

Entomopathogenic Nematodes - Step Outside

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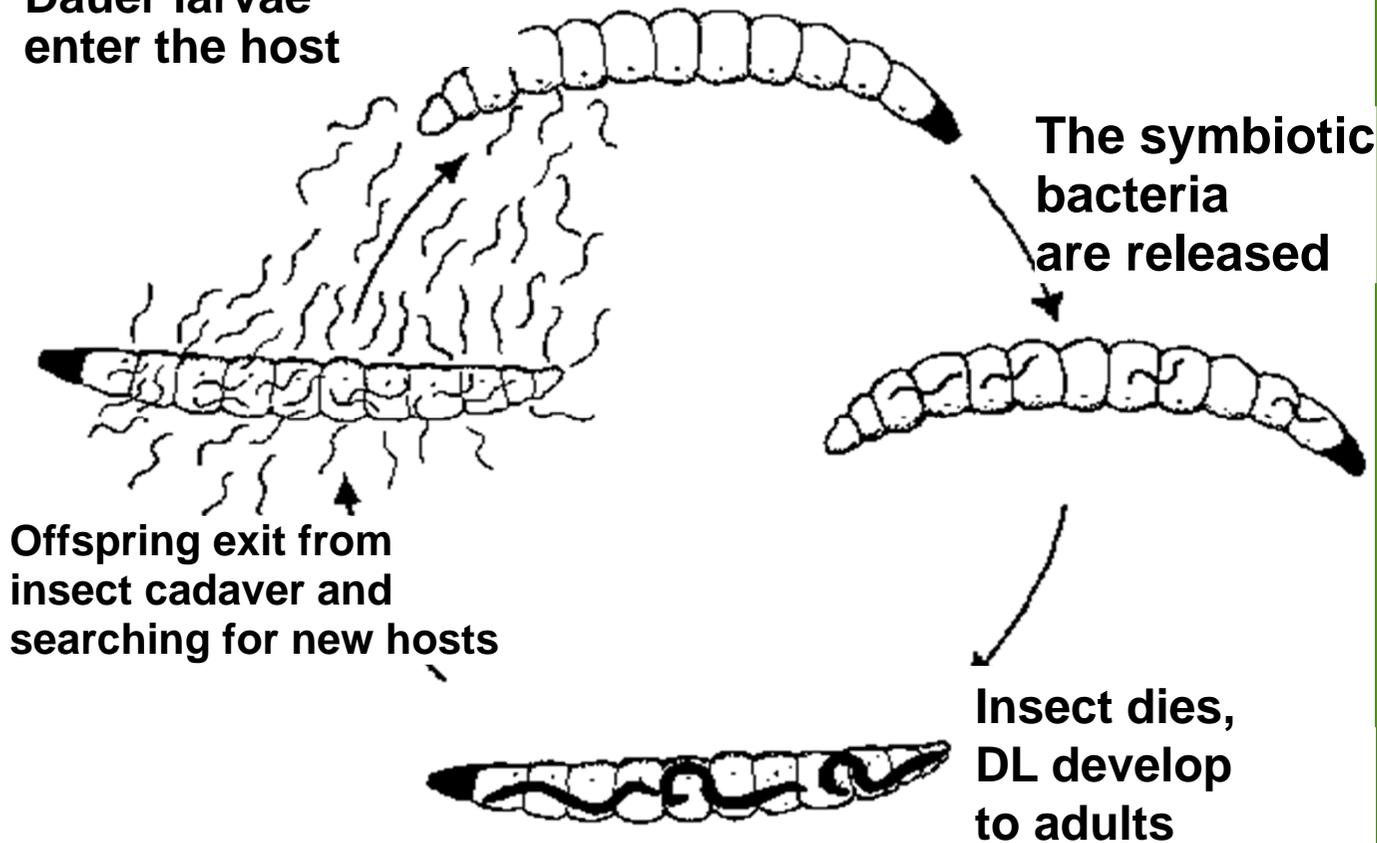


Dauer juvenile
emigrate from a
cadaver

Life cycle



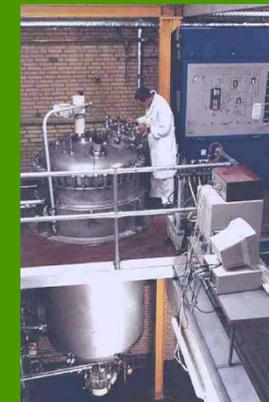
Dauer larvae enter the host



Infected larvae of *Diabrotica virgifera v.*

Nematodes recycle in host and infect surviving larvae

Commercial Production



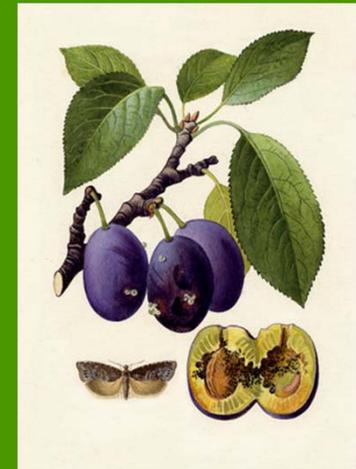
EPN are produced in industrial scale bioreactors

Usually no registration required

Stepping Outside Orchards



- Control of overwintering cocooned last instars of the codling moth *Cydia pomonella* by application of *S. feltiae* or *S. carpocapsae*
- Best combined with mating disruption
- Requirements for high humidity can be overcome by increasing application volume and improved nematode formulation
- Use in apples, pears. Plums *Cydia funebrana*
- *Hoplocampa testudinea* other potential target



Plum codling moth



Application

Stepping Outside Forestry



- Control of *Hylobius abietis* adults and larvae in *Pinus* spp. by application of *S. carpocapsae*, the cruiser nematode
- Limited to Scotland, Ireland and Scandinavia
- Other countries?



Stepping Outside Maize



- Control of *Diabrotica virgifera virgifera* larvae in corn fields by application of *H. bacteriophora*



Red larva is
nematode-
infected

Application Technology



**Application either with corn seeder
in April or spraying in row in June
against second larval stage**

**Recommended application rate:
 1.3×10^9 DL *H. bacteriophora* ha⁻¹
Approx. 2 kg ha⁻¹ formulated product**

KTI/CTI

Landi
REBA

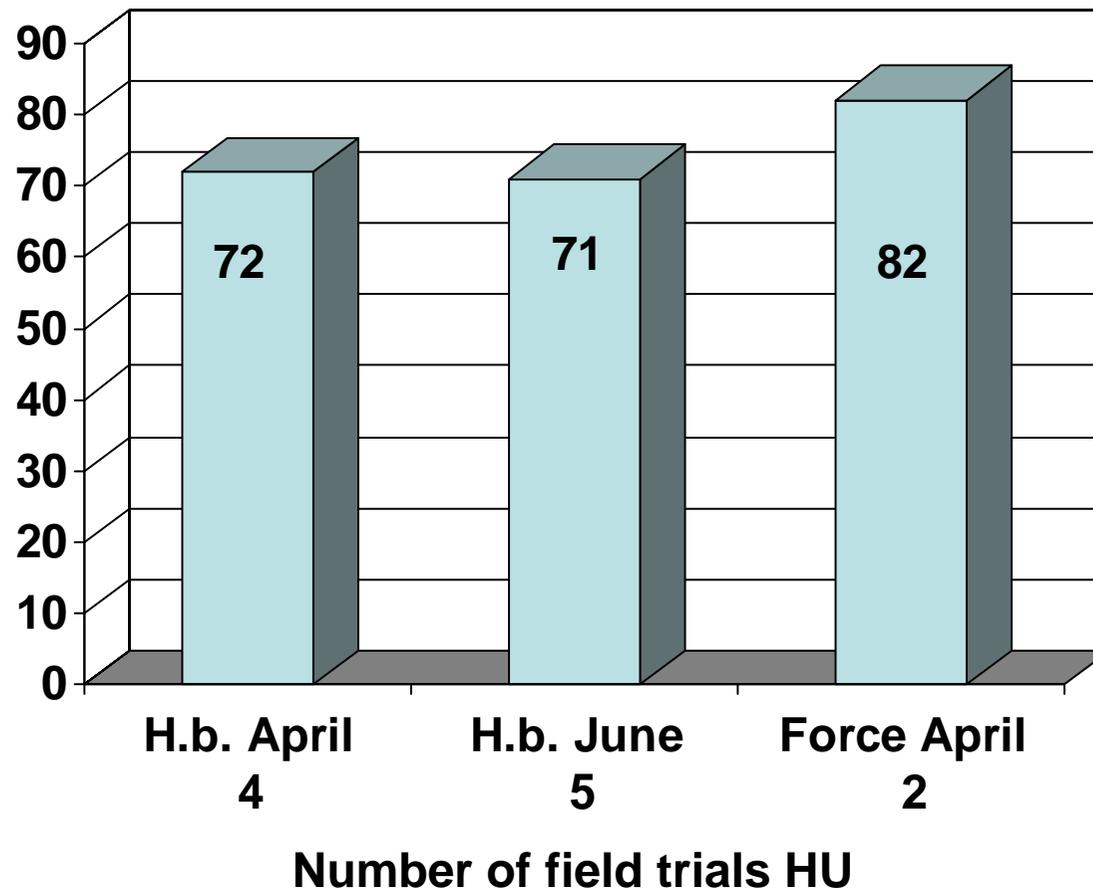


Root Damage

Summary Field Results Hungary 2005-2007



Control Adult Emergence (%)

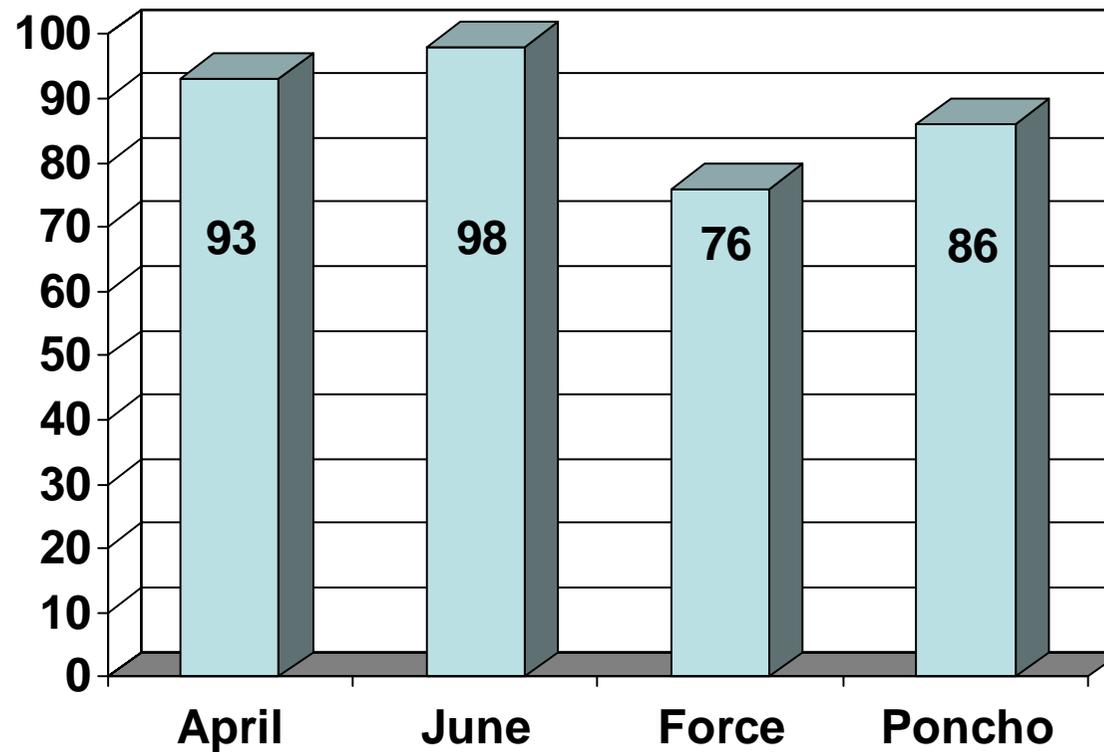


Single plant cages

Comparison with Clothianidin and Tefluthrin



Control Adult Emergence (%)



H.b.: 10^9 ha^{-1} in April or June
Force and Poncho: At sowing



Stepping Outside Mediterranean countries



Control of the Red Palm Weevil (*Rhynchophorus ferrugineus*)

Has reached Europe (Spain,
France, Italy, Crete)

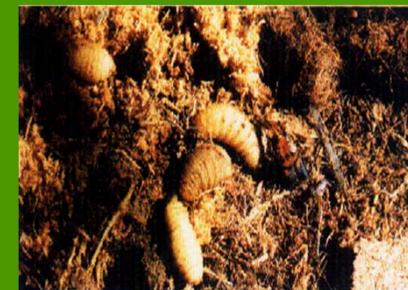
BIQREND[®]

(Trademark of Idebio,
Salamanca, Spain)

Persistence for 2 months

Re-application necessary

Application combined with
tree surgery



Red Palm Weevil

Stepping Outside Mediterranean countries



Control of Mediterranean Root Borer *Capnodis tenebrionis*

Major pest in Mediterranean
stone fruit orchards

Attacks roots and stem

Trees desiccate

Application through irrigation,
drench or soil injection

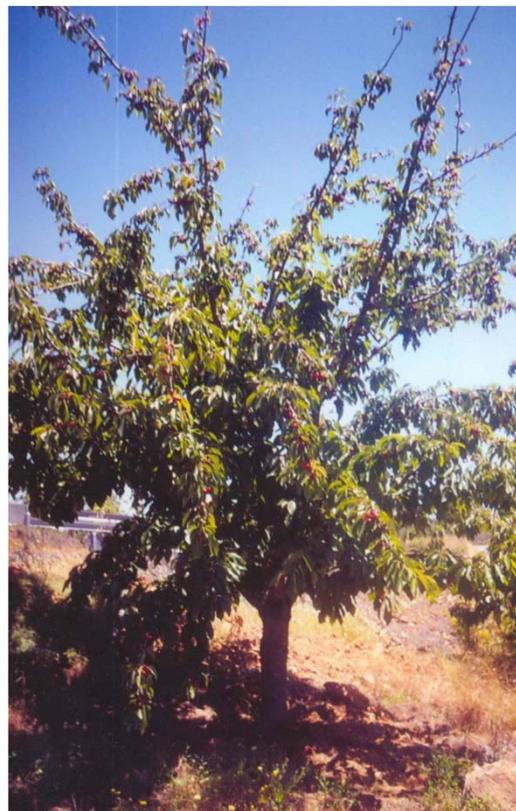
Biorend accelerates recovery of
desiccated trees



1×10^6 *S. carpocapsae* or *S. feltiae*/tree

*Capnodis
tenebrionis*

Stepping Outside Mediterranean countries



Cherry tree before + 1 year after application of

BIQREND[®]



*Capnodis
tenebrionis*

Stepping Outside Mediterranean countries



Control of Hazelnut Borer (*Balaninus nucum*) with *H. bacteriophora*

Major pest of hazelnuts

No chemical control
available

Production in E, I, F, TUR

Application of *H. bacterio-*
phora at emergence of
larvae from infested nuts
before pupation

Timing important !

Forecast necessary

500,000 *H.bacteriophora*/m² under tree



Balaninus nucum

EPN - Steping Outside



Business opportunities in outdoor markets

Less chemical control available, particularly in soil

EPN can substitute

In many cases a further reduction of application costs will be necessary to approach these markets

Production costs and application density are targets for reduction

Improvement through breeding programmes

Enhancement of, e.g., storage stability, host finding capacity, reproduction potential

**Thanks for your
attention**