Contans® WG

Control +

Biologicals:

Enhancing crop protection to break the cycle of *Sclerotinia* in the soil

Bayer CropScience

Keep your crops safe from *Sclerotinia*

Sclerotinia disease can be devastating. It's estimated to reduce crop yields significantly in the UK and, on occasion, result in total crop losses.

Now you can help ensure the health, quality and yields of your crops with an effective biological control to integrate with conventional foliar treatments – Contans® WG biological fungicide from Bayer CropScience.

A different way to crop performance

Whereas conventional foliar treatments target *Sclerotinia* disease in-season, Contans WG decreases *Sclerotinia* loading right from the start.

Based on a naturally-occurring fungus, it neutralises and eliminates the source of the disease, limiting the potential for infection and spread in your crops.

A sustainable crop protection solution

Contans WG is a vital rotational tool to reduce disease loading as part of IPM (Integrated Pest Management) or ICS (Integrated Crop Solution) programmes.

It enhances pest and residue management, and is safe to beneficial insects and organisms, making Contans WG an ideal option across the whole food chain.

The product is approved for all edible and non-edible crops and can be used on its own or to complement chemical-based treatments to improve long-term *Sclerotinia* disease management.

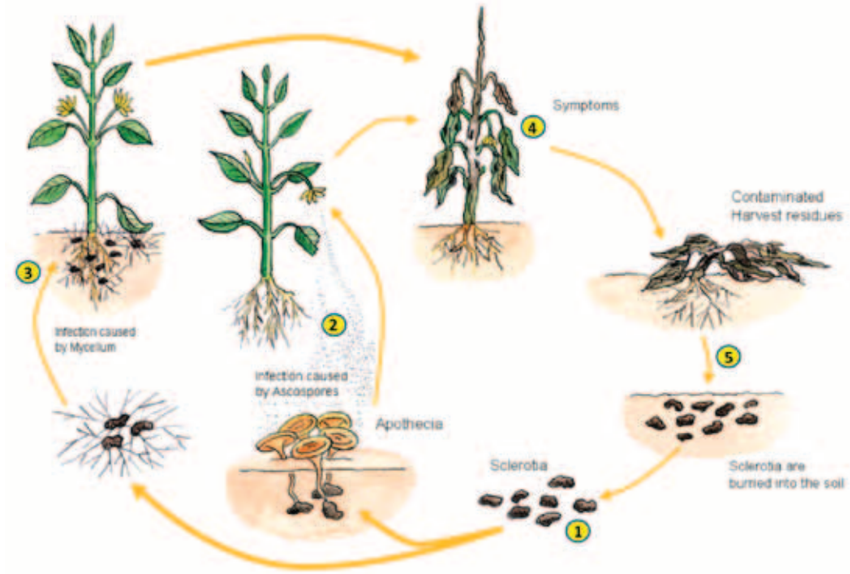
Now discover more about Contans WG.

Why *Sclerotinia* builds up in the soil

Sclerotinia is very difficult to control using traditional foliar treatments alone. The reason is simple: it's a continuous cycle that is replenished from one season to the next where sensitive crops are grown. Sclerotia (resting bodies) of *Sclerotinia* can survive for several years; indeed, viable sclerotia have been seen after 10 years in the soil.

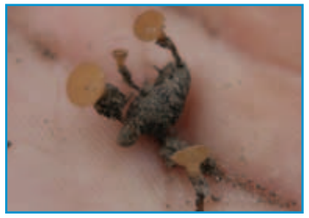
Sclerotia germinate and develop apothecia if within the top 3-5 cm, so annual cultivations can continue to bring problems to the surface even when sensitive crops have not been grown in the rotation for several years.

Life-cycle of *Sclerotinia* spp.



1. Sclerotia (resting bodies) of *Sclerotinia* germinate and develop apothecia.
2. These apothecia produce ascospores that are released into the air. They attach to senescent parts of the plant such as old leaves and fallen petals. Depending on climatic conditions (temperature and moisture), these spores can germinate and infect the plants via leaves, flowers, fruit and stems.
3. Meanwhile, the mycelium resulting from the sclerotia germinating in the soil can infect the roots of certain host plants. Symptoms of infection vary between plant species and can appear rapidly.
4. White mycelium develops and new sclerotia appear on the infected plant parts or inside the stem. The infected plant parts start senescing, typically resulting in plant death.
5. The newly formed sclerotia return to the soil and can be viable for several years.

Surviving structures (sclerotia) of *Sclerotinia* are viable in the soil for several years.



Sclerotia germinate and develop apothecia.

Apothecia formed from S. *sclerotiorum* can develop up to 5 cm long.

Sclerotinia sclerotiorum

Sclerotinia sclerotiorum can infect many crops, particularly oilseed rape, lettuce, carrot, potato, beans (field and fresh), peas (combined, vining and fresh), vegetable brassicas and celery. See a full list below.

When within 3-5 cm of the soil surface, its sclerotia classically develop apothecia that produce and release ascospores (stages 1 and 2, opposite) into the air. The spores may germinate and infect susceptible plants, as can the mycelia resulting from sclerotial germination in the soil (stage 3).

Sclerotinia minor

Sclerotinia minor particularly infects lettuce. It requires more intensive treatment than *Sclerotinia sclerotiorum* as its sclerotia are smaller and more numerous. *Sclerotinia minor* very rarely develops apothecia and the attack does not occur via ascospores (stage 2). Instead, the sclerotia germinate in the soil and the mycelium infects the roots, the base of the stem and the parts of the plant in contact with the ground (stage 3). The following stages (4 and 5) are identical to those of *Sclerotinia sclerotiorum*.

Sclerotia build-up in OSR stem.

Fresh mycelia and sclerotia on lettuce.

Accumulation of sclerotia and mycelia on celery.

Sclerotia from *S. minor* on lettuce.

Sclerotinia spp. can affect a wide range of crops

Field crops	Vegetables	Herbs	Ornamentals
Alfalfa/Lucerne	Artichoke	Chive	Aster
Clover	Asparagus	Coriander	Begonia
Field bean	Bean (dwarf French, broad, runner)	Dill	Calendula
Lupin	Broccoli	Fennel	Chrysanthemum
Mustard	Cabbage	Parsley	Fuchsia
Oilseed rape	Carrot		Gerbera
Pea (combined)	Celery		Lupin
Potato	Chicory		Pelargonium
Sunflower	Cucumber		Petunia
	Cucurbits (courgette, squash, pumpkin)		Poppy
	Endive		
	Fennel		
	Lettuce		
	Onion		
	Pea (vining, fresh)		
	Radish		
	Sweet pepper		
	Tomato		
	Turnip		

The performance you need to ensure yields

Contans WG effectively cleanses your soil and improves its health by reducing the source of *Sclerotinia* disease.

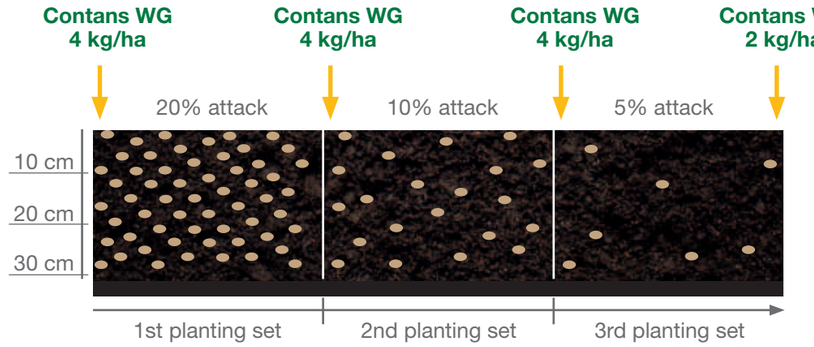
The active ingredient – spores of the naturally-occurring fungus *Coniothyrium minitans* – attacks and destroys the sclerotia and mycelium of *Sclerotinia spp.* in the soil. With a highly effective concentration of $1x10^{12}$ active spores per kilogram, it interrupts the life-cycle of the plant pathogen before the sclerotia can infect the crop.

Following application and incorporation of Contans WG, the spores of *C. minitans* germinate and produce mycelium, attacking and preventing the infected *Sclerotinia* sclerotia from generating apothecia or their mycelium. Total destruction generally takes 6 to 12 weeks but sclerotial viability is typically inhibited much sooner, depending on factors such as soil temperature and soil moisture.

Rotational application gives lasting control

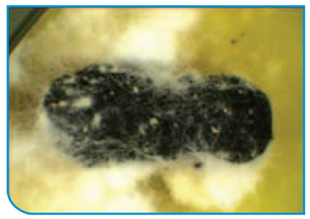
In situations of heavy infestation with *Sclerotinia* (high level of sclerotia in the soil), a one-time application of Contans WG or conventional chemical foliar treatments is unlikely to give adequate control. In such cases, best effects can only be achieved with multi-year or multi-crop rotational treatments as illustrated below.

Reduced crop losses from *Sclerotinia* spp.

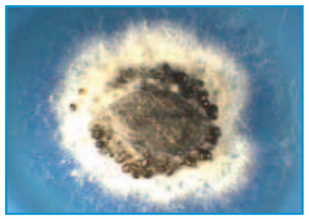


With every application of Contans WG, on average 80-95% of sclerotia in the soil layer of the application area are destroyed. As a result, the *Sclerotinia* pressure is strongly reduced from one application to the next. However, in situations with heavy infestation a considerable number of uncontrolled sclerotia may remain viable. An integrated programme with foliar products can offer sustainable control and improve the effectiveness of long-term *Sclerotinia* disease-management programmes.

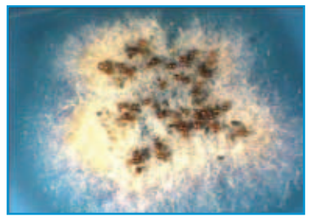
Contans WG in action



Intact sclerotium.



Sclerotium attacked by *C. minitans* (arrows: pycnidia spores and spore slime of *C. minitans*).



Sclerotium being degraded by *C. minitans* (arrows: pycnidia spores and spore of *C. minitans*).

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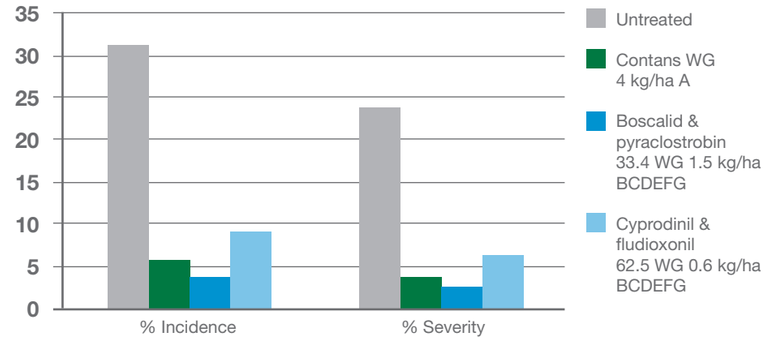
Example results

LETTUCE

Graph 1: Effective control of *Sclerotinia sclerotiorum*: Germany trial

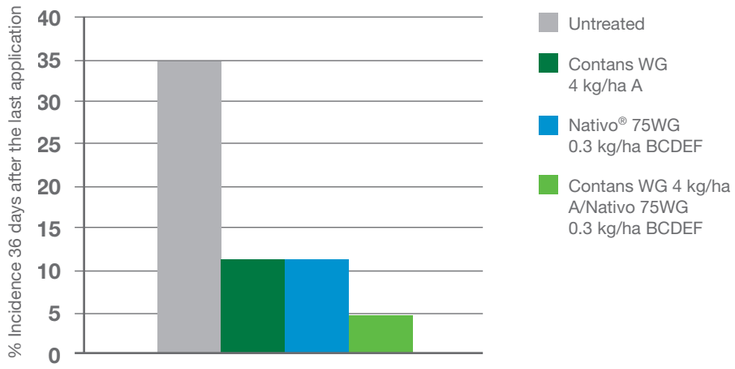


This graph shows the infestation level of S. *sclerotiorum* in lettuce after the last foliar application.

Contans WG applied as solo application before planting at 4 kg/ha showed similar incidence and severity level (≤ 5%) compared to either foliar treatment applied 6 times.

CARROTS

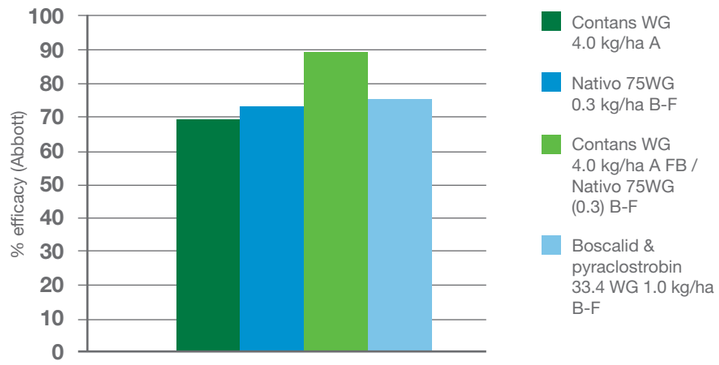
Graph 2: % incidence of *Sclerotinia* in box-stored carrots: United Kingdom trial



This graph shows % incidence of *Sclerotinia* infection in carrots harvested and stored, 36 days after last application. Contans WG (applied as a single application before planting) or 5 foliar sprays with the chemical standard reduced the incidence of infection to ~10%. However, an integrated programme of Contans WG and Nativo 75WG showed the best disease reduction.

In both this example and graph 3 overleaf, Contans WG kills the *Sclerotinia* in the soil, whereas the chemical fungicide prevents disease attack on the leaves. The best *Sclerotinia* control is achieved by integrating biological control in the soil with chemical control on foliage.

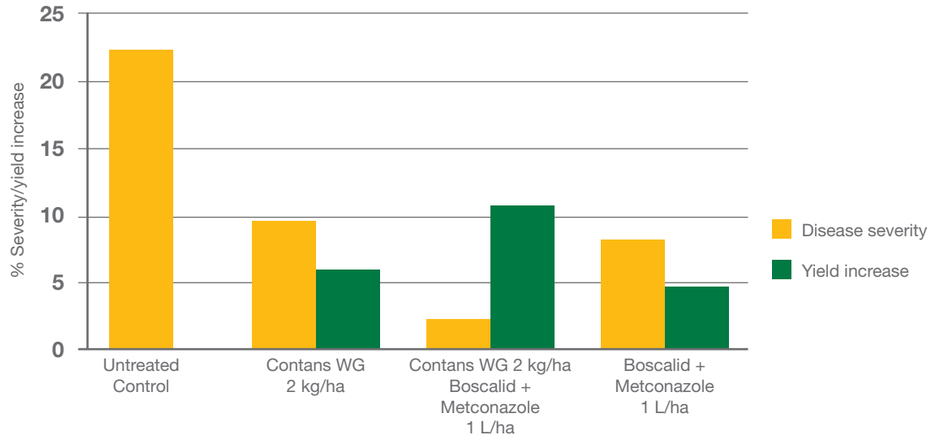
Graph 3: **Competitive efficacy against S. *sclerotiorum* in storage: Germany trial**



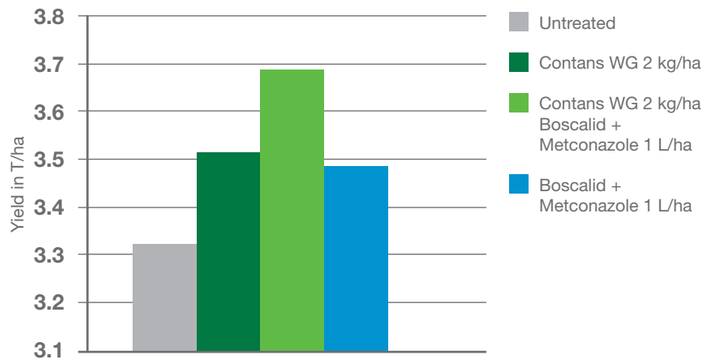
This graph shows storage losses – efficacy against *S. sclerotiorum* in stored carrots after 2 weeks. Contans WG applied at 4 kg/ha as a single application before planting performed at the level of both chemical treatments.

OILSEED RAPE

Graph 4: **Improved efficacy against *Sclerotinia sclerotiorum*: United Kingdom trial**



Graph 5: **Increased yield: United Kingdom trial**



Graphs 4 and 5 show the infestation level of *Sclerotinia sclerotiorum* and yield increase in oilseed rape. Contans WG applied pre-sowing at a rate of 2 kg/ha reduced the disease severity to below 10% with about 5% yield increase (3.5 t/ha) similar to the foliar chemical standard. However, an integrated programme of Contans WG with foliar chemical treatment showed the lowest disease level, at 2% with 10.8% yield increase (3.7 t/ha).

How to use Contans WG

General guidance

Contans WG is sprayed and incorporated into the soil using conventional spraying equipment. For best results, the treated soil surface must be well and homogenously mixed into the upper soil layer by using a rotary hoe or similar machinery. Shallow incorporation (5 cm max.) is preferred. Under good conditions (e.g. soil temperature: 12-25°C and sufficient moisture) *C. minitan*s needs 2-3 months to destroy fully the sclerotia structures in the soil, but sclerotial viability is typically inhibited much sooner. For best results, apply Contans WG no more than 3 days before preparation/incorporation.

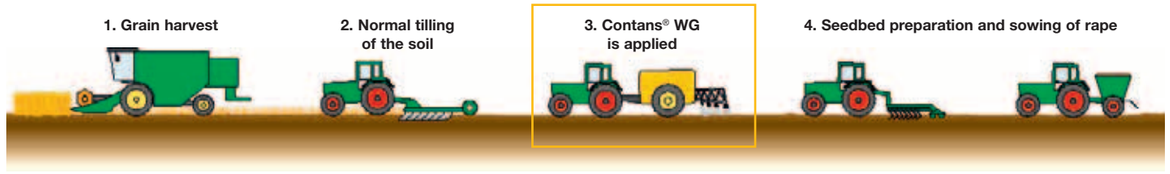
Specific crops

Arable

Contans WG can be sprayed and incorporated in the top soil layer before planting, either when preparing seedbeds by cultivations or when using a combined seed drill. The recommended dose in the pre-planting application is 1-4 kg/ha.

After application, Contans WG has to be incorporated thoroughly within the recommended depth, preferably using a rotary cultivator. Depending on cultivation practice and equipment type, the drill pass may also be suitable for incorporation.

Deeper incorporation will dilute the concentration per soil volume and may influence the efficacy. Ensure that subsequent cultivations prior to planting a susceptible crop are not below the depth of incorporation of Contans WG, otherwise sclerotia may be brought up from untreated soil lower in the profile.



Vegetables

Contans WG can be sprayed and incorporated in the top soil layer before planting or during seedbed preparation. The recommended dose in the pre-planting application is 1-4 kg/ha. Use a higher dose of up to 8 kg/ha where *Sclerotinia* infection levels are high and deeper incorporation (20 cm max.) is used.

The application rate is related to the infestation level in the soil. Even if the inoculum source has been reduced, Contans WG applied at a lower rate can prevent further build-up of sclerotia.

Application – further information

The applied dose depends on a number of factors such as *Sclerotinia* inoculum level in the soil, crop rotation, depth of the incorporation and timing of use.

Reduction of the inoculum level in relation to the infestation level depends on disease pressure. Crop rotations of susceptible crops like oilseed rape, beans, lettuce, carrots, brassicas and potatoes are likely to result in higher sclerotia density and lower tolerance to *Sclerotinia* pressure in the soil.

Contans WG offers good but much slower activity at lower than recommended soil temperatures (12-25°C). Even at 5°C the sclerotia of the pathogen are infected by *C. minitans.* When the soil temperature decreases below 0°C or rises above 27°C, *C. minitans ceases* its activity and rests in the soil. The fungus will not be destroyed during this period and will continue to grow once the temperature rises above 1°C or declines below 27°C.

Safety and compatibility

The acute and chronic toxicity of Contans WG is very low and cause no undesired side-effects to humans, wildlife or non-target organisms (e.g. beneficial insects, bees or earthworms).

Contans WG is susceptible to acids and alkalines. Avoid tank-mixing with liquid fertiliser and consult field service staff for approved products as tank-mix partners.

Packaging

Contans WG spores are available as water-dispersible granules in pack sizes of 4 kg.

Storage

Contans WG should be stored at low temperatures, but not below freezing. If stored at 4°C, shelf-life is up to 24 months from the time of production. Store in a dry, cool place away from direct sunlight and heat.

Learn more about Contans WG

Contact your advisor, visit www.bayercropscience.co.uk/contans-wg or call Bayer Assist on **0845 609 2266** (calls cost 5p per minute plus your telephone company's network access charge) or **01223 226644**.

Contans® WG and Nativo® 75WG are registered trademarks of Bayer. Contans WG contains viable spores of *Coniothyrium minitans*, strain CON/M/91-08. Nativo 75WG contains trifloxystrobin and tebuconazole. Always read the label and product information before use. Pay attention to the risk indications and follow the safety precautions on the label. For further information, please visit www.bayercropscience.co.uk or call Bayer Assist on **0845 609 2266** (calls cost 5p per minute plus your telephone company's network access charge) or **01223 226644**.

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