

# **NEMguard®**

**(a.s. garlic extract)**

**for effective and sustainable  
control of nematodes  
in horticultural crops**



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# NEMguard – background & active substance

## Background

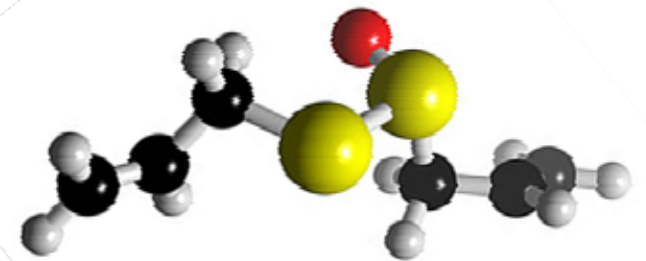
- commonly used in food production, but also as medicine and for crop protection for centuries
- major challenge: development of a high quality garlic-based product providing consistent field efficacy.

ECOspray Ltd characterized and developed quality control for this complex plant extract, and was finally able to prove batch-to-batch consistency.

## Active substance

Garlic contains numerous biologically active ingredients, including **allicin** and **polysulfides**.

The active substance of NEMguard, a highly refined food grade garlic extract, contains fingerprinted polysulfides protected by four patent families.



# NEMguard – mode of action

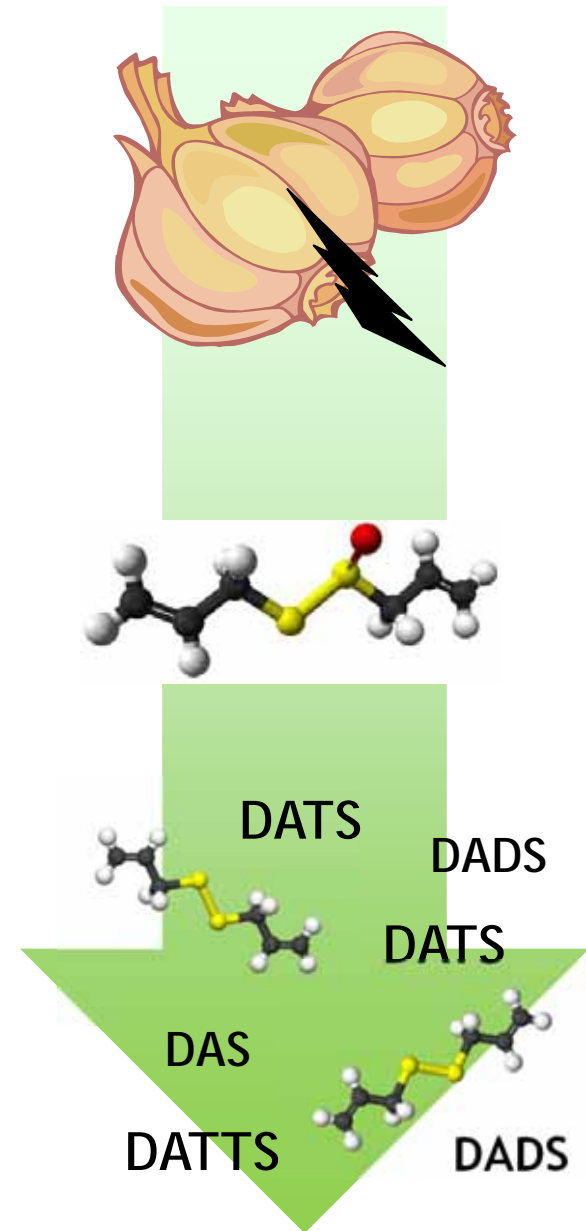
- Under certain conditions (injuries, attack by microbials) production of allicin (highly unstable)
- decomposition of allicin into polysulfides, such as diallyl sulfide (**DAS**), diallyl disulfide (**DADS**), diallyl trisulfide (**DATS**), diallyl tetrasulfide (**DATTS**)
- **DATS** and **DATTS**: primary components active against several insects and nematodes.

The full range of ECOspray's garlic active ingredients was voted through the EU Commission for inclusion into Annex 1 of 91/414 in October of 2008.

EFSA peer review is expected to be completed in December 2012.

## Mode of action:

- contact activity
- inhibition of enzyme systems



# NEMguard® - registration & distribution

NEMguard® is registered as a nematicide in the UK, Ireland, and Turkey. Registration is pending in several European and non-European countries.

The liquid concentrate that forms 45% of NEMguard, is registered in the UK and Ireland as a nematicide on Sports and Amenity turf (f.p. Eagle Green Care™).



**Biogard – Division of CBC Europe has agreed exclusive distribution rights with ECOspray for NEMguard® in the southern zonal countries of the EU and in North Africa.**



# NEMguard<sup>®</sup> - proposed label (Italy)

**Active substance:** garlic extract (purity  $\geq 99.9\%$ ),

**Formulation:** Granules (GR)

**Concentration:** 45% w/w

**Hazard symbol:** irritant (Xi)

**Crops:** carrot, tomato, eggplant, bell pepper, cucurbits, lettuce and other leafy vegetables

**Targets:** nematodes of the order Tylenchida

**Application rate:** 20 – 25 kg/ha

**Application timing:** before transplanting / sowing

**MRL:** exempt from MRL requirements

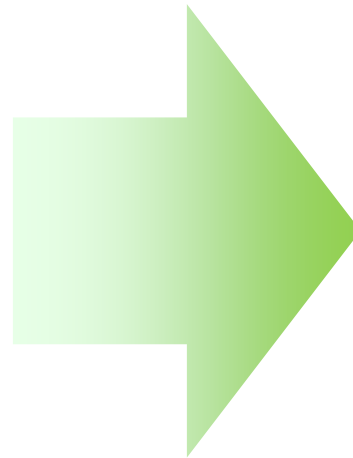
**Shelf life:** 2 years at room temperature



# NEMguard® - target pests & symptoms on crop

## Target

Nematodes order  
Tylenichida  
(eggs & larvae)

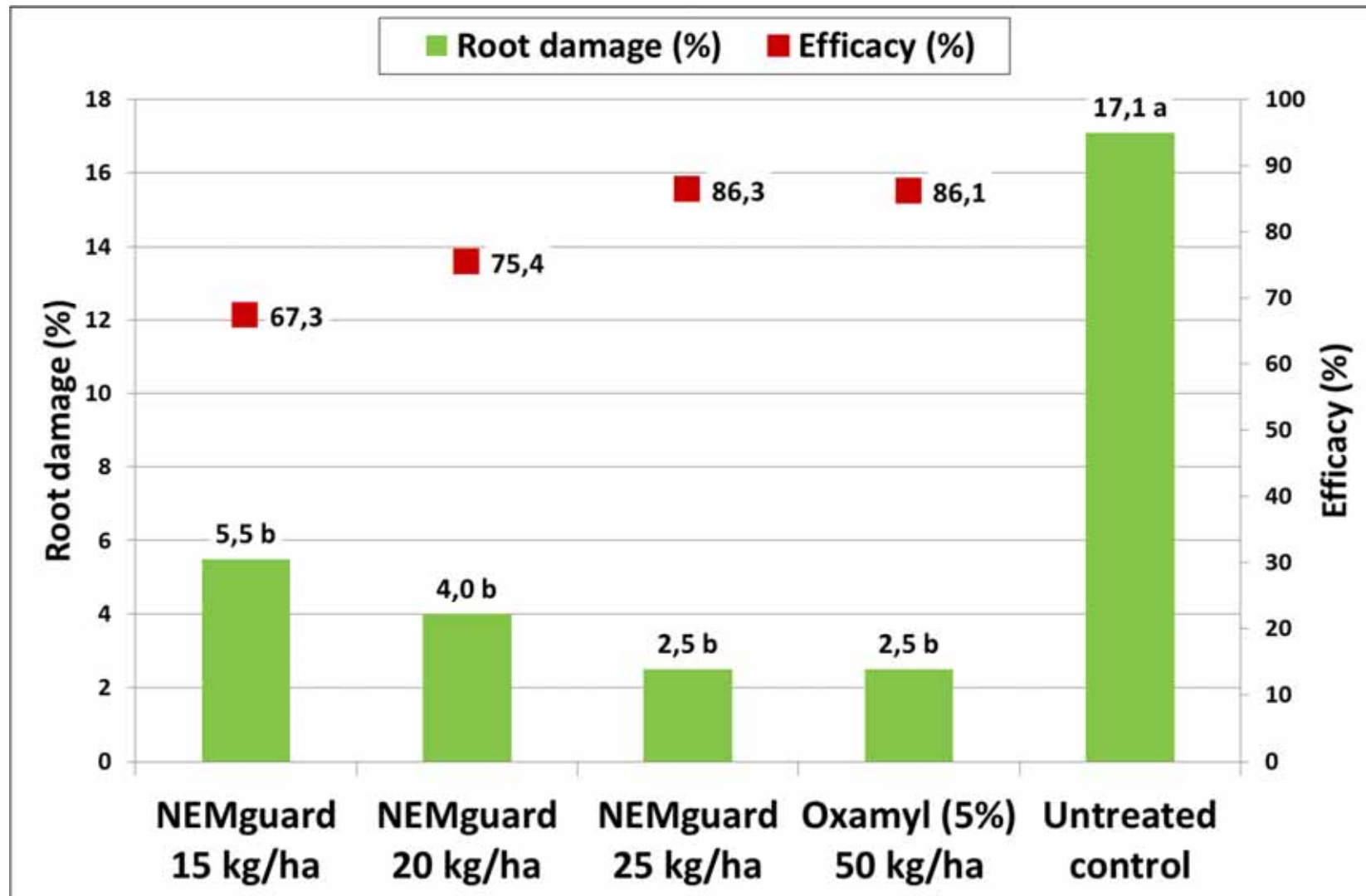


## Symptoms

root lesions, irregular root growth,  
disturbance to normal root function,  
yield loss, crop destruction



# NEMguard® – efficacy against nematodes on carrot



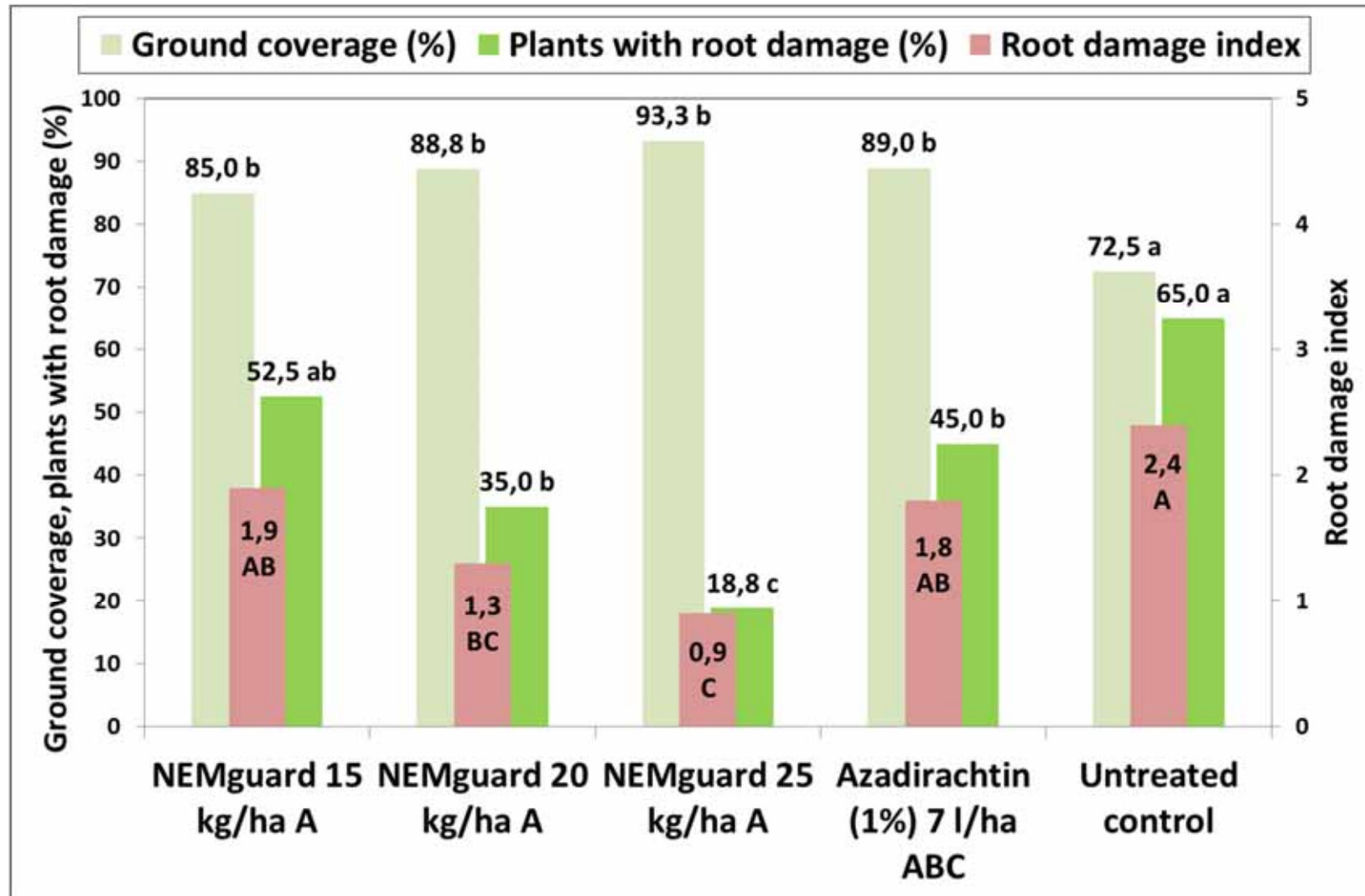
Open-field carrot cv Romance F1 (2011)

Ispica (RG), Sicily, Italy

Root damage (%) = % deformed + forked roots at harvest



# NEMguard® – efficacy against nematodes on lettuce

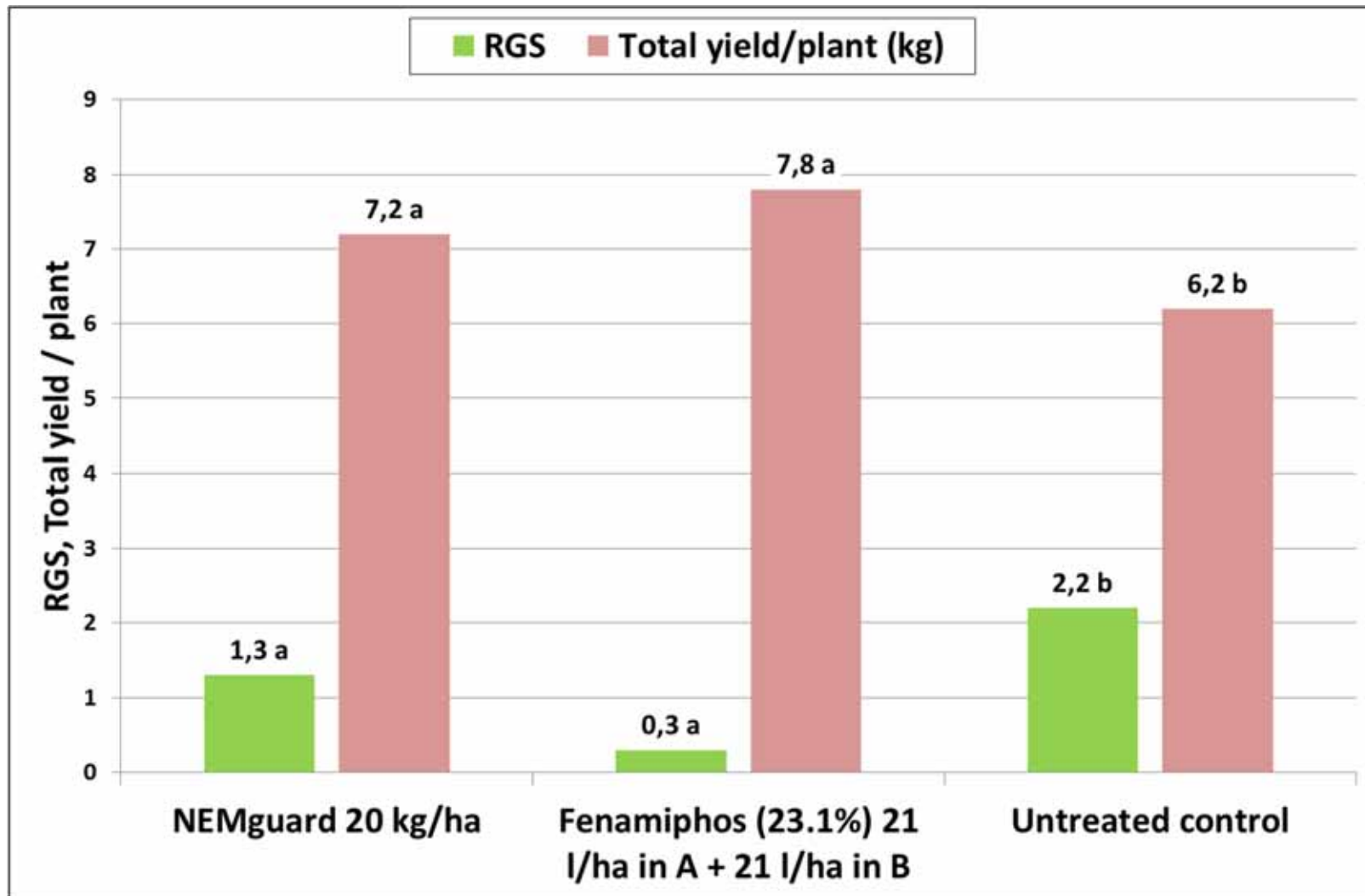


Open-field lettuce cv Nissena (2011)  
 Vittoria (RG), Sicily, Italy. A=7/11, B=21/11, C=6/12.  
 Root damage index (scale: 0-5)





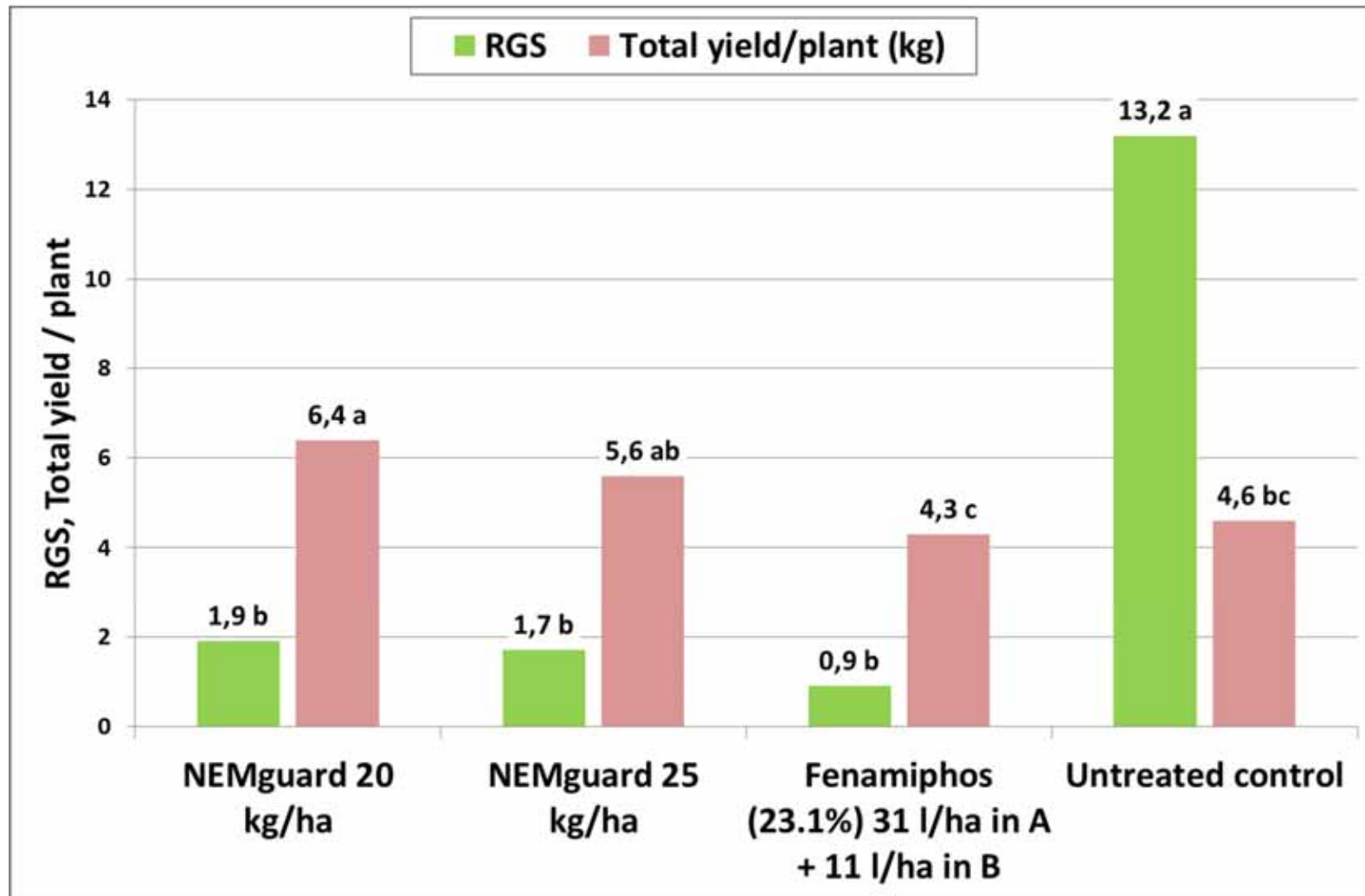
# NEMguard® – efficacy against nematodes on tomato



Protected tomato cv Piombo (2009)  
Santa Croce Camerina (RG), Sicily, Italy  
RGS = Root-galling severity (Zeck scale)  
A = 8 days before transplanting; B = at transplanting



# NEMguard® – efficacy against nematodes on melon



Protected melon cv Cabrera (2009),  
Vittoria (RG), Sicily, Italy

RGS = Root-galling severity (Zeck scale)

A = 6 days before transplanting; B = at transplanting



# NEMguard® – effects on rooting



# NEMguard<sup>®</sup> – benefits

- Highly refined food grade garlic extract formulated with innovative granulation technology
- Highly effective against several nematode species
- Prolonged activity
- Easy to use (apply granules using conventional granule applicator)
- Exempt from MRL restriction
- Safe to humans and the environment
- Can be used in combination with conventional nematicides and mBCAs (**Bioact WG<sup>®</sup>**, a.s. *Paecilomyces lilacinus* strain 251)
- Allowed in organic farming



**«... most nematicides have tended to be rather toxic or volatile, with poor target specificity and less-than-perfect human or environmental safety ...»**

(Chitwood, 2002)

**NEMguard<sup>®</sup> bucks the trend!**

**Thank you for your attention!**

