

# Novel use of EPN: what can we learn from the past?

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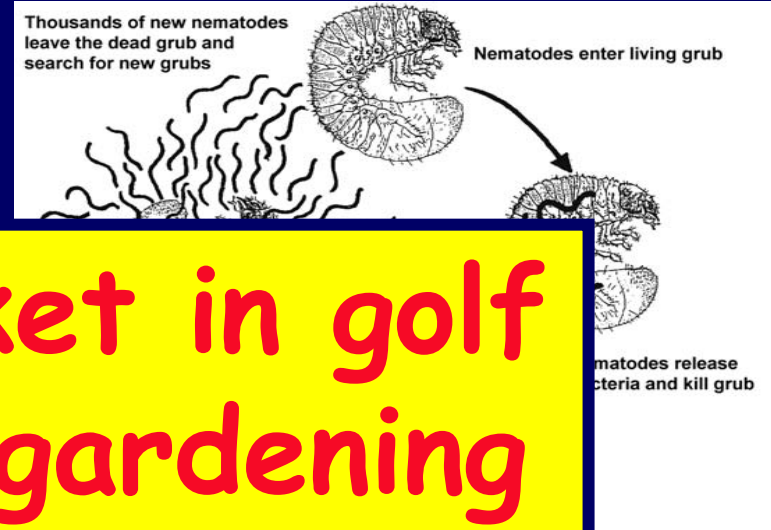
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# CURRENT USE OF EPNs AS BIOLOGICAL INSECTICIDES

COMMODITY	INSECT PEST	NEMATODE SPECIES
Artichokes	Artichoke plume moth	<i>S. carpocapsae</i>
Berries	Root weevils	<i>H. bacteriophora</i>
Citrus	Root weevils	<i>S. riobrave, H. indica</i>
Cranberries	Root weevils Cranberry girdler	<i>H. bacteriophora,</i> <i>S. carpocapsae</i>
Mushrooms	Sciarids	<i>S. feltiae</i> <i>H. bacteriophora</i>
Ornamentals	Root weevils	<i>H. bacteriophora,</i> <i>H. megidis</i>
	Wood borers	<i>S. carpocapsae,</i> <i>H. bacteriophora</i>
	Fungus gnats	<i>S. feltiae</i>
Turf	Scarabs	<i>H. bacteriophora, S. glaseri</i>
	Mole crickets	<i>S. riobrave,</i> <i>S. scapterisci</i>
	Bill bugs	<i>H. bacteriophora,</i> <i>S. carpocapsae</i>
	Armyworm, Cutworm, Webworm	<i>S. carpocapsae</i>
Ornamentals	Thrips	<i>S. feltiae</i>

# Grubs



Small market in golf and home gardening in DE, NL, B and Dk



Refrigerated /4-12°C

Control of garden chafer

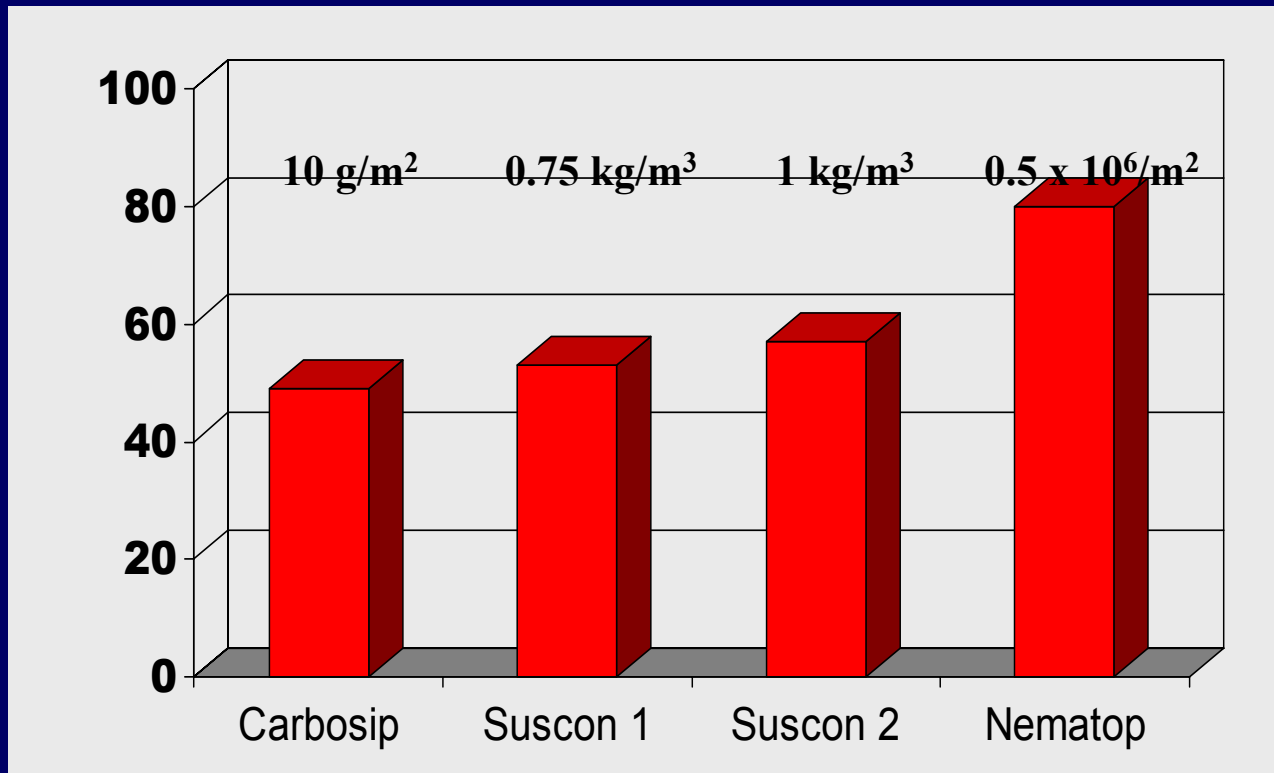
e-nema®

The advertisement features a green background. At the top, it says "Refrigerated /4-12°C". Below this, the text "Control of garden chafer" is written. The central part of the ad is a collage of three images: a close-up of a grub, a close-up of a garden chafer beetle, and a wide shot of a lush green golf course under a blue sky. At the bottom left, the logo "e-nema®" is displayed.

# nematop<sup>®</sup> against *Otiorhynchus sulcatus*



Abbot corrected control [%] *Taxus baccata*, 1998



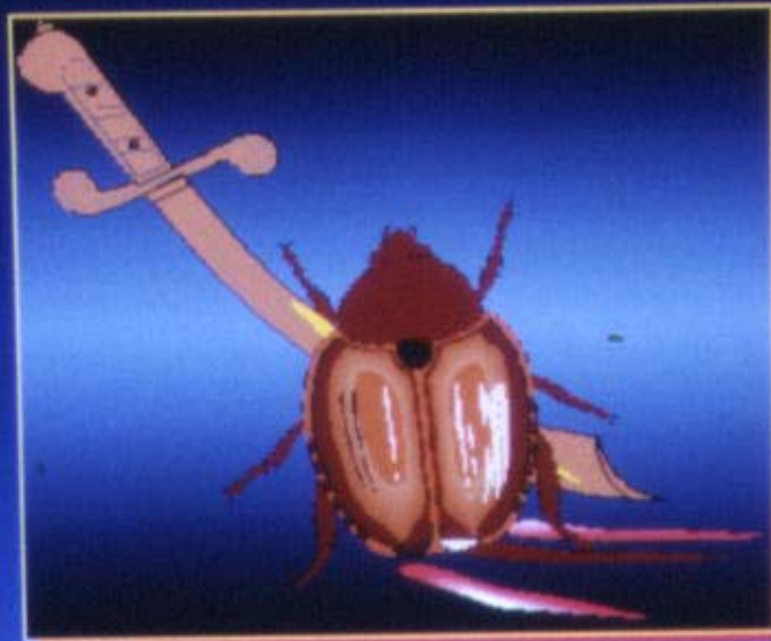
90 % of German tree nurseries use EPN instead of  
chemical control

In the past decade various insect  
pests were evaluated  
considerably as targets for EPNs

Some examples:

**BIOLOGICAL CONTROL OF THE BEETLE**  
*Maldera matrida*  
**BY ENTOMOPATHOGENIC NEMATODES**

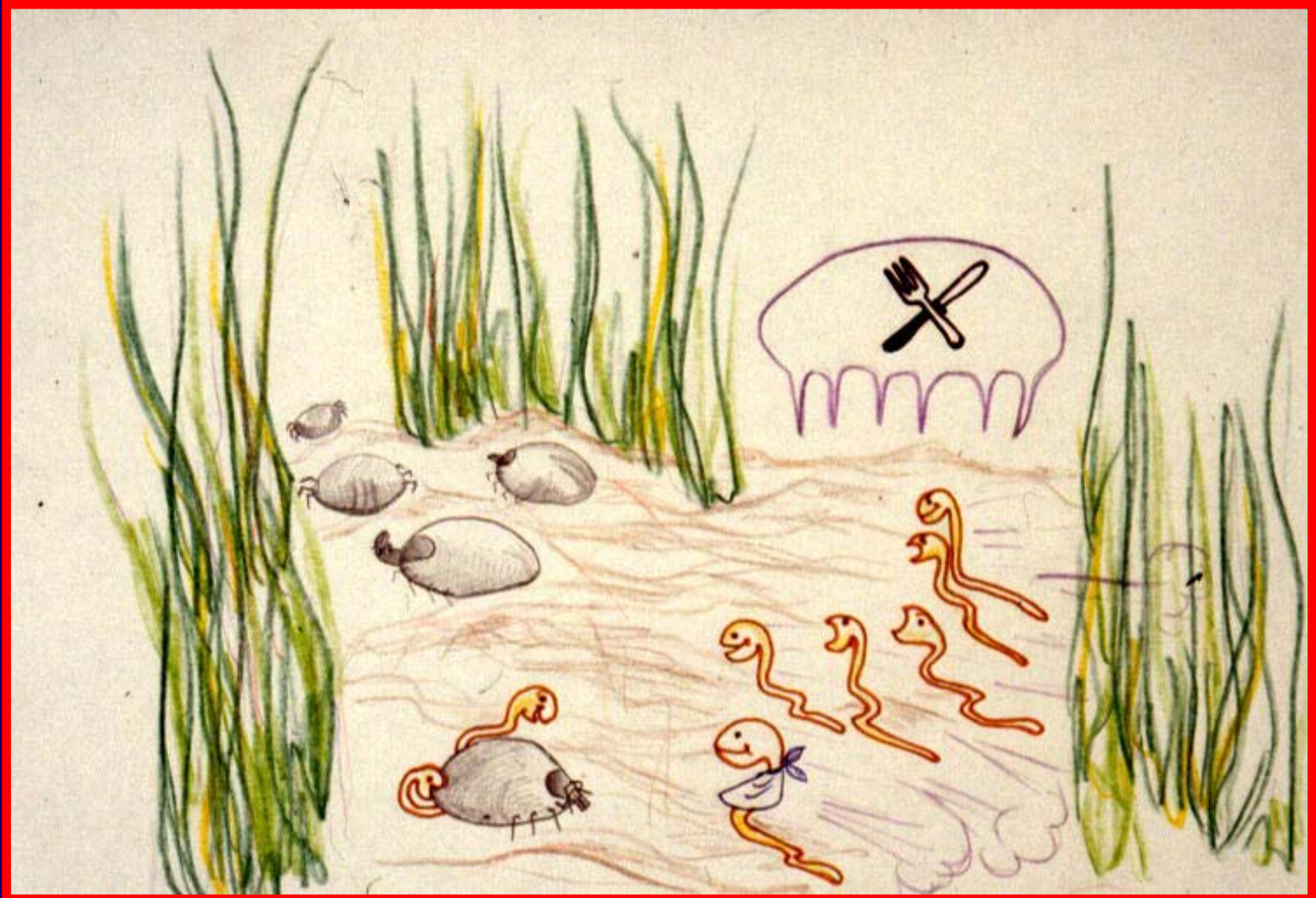
**I. GLAZER & A. GOL'BERG**



# Pink Bollworm- Cotton



# Biocontrol of Ticks with EPNs



# Use of EPNs against Lice



# White Flies?



# Thrips?



# So, why is the actual use of EPNs limited?

Itamar: Where did we go wrong?

Ralf: We have been successful in niche markets. No reason to be disappointed.



Reasons why EPN use is limited to niche markets:

Biological & Environmental Considerations

Application technology

Commercial aspects

# Biological and Environmental cons.



**BACTERIA**



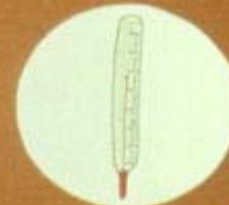
**FUNGI**



**HOST**



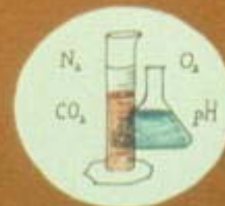
**MOISTURE**



**TEMP.**



**AIRATION**



**SOIL CHEM.**

# Application considerations

No favourable environment

Hard to reach with standard equipment

Formulation

# Application Considerations

More research support we lead to success.

e.g. results by Schroer on foliar application to control *Plutella xylostella*

We need to choose the targets we can control:

Wireworms - no; Diabrotica - yes/no?

We need to persuade users: Use more water instead of less; apply in evening, etc.

# Commercial considerations

No company to produce and commercialize

Niche market

Unawareness or conservative users (Education!!!)

Effective and cheaper alternatives

## Commercial Considerations

Shelf life needs to be prolonged to approach larger outdoor markets (e.g., Diabrotica, Cherry Fruit Fly)

Marketing only possible against pests for which chemical control is ineffective or no longer available

Income of SMEs usually too small to support further research and field development

Lack of professional marketing in outdoor markets (chemical companies fail to market biocontrol agents, biocontrol companies are active only in glasshouse horticulture)

# COST 850: Novel use

*Tipula paludosa*

*Plutella xylostella* (Foilage)

Pests of urban plants

Cockroaches

Wood Lice

Thrips

Forest

*Capnodis tenebrionis*

Nut Weevils

Cherry Fruit Fly

