



VANDINTER SEMO
Quality
SEED & SERVICES



ACTIVE

GREEN MANURES



ACTIVE

Quality mark for proven green manures. Guarantee for a healthy soil.

A 'healthy soil' and 'sustainable soil management'. These are themes that are very much in the spotlight. With farmers, because the awareness is growing that a continuously profitable cultivation of crops requires sensible soil management, but also with other stakeholders. Thus, water boards and drinking water companies are fully aware of soil quality as a guarantee for clean and safe drinking water. Today, but also in the future. And banks, financial institutions and mortgage lenders also recognize that healthy soil has a positive influence on the value development of land.

Vandinter Semo has a convincing vision of the use of green manures as a soil enhancer and as a combatter of nematodes. That is why Vandinter Semo is launching the "Active" quality mark for a selected number of top varieties within its range of green manures. It is your guarantee for the best choice of green manure.

The introduction of the Active quality mark is a logical consequence of the years of experience that Vandinter Semo has built up with its own cultivation and breeding programme for crucifers. Whether it is radish, white mustard or Japanese oats, the varieties are distinguished by a high resistance to nematodes in combination with a high yield of biomass. The top position that Vandinter Semo holds in the market is especially due to the continuous collaboration with knowledge institutions such as Wageningen University, NOW (Netherlands Organisation for Scientific Research) and numerous experimental farms.

Active. Quality guarantee.

The current top varieties of green manures by Vandinter Semo are the result of a cultivation and breeding programme which has been running for many years. Vandinter Semo green manures such as radish, white mustard and Japanese oats grace the lists of varieties with top positions. Due to the increasing popularity of green manures, less proven varieties are also being offered on the market as green manure and catch crops for nematodes. Examples that we know? Alexandrian clover, vetches and phacelia. A worrying development in our opinion. Especially because not all green manures have a further developed resistance to nematodes.

To separate the wheat from the chaff and to have a clear message for the professional user of green manures, Vandinter Semo is launching the Active label as a hallmark for the top varieties which Vandinter Semo is releasing.

What does the Active label guarantee?

- + Proven active impact against nematodes (roundworms), to be found on the list of varieties
- + Proven active germination rate of at least 80% (approved by NAK – Dutch General Inspection Service)
- + Proven seed purity of 98.5%, approved by NAK. Free from harmful weeds such as wild oats, dodder and thorn apple (approved by NAK)
- + Proven varietal purity (DUS examination)
- + Varieties produced exclusively by Vandinter Semo itself

Vandinter Semo & Research

Single green manures are more effective

In addition to development and breeding of new varieties, Vandinter Semo is conducting intensive research into the causes that have a strong influence on the propagation of nematodes.

Special attention has been given to the use of green manure mixtures. Many good qualities are attributed to green manure mixtures, also that they could be used simultaneously for the control of several nematode species.

However, many of the admixed species actually increase harmful nematodes. Thus, the nematode-reducing effect of a resistant species in a mixture would be negated by the presence of the propagating species.

In a pot experiment with beet cyst nematodes, it was shown that this is indeed the case: in pots with mixtures or monocultures of various resistant green manures almost no cysts were formed, while in pots with mixtures of susceptible and resistant green manures or monocultures of susceptible species, very many cysts were formed (see graph).



It was striking that the cyst number in the mixtures did not differ significantly from that in the susceptible monocultures. The presence of susceptible plants in a mixture thus ensures that this mixture is not used effectively for the control of harmful nematodes.

If harmful nematodes are present in the plot, then we would recommend using a single green manure on the basis of this research to prevent nematode propagation.

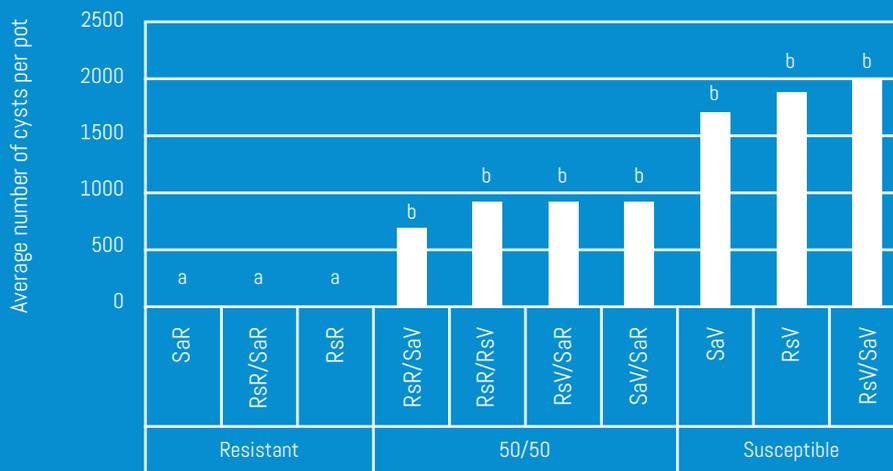


Figure 1.
Average number of cysts per pot per culture.
SaR: resistant white mustard,
SaV: susceptible white mustard,
RsR: resistant cultivated raddish,
RsV: susceptible radish
Columns with the same letter are not significantly different from each other (Tukey, $p \leq 0.05$), $n = 6$.

Top score for CORDOBA and VENICE

Organic matter (OM) plays an essential role in the biological, chemical and physical soil quality. Organic matter also provides great storage of CO₂ from the atmosphere. Since many factors in soil management influence the structure of organic matter, Vandinter Semo believes that it is extremely important to examine the effects of all these factors. This insight can help to increase the popularity of green manure crops.



Recently, Wageningen University | Open Teelten conducted research into the organic matter production of two green manure varieties at Vandinter Semo. These are CORDOBA (a fodder radish) and VENICE (a white mustard). The green manures were sown in the demonstration field in Vredepeel, the Netherlands, for the green manure day that took place on 29 August 2018.

Trial run and implementation

The two varieties were sown in demonstration fields of 6 x 12 metres. For each demonstration field, in three places, a quarter of a square metre of mass above ground was harvested, rinsed and weighed. A sample of the fresh above-ground mass was finally dried. At the same time, a soil sample was taken at the places where the above-ground mass was harvested. The relevant roots were weighed, reduced and dried. The obtained dry matter percentage is processed with the fresh mass and converted in order to determine the dry matter production per hectare.

The results

It is important to note that the pre-crop in 2017 was a fodder beet. The green manure crops examined were sown in the first half of July and fertilized with Kali40 and KAS 27%. Tillage was carried out with a disc cultivator and a spading machine. If sowing volume is maintained; 30 kg / ha for the CORDOBA fodder radish and 25 kg / ha for the VENICE white mustard. Because of the drought, the plot was irrigated 4 times with 25mm to 30mm water each time. The samples were taken 13 weeks after sowing.

Test results Wageningen University trial field

* According to soil and fertilization manual WUR

Object	Yield fresh (kg per ha)	Dry matter (%)	Yield dry matter (kg per ha)	Humification coefficient*	Effective organic matter average* (kg per ha)	Effective organic matter test field Wageningen University (kg per ha)
Fodder radish – CORDOBA	85592	11.20	9626	0.23	875	2214
White mustard - VENICE	93316	15.50	14557	0.23	875	3353

Source: WUR open cultivation – location Vredepeel, the Netherlands

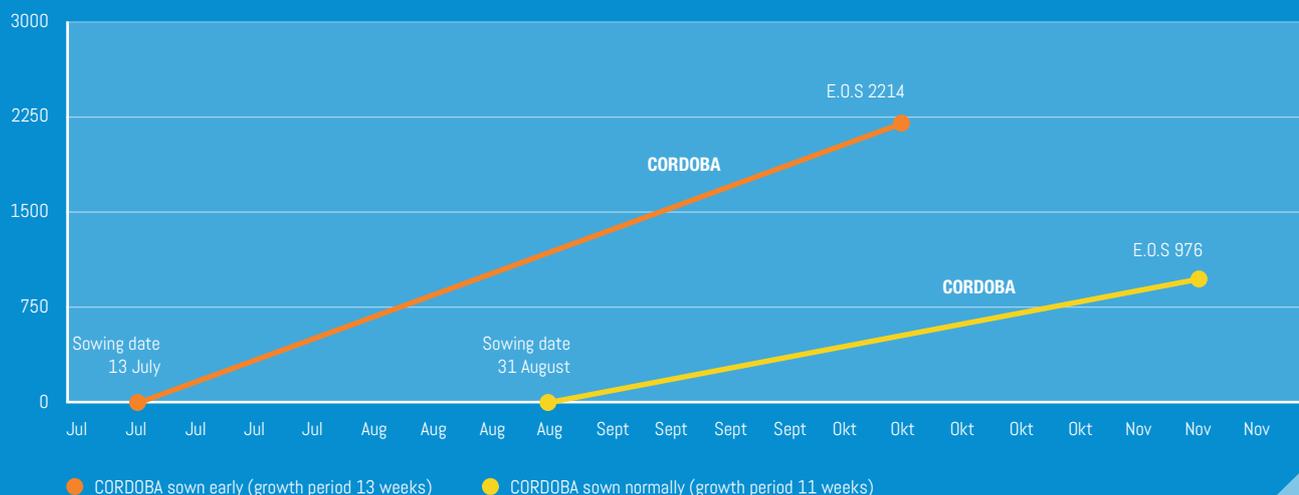
Test results Vandinter Semo trial field

Fodder radish - CORDOBA	40000	11.20	4245	0,23	875	976
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At our own trial field, we measured the results of CORDOBA with average to late sowing. Sowing date was 31 August.

Growth results of CORDOBA 'early' sowing versus CORDOBA 'average to late' sowing

Effective organic matter





Radish

(Raphanus sativus)

Radish is a cruciferous green manure that grows 80cm to 110cm high.

Radish is generally sown in the second half of August, but springtime sowing is also possible. Thanks to the rapid development and good soil coverage, weeds are well suppressed. After the first winter frost, radish can easily be plowed under.

Radish is an excellent trap crop for combating nematodes.



Radish —
(Raphanus sativus)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for radish

Sowing time in spring	April - May
Sowing time in autumn	July - August
Seed quantity	25 - 30 kg per hectare
Fertilization	On clay soil 50 kg N per hectare

Featured breed: CORDOBA

CORDOBA is the world's number 1 radish. No other radish has the quality to combine the highest resistance to beet cyst nematodes (BCA1) with the highest resistance to *Meloidogyne chitwoodi* and an excellent initial development and optimal length and firmness. In addition, CORDOBA only propagates the northern root knot nematode (*M. hapla*) moderately and can thus compete with other varieties on the market that have this characteristic. The strongly developed root system gives a good and deep rooting of the soil. CORDOBA is late flowering and provides substantial biomass thanks to excellent growth above and below ground. CORDOBA is not sensitive to clubroot.



White mustard

(Sinapis alba)

White mustard is a rapid grower that quickly covers the ground. Under favourable circumstances, the crop produces a large amount of organic matter in a short time. That makes this species extremely suitable for late sowing until September, but spring sowing is also entirely possible.

White mustard produces a firm taproot that penetrates deep into the soil. The crop blooms quickly, but does not produce any ripe seed at autumn sowing, so storage is virtually impossible. Usually pre-treatment is required to properly plow under the tall crop. Plowing after the winter is possible without pre-treatment. The plant freezes to death in the winter.

White mustard is highly susceptible to clubroot. That is why green manure is less suitable for a crop rotation plan with cabbage varieties.



White mustard —
(Sinapis alba)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for white mustard

Sowing time in spring	April - May
Sowing time in autumn	August - September
Seed quantity	25 - 30 kg per hectare
Fertilization	50 kg N per hectare

Featured breed: VENICE

VENICE is an extremely late flowering variety and is therefore very suitable for early sowing. VENICE has a rapid initial development and good ground cover. Provides substantial biomass both above and below the ground and remains well upright due to good firmness. Due to early sowing and late flowering, VENICE is an excellent variety to combat beet cyst nematodes over a long period.



Japanese oats

(Avena strigosa)

Japanese oats is a type of cereal that is used especially for the control of root lesion nematodes (*Pratylenchus penetrans*).

Japanese oats are resistant to *Meloidogyne hapla*. The crop provides quick ground cover and can produce a large amount of dry matter in a short time.

In addition to Japanese oats, tagetes are also suitable for combating *Pratylenchus*. In contrast to tagetes - which must be sown early for optimal effect - Japanese oats are, however, suitable as a successive crop.

Japanese oats are more sensitive to frost than most other grains. With the first frosts, it will continue to grow, but the crop will not survive a severe winter. The advantage of this is that the crop does not have to be sprayed to kill it off.



— **Japanese oats**
(Avena strigosa)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for Japanese oats

Sowing time	April - September
Seed quantity	80 - 100 kg per hectare
Sowing depth	1 - 2 cm
Fertilization	60 kg N per hectare

Featured breed: EXITO

EXITO is characterized by rapid initial development and growth of the crop. The variety is also characterized under the ground by a massive root development, good for rooting and catching nematodes. EXITO can be sown from April to the end of September.

 **ACTIVE**

Tagetes

(Tagetes patula)

Tagetes is a plant from the composite family, originating from Mexico. Tagetes is best known as a garden plant (marigolds). In recent years, it has also been used for the control of the root lesion nematode (*Pratylenchus penetrans*). The nematode-killing effect is caused by the release of oxygen radicals in the roots after penetration of the nematodes.

An effective nematode control requires a cultivation period of 3-5 months in the summer, so that a large root system is formed.

The optimal sowing time is in June and July. The crop will then quickly develop. Sowing too early leads to a long seedling phase that allows the growth of unwanted weeds. In addition, tagetes is sensitive to frost. A successful weed-free cultivation of tagetes has a long-term effect against root lesion nematodes.



— **Tagetes**
(Tagetes patula)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for tagetes

Sowing time	Mid May - July
Seed quantity	6 - 12 kg per hectare
Fertilization	70 kg N per hectare

Featured breed: GROUNDCONTROL

GROUNDCONTROL has a very strong killing effect against *Pratylenchus*. This variety germinates quickly and gives a good rooting of the soil. Besides the control of nematodes, GROUNDCONTROL also has a positive effect on the structure and soil fertility.



ACTIVE

Sticky nightshade

(Solanum sisymbriifolium)

Sticky nightshade comes from South America and is related to the potato. The catch crop Sticky nightshade is suitable for the control of potato cyst nematodes and improves the soil structure.

We introduced this crop in the Netherlands in 2001 and, together with the University of Wageningen, we have succeeded in making this crop more suitable as a cyst nematode killer.

Sticky nightshade kills about 70% of the nematode population, provided the crop has been able to develop well.

The nematode-reducing effect is almost the same as that of soil decontamination (80% control) and considerably greater than that of black fallow (50% killing).



Sticky nightshade —

(Solanum sisymbriifolium)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for sticky nightshade

Sowing time in spring	After mid-May (0.5 to 1 cm deep with a soil temperature of at least 10 degrees)
Seed quantity	3 kg per hectare - 20 kg per hectare (including filler)
Flowering time	End of August
Weed control	Immediately after sowing, before emergence, apply low dose Roundup. After emergence, in well-developed crops, a maximum of 30 grams of Titus per hectare. Spray in a low dose several times in consultation with your advisor.
Fertilization	100 kg N per hectare in the spring, 50 kg N per hectare end of July
Row distance	10 - 15 cm

Featured breed: QUATTRO

QUATTRO offers good resistance to potato cyst nematodes. Specially developed for growing on clay soil. QUATTRO grows rapidly after germination and 7 weeks after sowing, the crop has covered the field. In addition to nematode control, it also provides a significant contribution to the structure and soil fertility with its root system.

 **ACTIVE**

Garden rocket

(Eruca sativa)

Garden rocket, also called rocket lettuce, is an annual plant that belongs to the Brassicaceae (cruciferae). This plant is also cultivated as arugula lettuce.

Garden rocket can be used as green manure, but produces much less biomass than, for example, radish or white mustard. It is a bad host plant for most harmful nematodes. Garden rocket is therefore an ideal crop to serve as a mixing partner for mandatory blending by the government.



— **Garden rocket**
(Eruca sativa)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for garden rocket

Sowing time	July - September
Seed quantity	6 - 8 kg per hectare
Fertilization	100 kg N per hectare

Featured breed: ROCKET

ROCKET has a rapid initial development and good ground cover. ROCKET is not a massive crop, but with its leaf and root mass, contributes to the soil fertility and with its poor host plant status is a welcome addition as a mixing partner in our package of crucifers.

Brown mustard

(Brassica juncea)

Sarepta mustard is originally from Asia and is also called brown or leaf mustard. Sarepta mustard belongs to the cruciferae family and is a good previous crop for potatoes and vegetable crops.

The crop has been selected for biofumigation. After the bruising and processing of the crop, the active substances are converted into gases that are toxic to a large number of soil organisms. Biofumigation is mainly aimed at combating soil fungi, such as brown rot in potatoes.

Tests have shown that the growth of Pythium fungi has reduced by 60 to 80%. Similar results are known for black scurf (*Rhizoctonia*) and wilt (*Verticillium*).



— **Brown mustard**
(Brassica juncea)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice for brown mustard

Sowing time	April - May, August - November. Do not turn under with late sowing.
Seed quantity	10 - 12 kg per hectare
Fertilization	60 kg N per hectare

Featured breed: SCALA

SCALA is characterized by rapid initial development and growth. Can produce abundant leaf and root mass in a short time and has a high glucosinolate content. Ideal crop for biofumigation and improving soil fertility.

Ethiopian mustard

(Brassica carinata)

Ethiopian mustard, or Abyssinian mustard, originates from Ethiopia, but can also be grown in Europe. This mustard species can cope well with drought and warmer periods and also remains in the vegetative growth phase for a long time. This makes it suitable for sowing early, and it will not blossom until late.

Ethiopian mustard quickly produces a long tap root and can grow up to 1 to 2 meters high, whereby substantial biomass is formed. Together with a high content of glucosinolates, this also makes it very suitable as a biofumigation crop.

Ethiopian mustard is sensitive to frost, but less sensitive to frost than, for example, white mustard.



— ***Ethiopian mustard***
(Brassica carinata)

To be used during the harvest and sowing plan of



Potatoes



Sugar beet



Wheat



Onions



Carrots



Cabbage



Salsify



Spinach

Cultivation advice Ethiopian mustard

Sowing time	August - September
Seed quantity	10 - 15 kg per hectare
Fertilization	60 kg N per hectare

Featured breed: B.CAR ELEVEN

B.car ELEVEN has a rapid initial development and produces a lot of leaves and root mass in a short time. Has a long vegetative growth and therefore only blooms very late. Also contains a high content of glucosinolates and can be easily chopped and processed and that makes B.car ELEVEN also very suitable as a biofumigation crop.

Green manure variety overview

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
RADISH												
CORDOBA	●		●	●							●	
GERON		●	●	●							●	
JORBA		●	●						●			
TAJUNA		●	●						●			
VALENCIA		●	●						●			
KARAKTER		●						●				
IMAGE		●										●
RESPECT	●										●	
ILLUSION		●								●		
EVERGREEN		●									●	
PINA		●								●		
SPLENDID		●					●					

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
WHITE MUSTARD												
VICTORIA	●										●	
VENICE		●										●
CEZANNE		●									●	
IRIS		●									●	
BRILLIANT		●									●	
FLEVO								●				
LUDIQUE											●	
SARAH												●

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
JAPANESE OATS												
EXITO				●	●							

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
TAGETES												
GROUNDCONTROL					●							
SPARKY					●							

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
STICKY NIGHTSHADE												
QUATTRO						●						
DOMINO						●						
PION						●						

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
GARDEN ROCKET												
ROCKET										●		

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
BROWN MUSTARD												
SCALA										●		

Crop	Resistance						Flowering time					
	BCA1	BCA2	M.chitwoodi	M. hapla	P. penetrans	ACA	Very early	Early	Mid-early	Mid-late	Late	Very late
ETHIOPIAN MUSTARD												
B.CAR. ELEVEN										●		

VANDINTER SEMO

SEED & SERVICES

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