUTTER	Grass-clover blend for harvest in the growing year	++	++	++	+		+		WV, WEI	45 kg/ha	May–Jun	45
	SOMMERFUTTER A2	Forage mix for harvest in the growing year	++	++	++	+				WV, WEI, PKL	30 kg/ha	May–Jun	45
Special blends	UNTERSAAT	For sustainable maize cultivation	++							WW, WD	10 - 15 kg/ha	Apr–May	46
	MULTIKULTI	Flowering blend	+	+		+				LUB, WIS, SOL, PHA, PKL, AKL, LN, OR, SF, SD	25 kg/ha	Jun–Aug	46
	MULTIKULTI KRUZIFERENFREI	Flowering blend without crucifers	+	+	+ +	+				LUB, WIS, SOL, PHA, PKL, AKL, LN, SD, RBL, BOR	25 kg/ha	Jun–Aug	46
	BIOFUMIGATION	For biofumigation					+	++	++	OR, SFB	15 kg/ha	Jun–Aug	47
	HORRIDO	Biennial cultivated deer pasture blend	+	+						BW, HA, AKL, PKL, SOL, LN, WV, PHA, u.w.	30 kg/ha	Jun–Aug	47
	RANDSTREIFEN	The arable border strip blend	for greening							ROT, WKL	15 kg/ha	Jun–Aug	48
	BLÜHZAUBER	The flowering meadow	not recommended for arable farming							over 40 flowering species	5-7 g/m2	Jun–Aug	48
	BIENE NEW	Annual bee fallow / honey fallow	+	+	+	+				EFIKL, RBL, BOR, PHA, LUB, SOL, AKL, WIS, SD, WKL, LUZ	25 kg/ha	Jun–Aug	48

\+ suitable for appropriate crop rotations
++ especially suitable and recommended for appropriate crop rotations, G greening-compatible (as of January 2018)

AKL Egyptian clover, BW buckwheat, EF forage pea, HA oat, HS black oat/bristle oat, IKL crimson clover, LN linseed, LUB blue lupine, LUZ alfalfa, OR oil radish, PHA Phacelia, PKL Persian clover, RKL red clover, ROT red fescue, RUW winter turnip rape, RS spring rye, RW (H) hybrid winter rye, RW (P) population winter rye, RUW winter feeding beet, SD seradella, SF white mustard, SFB Indian mustard, SOL sunflower, TIS spring triticale, WD perennial rye grass, WIS common vetch, WIW winter vetch, WV Italian rye-grass, WEI annual ryegrass

As of April 2018

Soil fertility blends

The **viterra® soil fertility blends** contribute to the formation of humus and improve soil fertility. They promote root penetration and offer erosion protection. Nitrogen and other nutrients are bound during winter and remain available in the upper strata close to the roots. They increase quality and yields in the main crop.

viterra® INTENSIV

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
INTENSIV	+	+	+	+	++	+	++
Seed proportions	56 % bristle oat PRATEX, 44 % multi-resistant oil radish DEFENDER						
Sowing	mid July to start September						
Sowing density	40 - 50 kg/ha						

… the health blend

- Control of migratory root nematodes (Pratylenchus) and reduction of viral corky ring spot in potatoes with multi-resistant oil radish DEFENDER and bristle oat PRATEX
- Fast-growing with intensive weed suppression
- The large amount of organic matter boosts the beneficial soil organisms
- The fibrous roots of PRATEX and taproot of DEFENDER complement each other during root penetration of the entire soil crumb
- In trials, water protection advisers were convinced by viterra® INTENSIV, with its very low Nmin content in late autumn

viterra® MULCH

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
MULCH	++	+	+	++	+	+	+
Seed proportions	55 % bristle oat PRATEX, 45 % nematode-resistant oil radish COMPASS						
Sowing	mid July to start September						
Sowing density	40 - 50 kg/ha						

… frost-sensitive blends without clover

- Blend with the easily freezing-off oil radish COMPASS and frost-sensitive bristle oat PRATEX
- Particularly recommended for direct and mulch-sowing procedures, especially for maize and sugar beets
- The created root channels allow rapid deep-root formation in maize
- Activates the beneficial soil organisms, loosens and aerates the soil for optimal maize crops
- viterra® MULCH binds nitrogen during the winter and protects it from displacement
- Bristle oat promotes mycorrhizal fungi, which stabilise the soil crumb and which benefits the following maize

The weight proportion of the individual components can vary slightly due to the different TSWs.

Soil fertility blends

viterra® RÜBE

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
RÜBE	+	+		++		+	
Seed proportions	26 % nematode-resistant oil radish COLONEL, 30 % nematode-resistant oil radish COMPASS, 24 % nematode-resistant white mustard ACCENT, 20 % nematode-resistant white mustard LUCIDA						
Sowing	mid-July to start September						
Sowing density	20 - 25 kg/ha						

… professional nematode control

- Blend of two nematode-resistant oil radish (COLONEL and COMPASS) and white mustard varieties (ACCENT and LUCIDA)
- Sufficient plant density of over 160 plants/m² enables active nematode control at the highest level
- Higher cultivation reliability and improved control success through the complementary variety types and intensive root penetration
- viterra® RÜBE is suitable for mid-early to late sowing times and all site conditions
- Oil radish roots into the deep soil layer and reduces the nematode infestation even there

viterra® TRIO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
TRIO	+	+	+	++			
Seed proportions	16 % nematode-resistant oil radish COMPASS 29 % Egyptian clover, 55 % phacelia ANGELIA						
Sowing	start /mid July to end August						
Sowing density	20 -25 kg/ha						

… frost-sensitive blend with clover

- viterra® TRIO of the easily freezing-off oil radish COMPASS, Egyptian clover and Phacelia ANGELIA
- Beet cyst nematodes do not multiply due to the resistant oil radish COMPASS and the non-host plants
- Rapid initial development and intensive root penetration of the soil
- Bees and insects use the late Phacelia flowers
- Fine-stemmed mulch layer offers good erosion protection until spring sowing

The weight proportion of the individual components can vary slightly due to the different TSWs.

Soil fertility blends

viterra® MAIS

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
MAIS	++	+	+			+	
Seed proportions	30 % oil radish SILETINA,19 % bristle oat PRATEX 50 % Phacelia ANGELIA, 1 % sunflower						
Sowing	mid July to end August						
Sowing density	20 kg/ha						

… fast-growing blend without legumes

- Rapid soil coverage with this blend of oil radish SILETINA, bristle oat PRATEX, Phacelia ANGELIA and sunflower
- Combination of deep and flat rooters for intensive root penetration and stabilisation of the soil structure
- Viterra® MAIS creates root channels facilitating deep-root penetration of maize
- Bristle oat promotes mycorrhizal fungi, which stabilise the soil crumb and benefits the following maize plants
- Nutrients are bound and are available to the following maize during the main growing phase

viterra® SCHNELLGRÜN and viterra® SCHNELLGRÜN LEGUMINOSENFREI

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
SCHNELLGRÜN	++	+				++*	
Seed proportions	**SCHNELLGRÜN**: 56 % white mustard ALBATROS, 26 % Egyptian clover, 18 % Indian mustard ENERGY **SCHNELLGRÜN LEGUMINOSENFREI**: 56 % white mustard ALBATROS, 26 % linseed, 18 % Indian mustard ENERGY						
Sowing	start August to mid/end September						
Sowing density	15 kg/ha						

… suitable for late sowing

- Rapid greening through particularly strong-growing components
- White mustard ALBATROS and the phytosanitary effect of the Indian mustard ENERGY enable for late sowing dates (to mid/end September)
- Not winter-hardy species facilitate mulch sowing of the following crop in spring
- Ideal before maize and also suitable as a cover crop after an early maize harvest
- Undemanding regarding seed bed suitability for broadcast sowing allows simple and cost-effective sowing.

* only applies to SCHNELLGRÜN LEGUMINOSENFREI

The weight proportion of the individual components can vary slightly due to the different TSWs.

Soil fertility blends

viterra® UNIVERSAL WINTER

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
UNIVERSAL WINTER	++	+	++			+	
Seed proportions	10 % bristle oat PRATEX, 46 % Italian rye-grass, 44 % Phacelia ANGELIA						
Sowing	start July to mid September						
Sowing density	25 - 45 kg/ha						

… crucifer-free and winter green

- As a winter green cover crop with the possibility of being used as farm-produced fertiliser in spring
- Free of crucifers and can therefore be used without problem in oilseed rape crop rotations
- Different components enable a broad spectrum of use
- Wintergreen ryegrass increases the erosion protection and stabilises the soil structure up to the following crop
- Binds the remaining nitrogen in the soil and protects the groundwater

viterra® UNIVERSAL

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
UNIVERSAL	+	+	++	+			
Seed proportions	25 % bristle oat PRATEX, 29 % Egyptian clover, 46 % Phacelia ANGELIA						
Sowing	start July to start September						
Sowing density	25 kg/ha						

… crucifer-free and fast-growing

- Free of crucifers and can therefore be used without problem in oilseed rape crop rotations
- Universally usable due to drought stress tolerant components
- Fast shading maintains the soil quality and ensures good weed suppression
- Binds the remaining nitrogen in the soil and other nutrients in the area/layer close to the roots
- viterra® UNIVERSAL increases the biodiversity and breaks the disease cycles
- Phacelia and clover flowers attract large numbers of insects

viterra® BODENGARE

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
BODENGARE	++	+	++	+			
Seed proportions	2 % blue bitter lupine, 14 % common vetch, 16 % Egyptian clover, 5 % spring forage pea, 25 % Phacelia, 37 % Persian clover, 1 % sunflower						
Sowing	mid June to mid August						
Sowing density	50 kg/ha						

… legume-rich for greater soil fertility

- Promotes soil quality, soil stabilisation and crumb formation for improved soil fertility
- Persistent tilth promotes air and water flow and prevents silting
- Enrichment of the plant community and habitat for many insects and beneficial organisms
- The high proportion of legumes gathers additional nitrogen
- Following an early preceding crop as a summer cover crop for soil regeneration, free of grasses
- Crucifer-free, therefore particularly suitable for oilseed rape crop rotations

Soil fertility blends

viterra® RAPS

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
RAPS	+	++	++	+			
Seed proportions	47 % Phacelia ANGELIA, 24 % oil linseed JULIET, 19 % Persian clover, 10 % Egyptian clover						
Sowing	start July to end August						
Sowing density	15 kg/ha						

… frost-sensitive blend without crucifers

- Crucifer-free blend including Phacelia ANGELIA, linseed JULIET, Persian and Egyptian clover
- Undemanding blend, no relation to the main crop (crop change): Ideal for crop rotations with cereals and oilseed rape
- Intensive root penetration improves the structure and promotes air exchange in the soil
- Phacelia and flax flowers are a source of food for bees and other insects
- Reliable freezing-off components allow troublefree sowing of the following crop

viterra® WASSERSCHUTZ NEW

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
RAPS	++	++				+	+
Seed proportions	42 % winter forage rape, 18 % marrow stem kale, 40 % winter turnip-rape						
Sowing	mid July to end September						
Sowing density	10 - 12 kg/ha						

… for effective groundwater protection

- High ability to take up nitrogen and good nutrient storage potential by the included, winter-hardy species
- Winter forage rape EMERALD and winter turnip rape JUPITER root quickly into the deep soil strata and take up free available nutrients there
- Nutrient release takes place during the main growing phase of maize from June onwards
- Long sowing period from mid July to end September
- The marrow stem kale ANGLIAN GOLD has good winter-hardiness and as a particularly tasty variety makes the blend an attractive source of nutrition for game animals

Biomass blends

The **viterra® biomass blends** are suitable for biomass production for biogas plants or in cattle feed. Spring cereal blends are cultivated as a second crop after early harvested cereal species. Winter-hardy blends can deliver biomass as a cover crop or main crop. New in the programme are grass blends for cover crop cultivation.

viterra® GRANOPUR

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
GRANOPUR	++	++	+	+	+	+	+
Percentage weights	40 % spring triticale, 20 % spring rye 20 % bristle oat PRATEX, 20 % oat						
Sowing	end March to end May or start July to start August						
Sowing density	135 - 150 kg/ha						
Harvesting date	June / July for spring sowing October / November if sown in summer						
Harvest	from existing crop to kernel dough stage						

... whole crop silage usage before winter

- For biomass production after whole crop silage or an early cereal harvest with cutting before winter
- Increased cultivation reliability through a balanced composition of different cereal components
- Maintenance of the soil quality during summer
- viterra® GRANOPUR, as a pure cereal blend, is also very good for potato crop rotations

viterra® GRANOLEG

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
GRANOLEG	++	++	+	+			
Percentage weights	35 % spring triticale, 20 % spring rye, 20 % oat, 15 % common vetch, 10 % bristle oat PRATEX						
Sowing	end March to end May or early July to early August						
Sowing density	135 - 150 kg/ha						
Harvesting date	June / July for spring sowing October / November if sown in summer						
Harvest	from existing crop to kernel dough stage						

... whole crop silage usage before winter

- For biomass production after whole crop silage or an early cereal harvest with cutting before winter
- Thanks to the common vetch, viterra® GRANOLEG delivers additional nitrogen to stressed sites and keeps the crop green for longer (optimised harvesting window)
- Increased cultivation reliability through a balanced composition of different cereal components
- Good shading promotes the soil quality and maintains the soil organisms

The weight proportion of the individual components can vary slightly due to the different TSWs.

Biomass blends

viterra® WICKROGGEN and viterra® WICKROGGEN TURBO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
WICKROGGEN / WICKROGGEN TURBO	++	+	+	+			
Percentage weights	**WICKROGGEN**: 90 % winter rye MATADOR, 10 % winter vetch **WICKROGGEN TURBO**: 72 % hybrid rye PHÖNIX, 18 % winter rye INSPECTOR, 10 % winter vetch						
Sowing	mid September to mid October						
Sowing density	100 kg/ha						
Harvesting date	depending on wax-ripe stage, mid to end June						
Harvest	from standing crop, side knives are recommended						

… winter-hardy whole crop silage blend

- Winter-hardy biomass-legume blend
- For high-yielding whole crop silage usage with a high content of protein and energy
- 25 - 40 t/ha whole crop silage fresh dry matter yields are possible, depending on the site
- The winter-hardy vetch delivers additional nitrogen
- Excellent erosion protection
- Prevents nitrogen displacement during winter

viterra® **WICKROGGEN TURBO** additionally contains the stress-tolerant whole crop silage hybrid rye PHÖNIX.

viterra® LUNDSGAARDER GEMENGE

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
LUNDSGAARDER GEMENGE	++	++	++	+			
Seed proportions	52 % Italian rye-grass, 43 % crimson clover, 4 % winter vetch, 1 % winter forage pea						
Sowing	end August to mid September or in spring as undersown crop in maize						
Sowing density	50 kg/ha						
Harvesting date	April to early May						
Harvest	silage trailer for forage or silage use or by forage harvester after prewilting phase						

… winter-hardy, greening-compatible with possible fodder use

- Suitable as winter cover crop for green manure and soil improvement or for fodder production
- The balanced combination of nitrogen collectors and nitrogen consumers has a positive effect on plant growth and the soil organisms
- Italian rye-grass uses the growing phases in winter
- Winter vetch and winter forage pea are valuable protein components for forage use
- Increases the agro-ecological value with an intense range of flowers

The weight proportion of the individual components can vary slightly due to the different TSWs.

Biomass blends

viterra® FUTTER

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
FUTTER	++	++	+	+	+		+
Seed proportions	58 % Italian rye-grass, 42 % crimson clover						
Sowing	mid/end September as a winter cover crop, end July to early August as a summer cover crop						
Sowing density	40 kg/ha						
Harvesting date	April to early May, cutting before winter possible when sown early						
Harvest	silage trailer for forage or silage use or by forage harvester after prewilting phase						

… grass-clover blend for harvesting after winter

- Stable yields of fodder and biogas
- Suitable for dual-culture and use systems in combination with maize or sorghum
- Nutrient uptake before winter dormancy and prevents leaching in early spring
- Organic substance from the roots and stubble improves the humus
- Not recommended for arid sites and soils with low water retention capacity

viterra® SOMMERFUTTER und viterra® SOMMERFUTTER A2

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
SOMMERFUTTER / SOMMERFUTTER A2	++	++	++	+		+	
Seed proportions / Percentage weights	**viterra® SOMMERFUTTER:** 23 % Italian rye-grass (tetr.), 31 % annual ryegrass (dipl./tetr.), 46 % % Persian clover **viterra® SOMMERFUTTER A2:** 67 % Italian rye-grass (tetr.), 33 % annual ryegrass (dipl./tetr.)						
Sowing	end June to end July (for greening to end August)						
Sowing density	**viterra® SOMMERFUTTER:** 30 kg/ha **viterra® SOMMERFUTTER A2**: 45 kg/ha						
Harvesting date	October						
Harvest	silage trailer for forage or silage use or by forage harvester after prewilting phase						

… forage blend for harvesting in the growing year

- Supplier of additional quality fodder when used as a summer cover crop
- The annual ryegrass provides sufficient structure and the Persian clover a high-protein content
- The vigorous Italian rye-grass provides winter greening after harvest
- High preceding crop value because of good root penetration and tilth

The blend is also available without Persian clover as viterra® **SOMMERFUTTER A2**.

The weight proportion of the individual components can vary slightly due to the different TSWs.

Special blends

The **viterra® special blends** are used for special applications like, for example greening of arable border strips, cultivated deer pasture and for undersown crop in maize or biofumigation.

viterra® UNTERSAAT

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
UNTERSAAT	++						
Seed proportions	32 % Italian rye-grass (tetraploid), 68 % perennial rye grass (diploid, late, forage type)						
Sowing	6 - 8 weeks after sowing maize until 6 - 8 leaf stage of the maize						
Sowing density	10 - 15 kg/ha						

… for sustainable maize cultivation

- Grass blend of Italian (tetraploid) and perennial ryegrass (diploid) for underseed in maize crops
- The grass crop continues to develop and binds freely available nitrogen after maize harvest
- The humus balance is also stabilised even in short maize crop rotations
- Effective protection against wind and weather erosion during winter
- Fast-growing Italian rye-grass combined with late perennial rye grass ensures high crop reliability
- Increases carrying capacity of the ground

viterra® MULTIKULTI and viterra® MULTIKULTI KRUZIFERENFREI

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
MULTIKULTI	+	+	++*	+			
Seed proportions	**MULTIKULTI**: 1 % blue bitter lupine, 2 % common vetch, 1 % sunflower, 32 % Phacelia ANGELIA, 25 % Persian clover, 18 % Egyptian clover, 10 % linseed, 2 % oil radish ADAGIO, 5 % white mustard FORUM, 4 % seradella **MULTIKULTI KRUZIFERENFREI**: without white mustard and oil radish, with marigold and borage						
Sowing	start April to end August						
Sowing density	25 kg/ha						

… annual bee and decorative meadow

- Flowering blend for high biodiversity and a wide range of benefits
- The roots penetrate the different soil horizons and have a stabilising effect on the soil structure
- Grass-free for easy emergence control in the following crop
- Effective protection against erosion and desiccation
- As a cover crop after a whole crop silage or cereal harvest or as border strip greening in maize and other cultures

The modification viterra® **MULTIKULTI KRUZIFERENFREI** is especially suitable for following crop rotations that include oilseed rape cultivation.

* only applies to MULTIKULTI KRUZIFERENFREI

The weight proportion of the individual components can vary slightly due to the different TSWs.

Special blends

viterra® BIOFUMIGATION

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
BIOFUMIGATION					+	++	++
Percentage weights	50 % multi-resistant oil radish DEFENDER, 50 % Indian mustard ENERGY						
Sowing	start May to mid September						
Sowing density	15 kg/ha						

… against soil-borne pests

- For controlling soil-borne diseases such as Fusarium and Rhizoctonia through the use of biologically active plant substances (principle of biofumigation)
- Fast-growing blend for crop rotations, where there is only a short time available for a cover crop
- Formation of leafy biomass
- At the time of full flower (7 – 8 weeks after sowing), chop the plants as finely as possible and incorporated into the soil
- Phytosanitary effect

viterra® HORRIDO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
HORRIDO	+	+					
Seed proportions	5 % buckwheat, 3 % bristle oat, 19 % seradella, 11 % Egyptian clover, 23 % Persian clover, 1 % sunflower, 3 % linseed, 6 % Phacelia, 1 % oil radish, 2 % winter vetch, 18 % Italian rye-grass, 3 % marrow stem kale, 2 % winter forage rape, 3 % turnip rape						
Sowing	March to June						
Sowing density	30 kg/ha						

… biennial deer pasture blend

- One of the few greening-compatible cultivated deer pasture blends
- Suitable for all native small game species
- The flowers attract numerous insects
- Tasty grain grazing for wildfowl
- Winter-hardy components offer grazing and cover for hares, deer and other small game species during winter

Cultivation tip: Sow parts of the area with double grain distance compared to cereals in order to create at double row distance partridges.

Special blends

viterra® RANDSTREIFEN

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
RANDSTREIFEN	**For greening**						
Percentage weights	67 % red fescue, 33 % white clover						
Sowing	mid March to end July, for border strips in greening to April 1stl						
Sowing density	15 kg/ha						

… the arable border strip blend

- Perennial blend with high proportion of grass
- Well suited greening as forest margins, and field border strips for use as ecological priority areas
- Undemanding
- Weeds and weed grasses are suppressed well
- Renewed cultivation is possible
- No problems with increased resistance due to the use of high quality red vescue

viterra® BLÜHZAUBER

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
BLÜHZAUBER	Not recommended for arable farming						
Species	Marigolds, Mexican aster, California poppy, common poppy, common toadlinseed, baby blue eyes, max chrysanthemum, sunflowers ... and many others						
Sowing	April until mid June						
Sowing density	5 - 7 g/m²						

… the flowering meadow

- Visually pleasing with a variety of flower colours and shapes of more than 40 flowering species
- Pollen and nectar source for bees, bumble bees, butterflies and many other insects
- Continuous flowering period from end May into autumn
- Promotes an improved image of the agricultural landscape

Cultivation tip: By mixing in sawdust or sand, the volume can be increased and sowing of the seeds improved.

viterra® BIENE NEW

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	fallow	Legumes	Intensive cultures
BIENE	+	+	+	+	++		
Seed proportions	spring forage pea 1.9 %, crimson clover 8.9 %, marigold 0.4 %, borage 0.2 %, Phacelia 49.7 %, seradella 2.1 %, blue bitter lupin 0.7 %, sunflower 0.5%, Egyptian clover 4.9 %, common vetch 1.1 %, white clover 28.3 %, alfalfa 1.3 %						
Sowing	early March – end May						
Sowing density	25 kg/ha						

… annual bee fallow/honey fallow

- Flowering blend with long flowering phase for high biodiversity and a positive image of agriculture
- Good for oilseed rape crop rotations - crucifer-free
- The roots penetrate the different soil horizons and have a stabilising effect on the soil structure
- Grass-free for easy emergence control in the following crop
- Free of buckwheat

Organic blends

The **viterra® organic blends** are a valuable basis for good crop rotations in organic farming. The main focus is on the optimisation of nutrient flows within the crop rotation. The demand for fast-growing components for good weed suppression is fulfilled by this reliable crop blend.

Both the pure seed and the organic blends from the viterra® range fulfil the requirements of EU Regulation 834/2007, and are checked by the competent authority DE-Öko-003. The certificate is available for download at www.phpetersen.com or www.saaten-union.com.

viterra	Special feature	Suitable for crop rotations with							Seed quantity	Sowing times				
		Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures		Jun	Jul	Aug	Sep	Oct
INTENSIV ÖKO	Health blend	+	+	+	+	++	+	++	40 - 50 kg/ha					
BODENGARE ÖKO	Nitrogen supplier	++	+	++	+				70 kg/ha					
DEPOT ÖKO	Nutrient reservoir	++	++				++		25 kg/ha					
LUNDSGAARDER GEMENGE ÖKO	Winter-hardy blend for fodder use	++	++	++	+				50 kg/ha					
WICKROGGEN ÖKO	Fodder/whole crop silage use	++	+	+	+				100 kg/ha					
WICKROGGEN FUTTER ÖKO	With subsequent fodder use	++	+	+	+				100 - 120 kg/ha					

viterra® INTENSIV ÖKO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
INTENSIV ÖKO	+	+	+	+	++	+	++
Percentage weights	70 % bristle oat PRATEX, 30 % multi-resistant oil radish DEFENDER						
Sowing	mid July to end August						
Sowing density	40 – 50 kg/ha						

... the health blend

- Control of migratory root nematodes (*Pratylenchus*) and reduction of viral corky ring spot in potatoes with multi-resistant oil radish DEFENDER and bristle oat PRATEX
- Fast-growing with intensive weed suppression
- The large amount of organic matter boosts the beneficial soil organisms
- The fibrous roots of PRATEX and taproot of DEFENDER complement each other during root penetration of the entire soil crumb
- By including the nematode-resistant oil radish DEFENDER, it is also good as a preceding crop for sugar beet

Organic blends

viterra® BODENGARE ÖKO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
BODENGARE ÖKO	++	+	++	+			
Percentage weights	22 % blue bitter lupine, 40 % common vetch, 28 % forage pea, 7 % Egyptian clover, 2 % Phacelia, 1 % sunflower						
Sowing	mid June to mid August						
Sowing density	70 kg/ha						

… the nitrogen supplier

- Supplies essential nitrogen for plant growth by synbiotic nitrogen fixation
- Increased availability of major and trace elements
- Stimulates the activity of the soil organisms with accompanying soil stabilisation for improved soil fertility
- Complementary and varied rooting types promote soil quality and structure
- Following an early preceding crop as a summer cover crop for soil regeneration
- Crucifer-free – therefore particularly suitable for oilseed rape crop rotations

viterra® DEPOT ÖKO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legu-mes	Intensive cultures
DEPOT ÖKO	++	++				++	
Percentage weights	30 % oil radish SILETINA, 46 % bristle oat PRATEX, 10 % white mustard, 10 % Phacelia ANGELIA, 4 % sunflower						
Sowing	end July to end August						
Aussaatstärke	25 kg/ha						

… the nutrient depot

- Vigorous species bind nutrients keep them during winter and make them available to the following crop
- Efficient suppression of weeds through rapid initial development
- Excellent root penetration of the soil by deep and flat rooters stabilises the soil structure and improves the infiltration capacity
- Especially suitable for crop rotations with legumes as the main crop

Organic blends

viterra® LUNDSGAARDER GEMENGE ÖKO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
LUNDSGAARDER GEMENGE ÖKO	++	++	++	+			
Percentage weights	31 % Italian rye-grass, 29 % crimson clover, 20 % winter vetch, 20 % winter forage pea						
Sowing	end August to mid September or as underseed for maize in spring						
Sowing density	50 kg/ha						
Harvesting date	April to early May						
Harvest	silage trailer for forage or silage use or by forage harvester after prewilting phase						

… winter-hardy grass-legume blend for fodder use

- Suitable as winter cover crop for green manure and soil improvement or fodder production
- The balanced combination of nitrogen-fixers and nitrogen-consumers has a positive effect on plant growth and soil organisms
- Italian rye-grass uses growing phases during over winter
- Winter vetch and winter forage pea are valuable protein components in fodder
- Increases the agro-ecological value through the large range of flowers

viterra® WICKROGGEN ÖKO and viterra® WICKROGGEN FUTTER ÖKO

Recommendation	Suitable for crop rotations with						
	Maize	Cereals	Oilseed rape	Sugar beet	Potatoes	Legumes	Intensive cultures
WICKROGGEN ÖKO / WICKROGGEN FUTTER ÖKO	++	+	+	+			
Percentage weights	**WICKROGGEN ÖKO**: 90 % winter rye, 10 % winter vetch **WICKROGGEN FUTTER ÖKO**: 71 % winter rye, 7% winter vetch, 13 % Italian rye-grass, 9 % crimson clover						
Sowing	mid September to mid October						
Aussaatstärke	100 - 120 kg/ha						

… winter-hardy blend for fodder production or green manure

- Winter-hardy mix of strong-yielding, resistant to lodging and healthy-leafed population rye INSPECTOR and winter vetch
- The winter vetch fixes atmospheric nitrogen and in doing so contributes to the nitrogen supply within the crop rotation
- Additional fodder source with a high-energy content and high levels of protein
- Winter-hardy vetch supplies nectar and pollen, and increases the biodiversity
- viterra® WICKROGGEN ÖKO helps to keep the area free of weeds and improves soil structure
- As viterra® WICKROGGEN FUTTER ÖKO the blend additionally contains crimson clover and Italian ryegrass, which can deliver additional yields over summer after a whole crop silage harvest and can ensure greening up to the following crop

The weight proportion of the individual components can vary slightly due to the different TSWs.

Cultivation recommendation

Preceding crop

The previous main crop already influences the development of the cover crop. Most important is how well the preceding crop has developed and how much nutrient content it has removed from the soil.

Tillage

Professional, clean tillage is a prerequisite for a reliable and successful performance, even in years with unfavourable weather conditions.

Sowing

Drill seeding after careful soil preparation promotes good and uniform crops with fast root penetration and maximum utilisation. The selection of the sowing process depends on the site, the sowing time and the crop rotation. The sowing depth should be 1 - 4 cm depending on the seed. Especially when sowing blends or small seeds we recommend using the same sowing method as for a main crop.

Fertilisation

Cover crops generally cope well with a low nutrient supply. Mineral or organic fertilisation can be very helpful in promoting soil fertility (observe the fertiliser ordinance). CAUTION! If the cover crop is to be calculated as EFA then only organic fertilisation (with the exception of slurry) is permitted in accordance within the fertilisation ordinance.

Subsequent working

With brittle, rough material and preceding deep soil preparation in summer / autumn mulch seeding is possible directly or after minimal soil tillage. Chemical or intensive mechanical measures (e.g. ploughing) can be used for cover crops that do not freeze-off.

Further information can be found at www.viterra-mischung.de or www.saaten-union.com

Breeding for the future

New approvals

P. H. Petersen is continuously breeding new varieties that meet the current requirements in the field. Beginning with crossing suitable parent plants, in the following 3 to 6 generations the valuable characteristics such as nematode resistance, flowering tendency, field emergence, biomass formation and many other characteristics are recorded. Promising candidates are multiplied in isolation to prevent cross-pollination and is applied for registration at the Federal Plant Variety Office for approval.

Depending on the type of culture, the Federal Plant Variety Office compares and tests the top candidates of all the cultivars in approx. 15 locations throughout Germany. If a variety candidate was able to prove after the test period that it is new, uniform, consistent and better than all varieties approved to that date, it is included in the descriptive variety list. For **multi-resistant oil radish varieties**, the new approval **ANGUS** is an outstanding variety, which combines the resistance of **CONTRA** with the good growth of **DEFENDER**. **AMIGO** is approved as a **nematode-resistant oil radish** of the highest resistance class with improved cultivation properties.

In the future, the new varieties **ACKERGOLD** and **SUNNY** will be available in the **nematode-resistant white mustard** range. Both varieties belong to those with strongly delayed flowering. Furthermore, both offer very fast initial development and good ground cover, so that even late sowing dates will still quickly provide a closed crop.

For the first time, **VERDI** is described in this catalogue. **VERDI** is a nematode-resistant white mustard, which had such a good result in the French official resistance tests against beet cyst nematodes that it was leveld as class H1 (best reduction). **VERDI** is also late flowering and offers fast initial development, **VERDI** - a class of its own.

New in the variety programme is the **small flowered lupin**. The blue bitter lupin **ILDIGO** surpasses all previously approved varieties in terms of vigour and biomass development. These advantages are not only of particular advantage as crop of its own but also in cover crop blends.

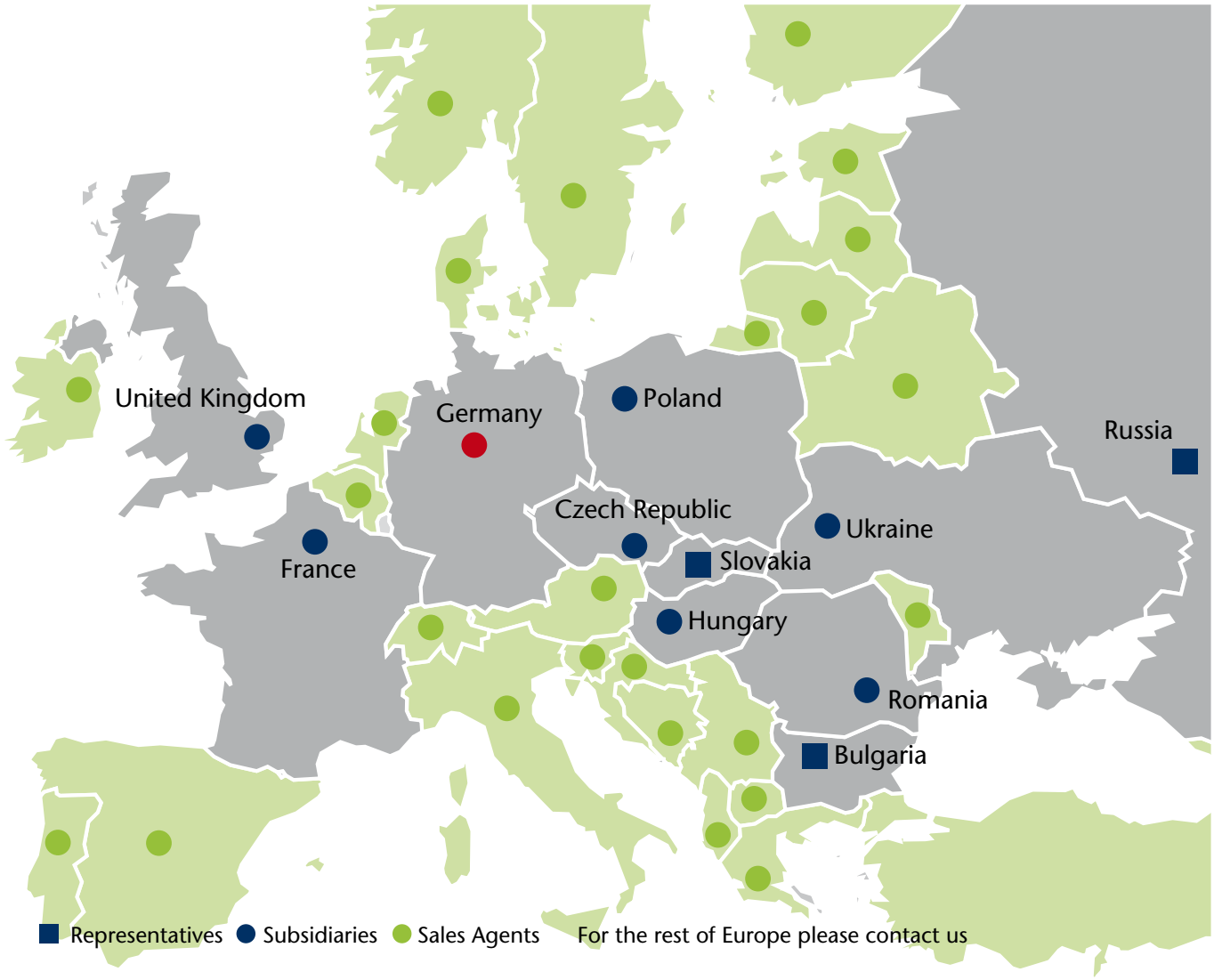
The range is completed with two new approvals in **green cut rye**. **LUNATOR** delivers the highest yields at defined harvest times; **SU VECTOR** has highest dry matter yields at standard harvest dates. Besides the highest yields, both varieties boast considerably improved lodging resistance compared to the top variety **PROTECTOR**.

All newly approved varieties are currently being produced, so that certified seeds will be available soon.

Notes:

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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Züchtung ist Zukunft

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