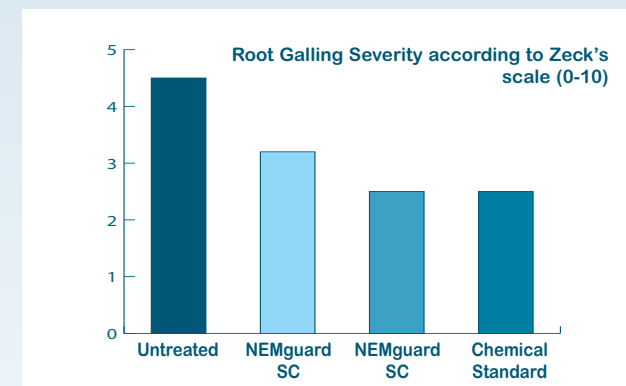
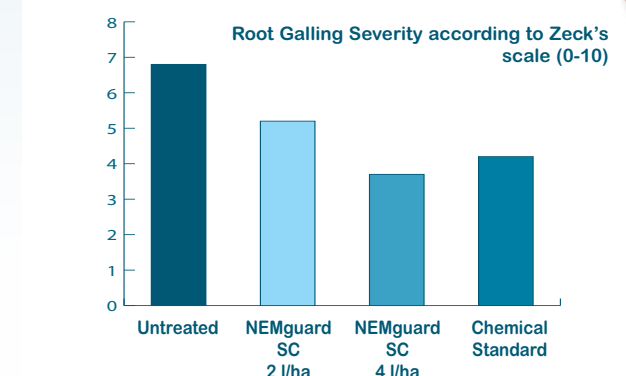


## Summary across efficacy trials with NEMGUARD® SC

The graphs reported are summaries across various efficacy trials, in which NEMGUARD® SC has been tested at 2 different rates in comparison to an untreated control (Untreated) and Conventional nematode control programs (Chemical Standard). Root Gallings Severity was assessed according to Zeck's scale (0-10).

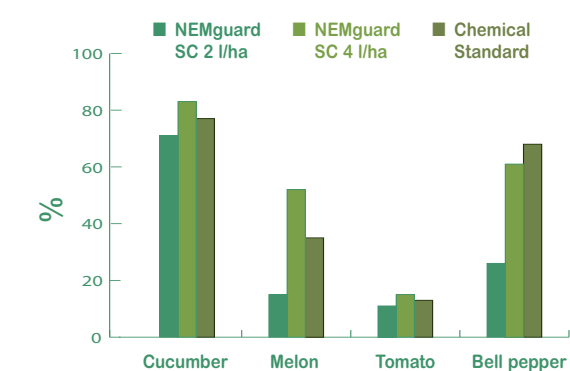


**NEMGUARD® SC**  
Root Galling Severity on tomato (mean of 5 trials)



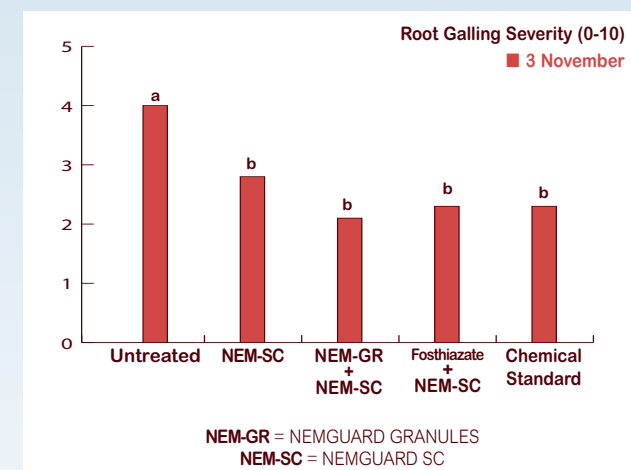
**NEMGUARD® SC**  
Root Galling Severity on melon (mean of 4 trials)

The graph reported below is a summary across trials in terms of mean marketable yield increase observed in the different treatments in comparison to the untreated control on 4 crops.

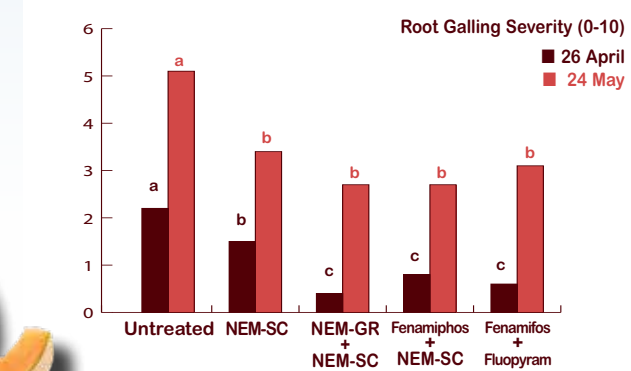


**NEMGUARD® SC**  
Marketable yield increase (mean of 3-5 trials per crop) observed in the different treatments compared to the untreated control.

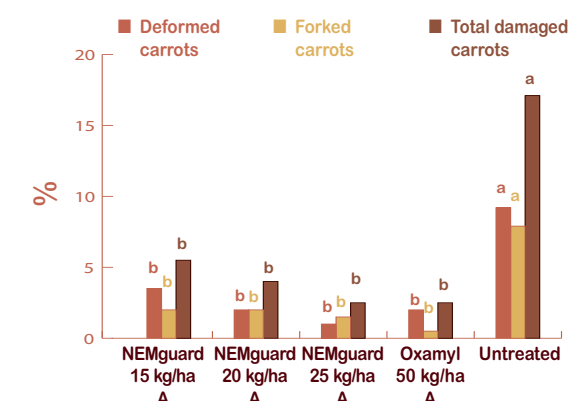
## Efficacy of nematode control programs including NEMGUARD® GRANULES and NEMGUARD® SC



**NEMGUARD® SC**  
Ispica (SR)  
tomato transplanted on 9 September

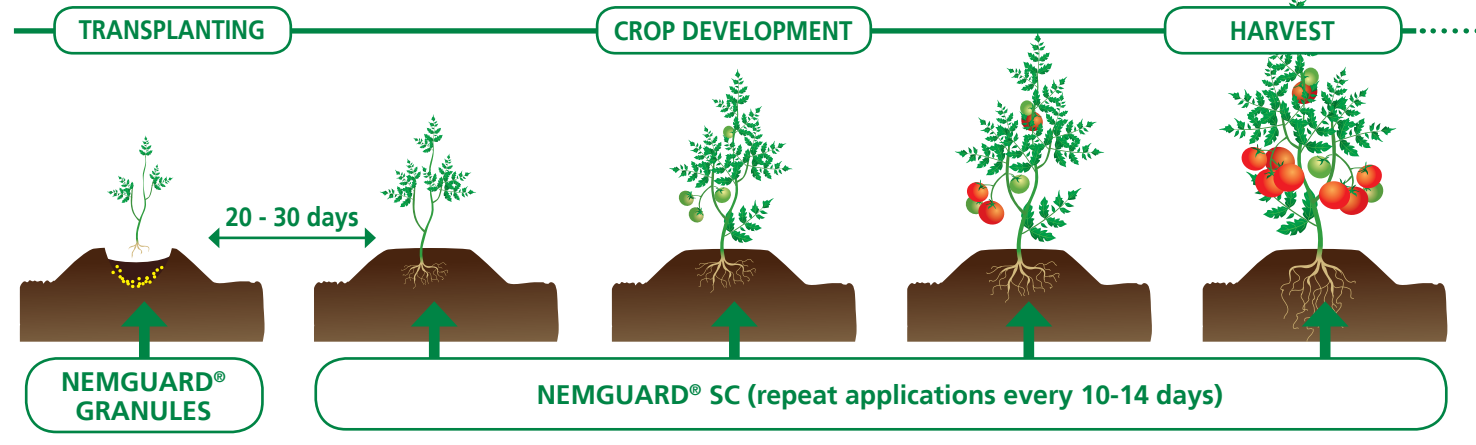


**NEMGUARD® SC**  
Licata (AG)  
melon transplanted on 10 February

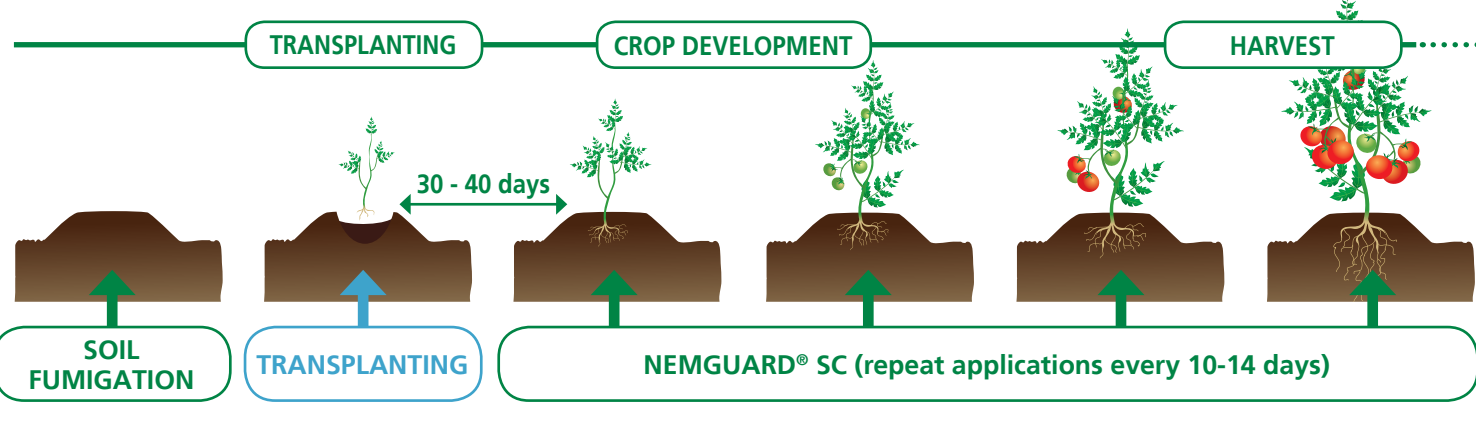


**NEMGUARD® GRANULES**  
**TRIAL ON CARROT**  
Carrot cv Romance F1.  
Ispica (RG), Italy.  
A = at sowing (17 September)  
Assessments: % deformed, forked and total damaged carrots at harvest (13 January)

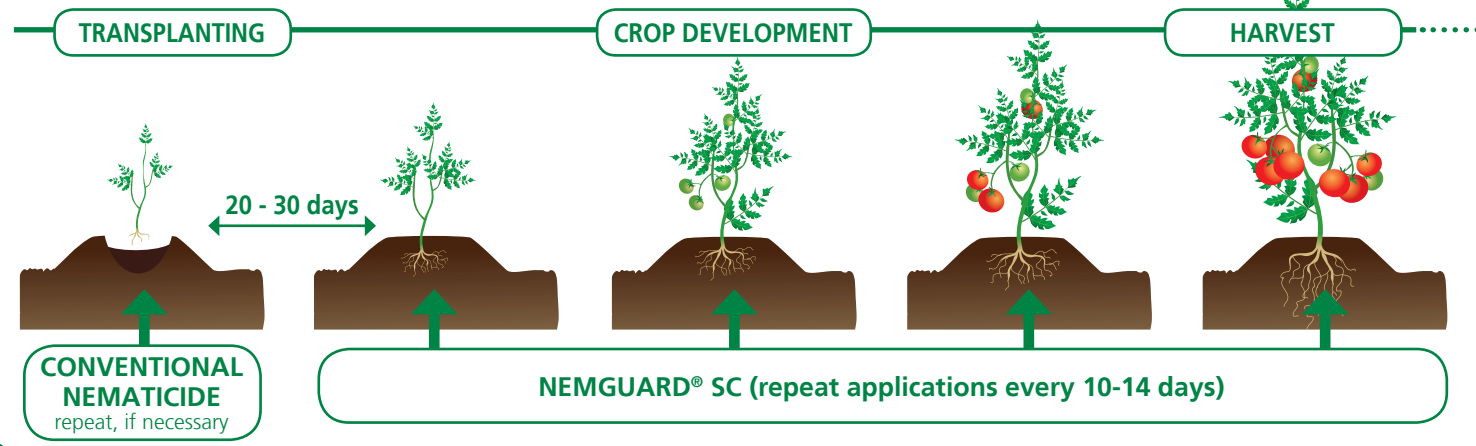
## NEMGUARD® nematode control strategy



## Control program with SOIL FUMIGATION



## Control program without SOIL FUMIGATION



For further information:

R&D Department BIOGARD Division • 47521 CESENA (FC) • Via Calcinaro 2085, int. 7  
Tel +39 0547 630 336 • Fax +39 0547 632 685 • email: [tecnicobiogard@cbceurope.it](mailto:tecnicobiogard@cbceurope.it) • [www.biogard.it](http://www.biogard.it)

Rev. April 2020



CBC (Europe) S.r.l.

Head Office and Logistics Centre

Via Zanica, 25 - 24050 Grassobbio (BG) - Tel. +39 035.335313 - Fax +39 035.335334 - [infobiogard@cbceurope.it](mailto:infobiogard@cbceurope.it)



Ecospray  
Registered trademark ©

# NEMGUARD® nematicides

Naturally Designed, Technically Refined



## Garlic extract: the active substance and its mode of action

Garlic is an aromatic bulb crop containing large quantities of different molecules containing functional groups based on sulfur. When garlic is crushed or damaged, alliinase (an enzyme located in the cell vacuoles) is released, which converts Alliin (a non-protein sulfur-containing amino acid naturally present in the cytoplasm of the cells) into Allicin. Allicin is very unstable and quickly changes in a series of other sulfur-containing compounds. In production, Allicin is heated blandly to break down into a complex cocktail of polysulfide chains, known as diallylsulfides, which are the key molecules responsible of the nematocidal activity of garlic extract.

The company ECOspray Ltd. (UK) has developed a patented production technology to ensure the right balance of diallylsulfides for maximum and consistent efficacy of its **NEMGUARD®** nematicides. The diallylsulfides (DAS) contained in **NEMGUARD®** nematicides pass through the cuticle of

plant parasitic nematodes and work by disrupting their cellular metabolism, as demonstrated by numerous studies conducted at the University of East Anglia (UK).

DAS disrupt redox homeostasis and detoxification capacity of cells and tissues by:

- reducing the level of glutathione (GSH) and other cellular thiols, important antioxidants preventing damage to key cellular components;
- generating ROS (Reactive Oxygen Species); when ROS activity exceeds the neutralization capacity of the cell, irreversible cell damage and finally cell death occur;
- inhibiting enzymatic activity of metalloenzymes due to their interaction with metallic ions.

Due to this irreversible disruption of the detoxification capacity of cells and tissues, the death of the nematode occurs within a short period of time.

## Two formulations: NEMGUARD® GRANULES and NEMGUARD® SC

In order to meet farmer's needs, two different formulations containing garlic extract as active substance, have been developed: a granular formulation (**NEMGUARD® GRANULES**) for applications at transplanting and/or sowing, and a liquid formulation (**NEMGUARD® SC**) for applications via irrigation system. The two formulations, both showing high nematocidal

activity, allow for adequate crop protection on various crops and during all the different stages of the crop cycle.

**Garlic extract, the active substance contained in the formulated products, has recently been included into Annex II of Reg. (EC) No. 889/2008 and subsequent amendments and additions thereto.**

### NEMGUARD® GRANULES

#### Active substance:

garlic extract 45% w/w (purity: ≥ 99.9%)

**Formulation:** granule (GR)

**Specific gravity/density:** 650-680 g/L

**CLP-classification:** not classified

**PHI:** not required

**MRL:** not required

**Shelf life:** in original packaging at room temperature (in a cool dry place) at least 2 years.

Approved for use in Organic Production



CONSENTITO IN AGRICOLTURA BIOLOGICA

### NEMGUARD® SC

#### Active substance:

garlic extract 100% w/w (purity: ≥ 99.9%)

**Formulation:** suspension concentrate (SC)

**CLP-classification:**

WARNING May cause an allergic skin reaction.

**PHI:** not required

**MRL:** not required

**Shelf life:** in original packaging at room temperature (in a cool dry place) at least 2 years.

Approved for use in Organic Production



CONSENTITO IN AGRICOLTURA BIOLOGICA



NEMguard® is a registered trademark of ECOspray Ltd.

Use plant protection products safely. Always read the label and product information before use. For further information with regard to the warning phrases and symbols for this product please refer to the product label.

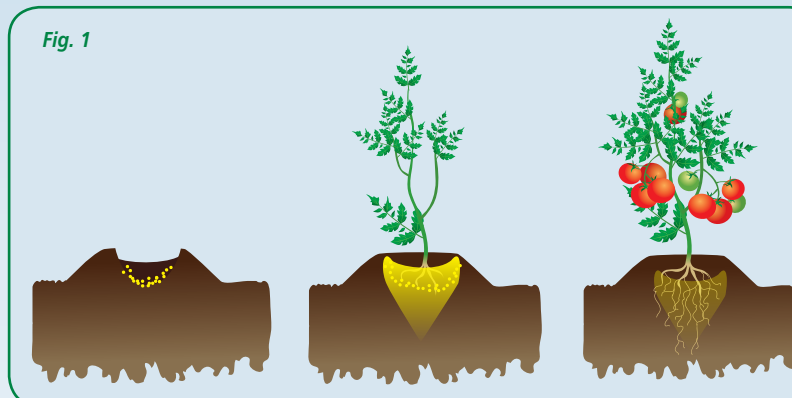
## NEMGUARD® GRANULES

**NEMGUARD® GRANULES** must be applied before transplanting or at sowing by using transplanting / seeding machines equipped with microgranulators. On Solanaceous crops and cucurbits it is recommended to distribute the product coarsely into the transplanting hole at an application rate of at least 1 g/plant, because best performance of **NEMGUARD® GRANULES** is achieved, if the product is applied close to the roots and in the rooting zone of the plant (Fig. 1).

The polysulfides with nematocidal activity are released from the granule into the soil in presence of sufficient water (rain or irrigation), creating a zone of action against nematodes. **NEMGUARD® GRANULES** can provide effective nematode control for a period of time of up to 20-30 days.

#### Application rate:

**NEMGUARD® GRANULES** must be applied once at transplanting/sowing. Recommended application rates for the different crops are listed below. In case of Solanaceous crops and cucurbits, the amount of product to be applied per plant is calculated by simply dividing the application rate/ha by the number of plants/ha. On these crops, the use of specific equipment (Fig. 2) allows for a quick and even distribution of the proper amount of product into each transplanting hole.



### Uses and application rates of NEMGUARD® GRANULES \*

Carrots	field	20-25 kg/ha **
Solanaceous crops (tomato, eggplant, bell/sweet pepper)	field and greenhouse	20-25 kg/ha **
Cucurbits (melon, water melon)	field and greenhouse	25 kg/ha
Lettuces	field and greenhouse	20-25 kg/ha **

\* NEMGUARD® GRANULES is not authorized for all uses in all Countries. Authorized uses may differ among Countries.  
\*\* Rates dependent on pest pressure and pest control strategy used.

## NEMGUARD® SC

**NEMGUARD® SC** must be applied into the soil via irrigation system. Due to its liquid formulation, the product can easily be included in different moments of various nematode control programmes:

- after the application of soil fumigants, at the first appearance of symptoms of attack;
- 3-4 weeks after the application of granular nematicides (e.g. **NEMGUARD® GRANULES**)
- following the application of conventional nematicides, applied during the first part of the crop cycle, in order to protect the crop also during the last part of the crop cycle up to harvest.

The polysulfides contained in **NEMGUARD® SC** should be distributed evenly in the zone of action, i.e. the entire root zone susceptible to attack by plant parasitic nematodes, primary and lateral roots included; adapt length and intensity of irrigation cycle depending on soil characteristics, plant growth stage and weather.

Best performance is achieved under conditions of moist soil; therefore, add **NEMGUARD® SC** to the water towards the end of the irrigation cycle.

#### Application rate:

**NEMGUARD® SC** must be applied at rates of 2 to 4 L/ha, depending on pest pressure and susceptibility of the crop to nematode attack; for best performance, at least 2-3 repeated applications at a time interval of 10-14 days should be carried out, up to a maximum of 6 applications per crop cycle.

### Uses and application rates of NEMGUARD® SC \*

Solanaceous crops (tomato, eggplant, bell/sweet pepper)	From transplanting up to harvest. Field and greenhouse.	2-4 L/ha **
Cucurbits (melon, water melon, pumpkin, cucumber, courgette)	From transplanting up to harvest. Field and greenhouse.	2-4 L/ha **

\* NEMGUARD® SC is not authorized for all uses in all Countries. Authorized uses may differ among Countries.

\*\* Rates dependent on pest pressure and pest control strategy used.

Benefits and features of NEMGUARD® nematicides	NEMGUARD® GRANULES	NEMGUARD® SC
Effective nematocidal activity		
MRL and PHI not required		
Can be used in combination with bumble bees, beneficials and mycorrhizae		
Lasting nematocidal activity	20-30 days	10-14 days
Application via irrigation system		
No phytotoxicity		
Safe to humans and the environment		
Approved for use in Organic Production		

