

Persistence of *Heterorhabditis* *bacteriophora* in turf



Alper Susurluk and Ralf-Udo Ehlers

**Inst. for Phytopathology, Dept. Biotechnol. &
Biological Control, Christian-Albrechts-
University Kiel, 24223 Raisdorf/Germany**

Damage of turf grass



Dry spots in summer

Damage caused by birds



Scarabaeidae



▶ **Garden Chafer (*Phyllopertha horticola*)**

Sustainable Control of White Grubs with Nema-Green®

kühl lagern / 4-12°C

nema-green®
Biologische Engerlingsbekämpfung

e-nema GmbH
Klausdorfer Straße 28 - 36, D. 24223 Raisdorf, www.e-nema.de

e-nema®

White Grub Species in Northern Europe

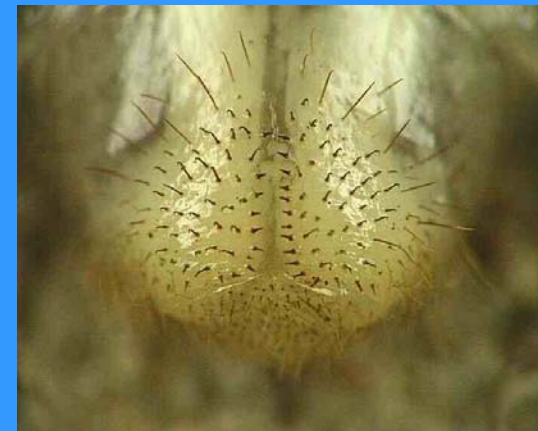
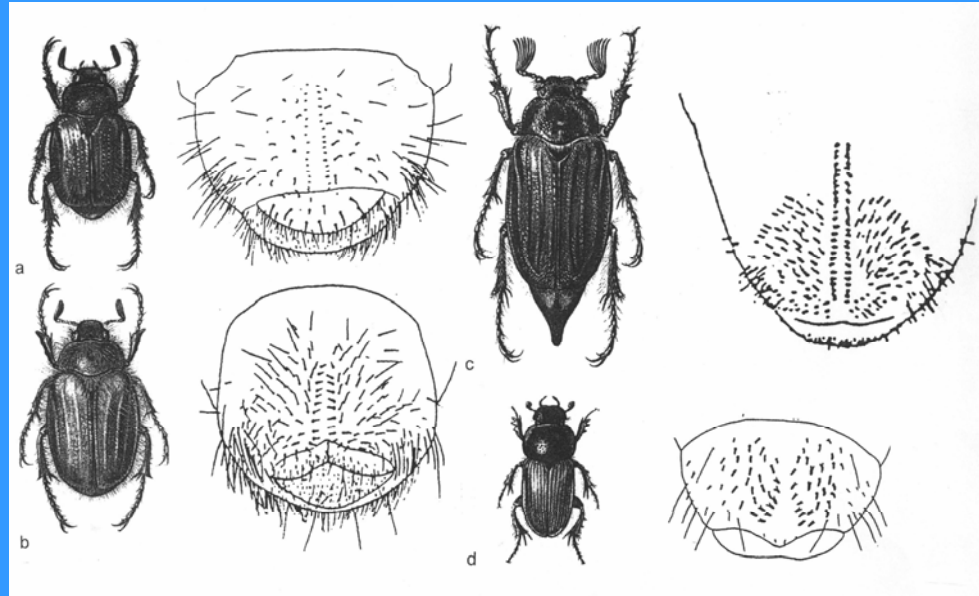
Phyllopertha horticola

Hoplia philanthus

Aphodius spp.

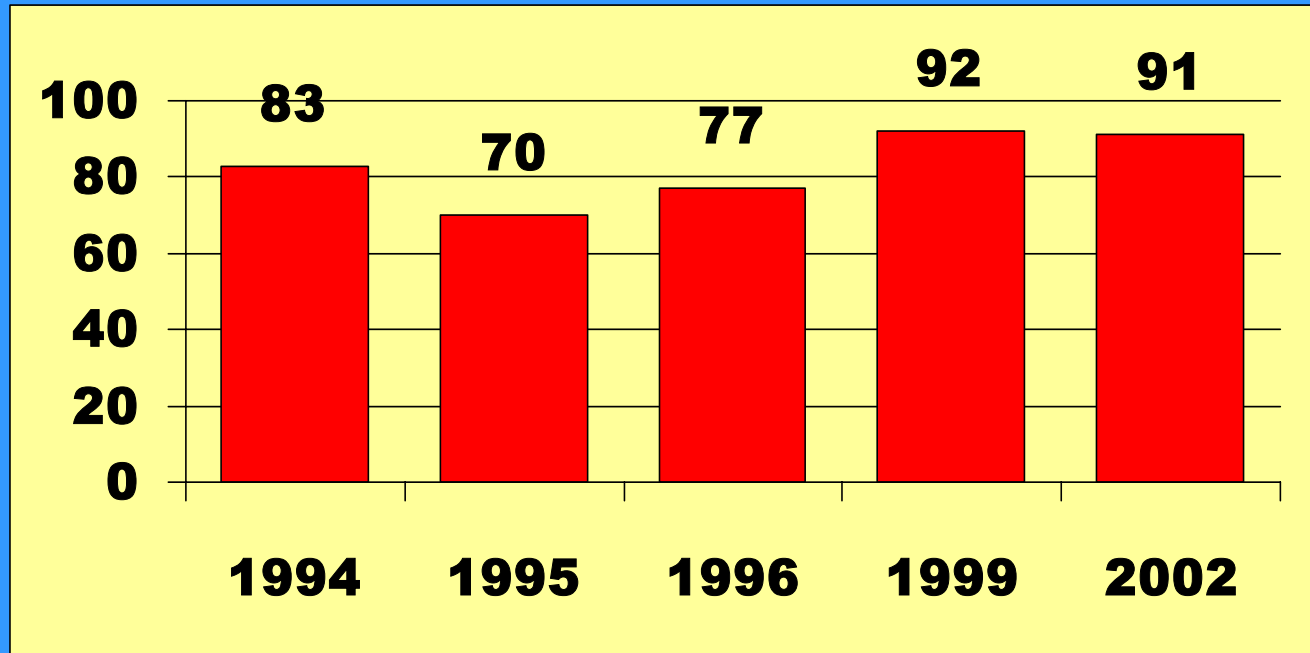
Amphimallon solstitialis

Melolontha spp.



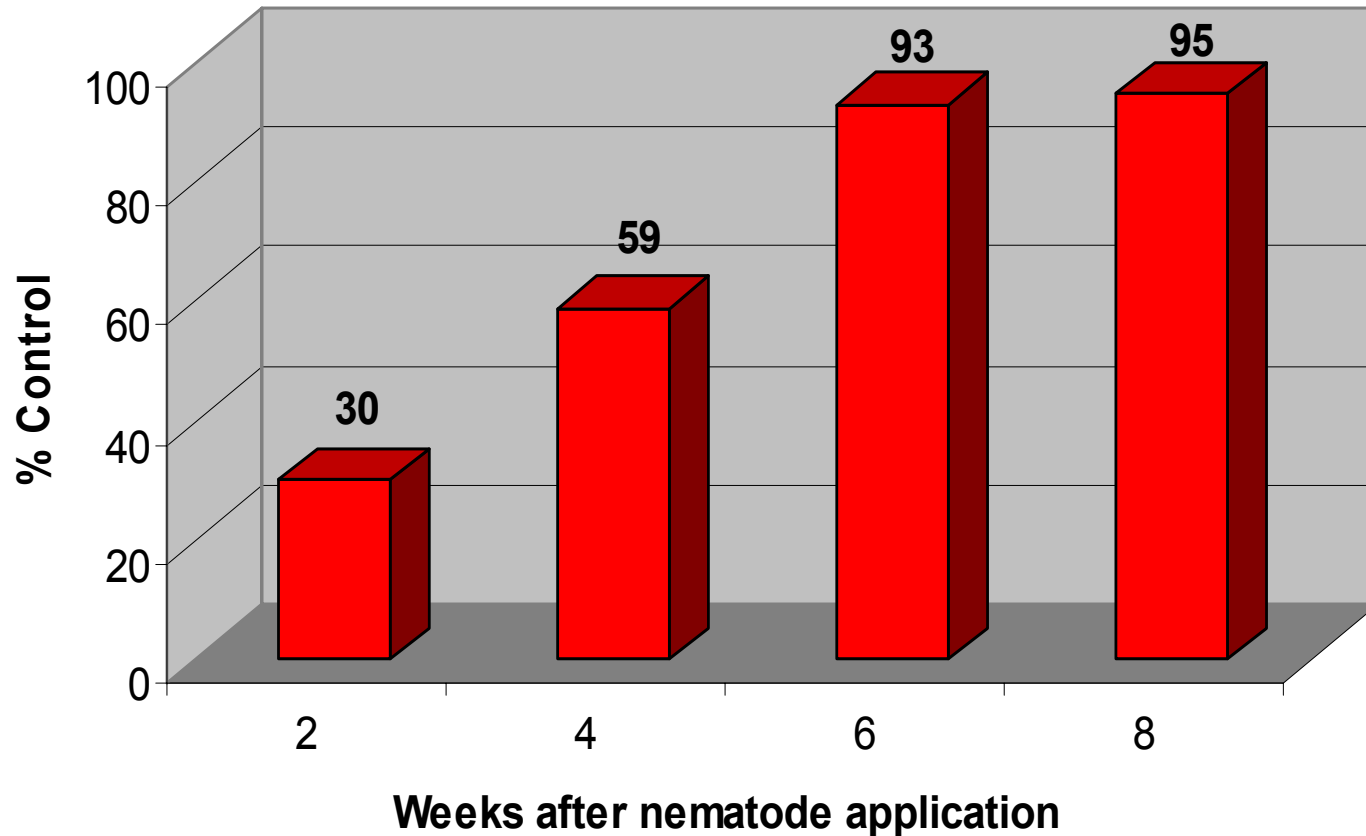
Field results with nema-green[®] against *Phyllopertha horticola*

Abbott corrected control [%]

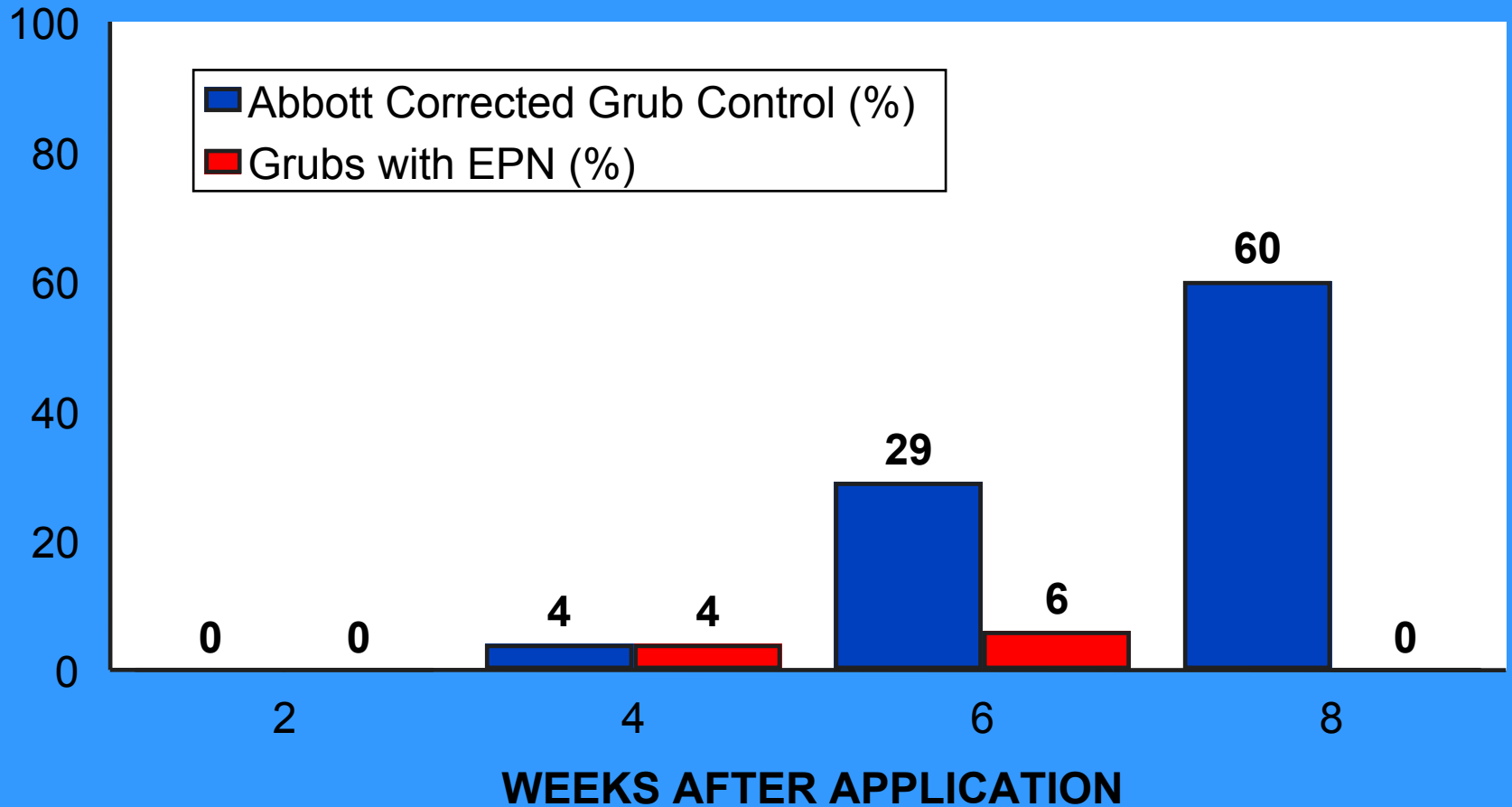


Year

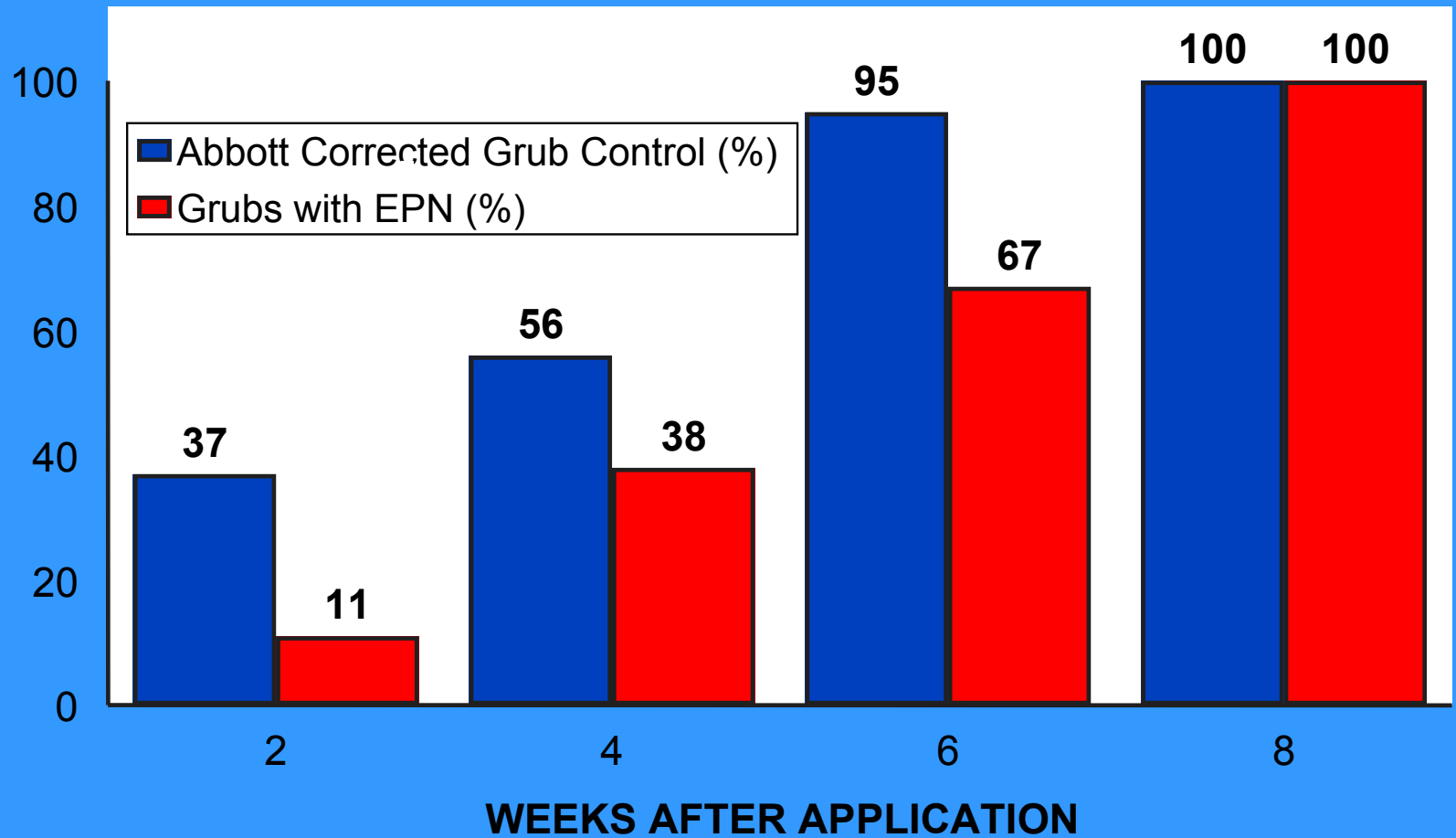
Constant increase of control



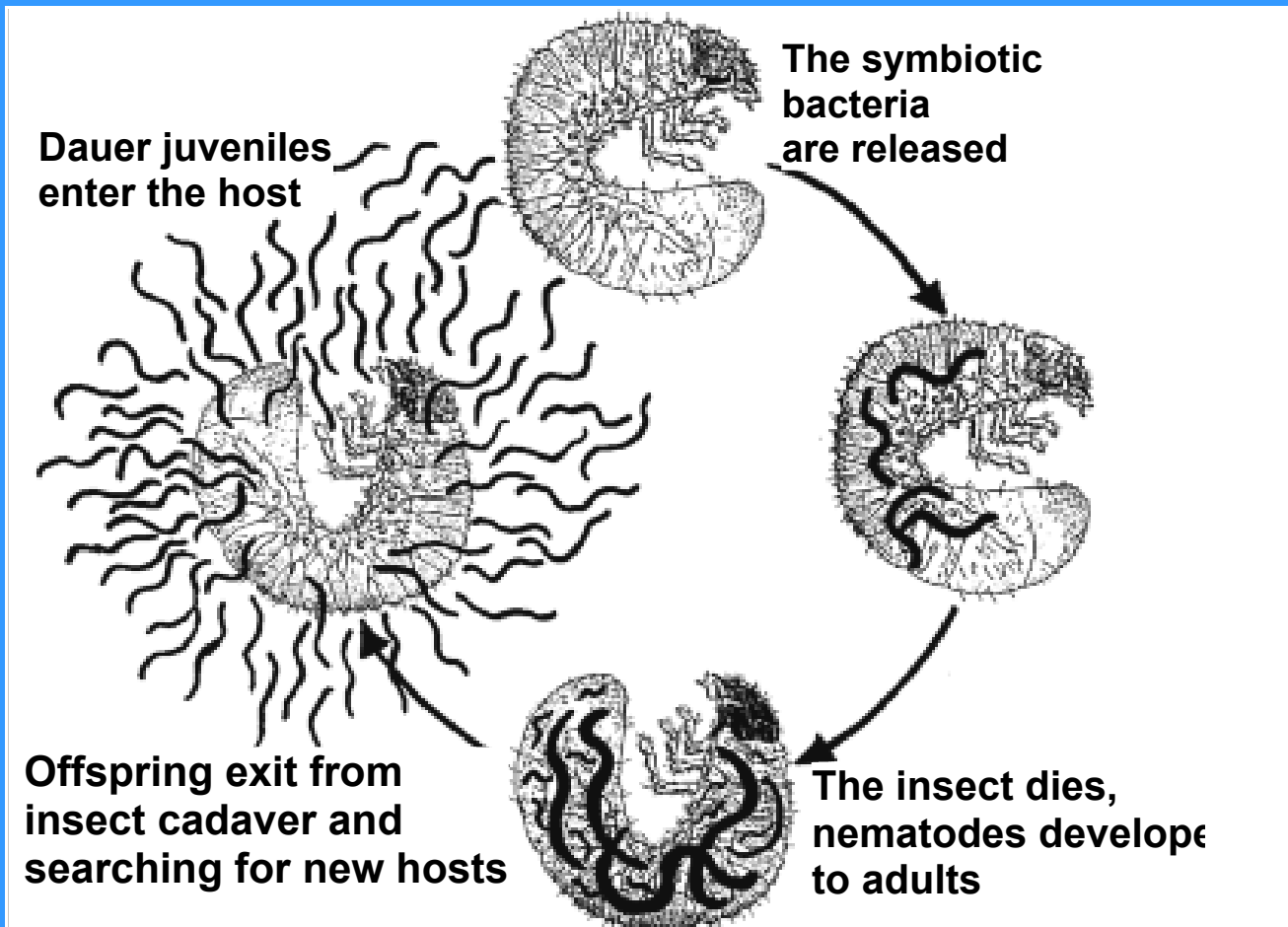
LOW CONTROL RESULTS



SUCCESSFUL CONTROL



Recycling in the target insect



Persistence in Turf 1999

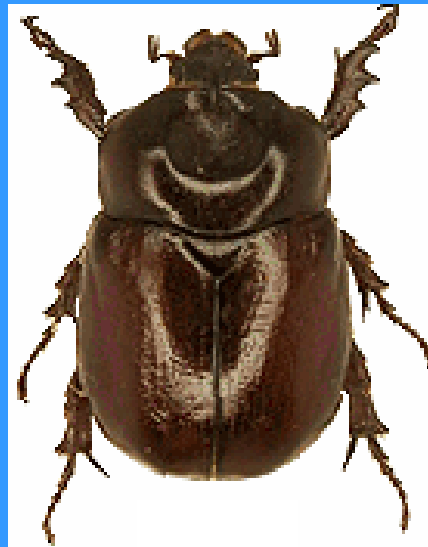
- **3-5 samples of 500 g each from fairways which had been treated with nema-green a year before sampling and baiting with *G. mellonella***
- **25% of samples were positive for *H.b.***
- **Of 14 golf courses, which had Garden Chafer all were positive in at least one sample**
- **Two courts had June Beetle and were negative**



**Not every grub species
is a host**



Melolontha melolontha



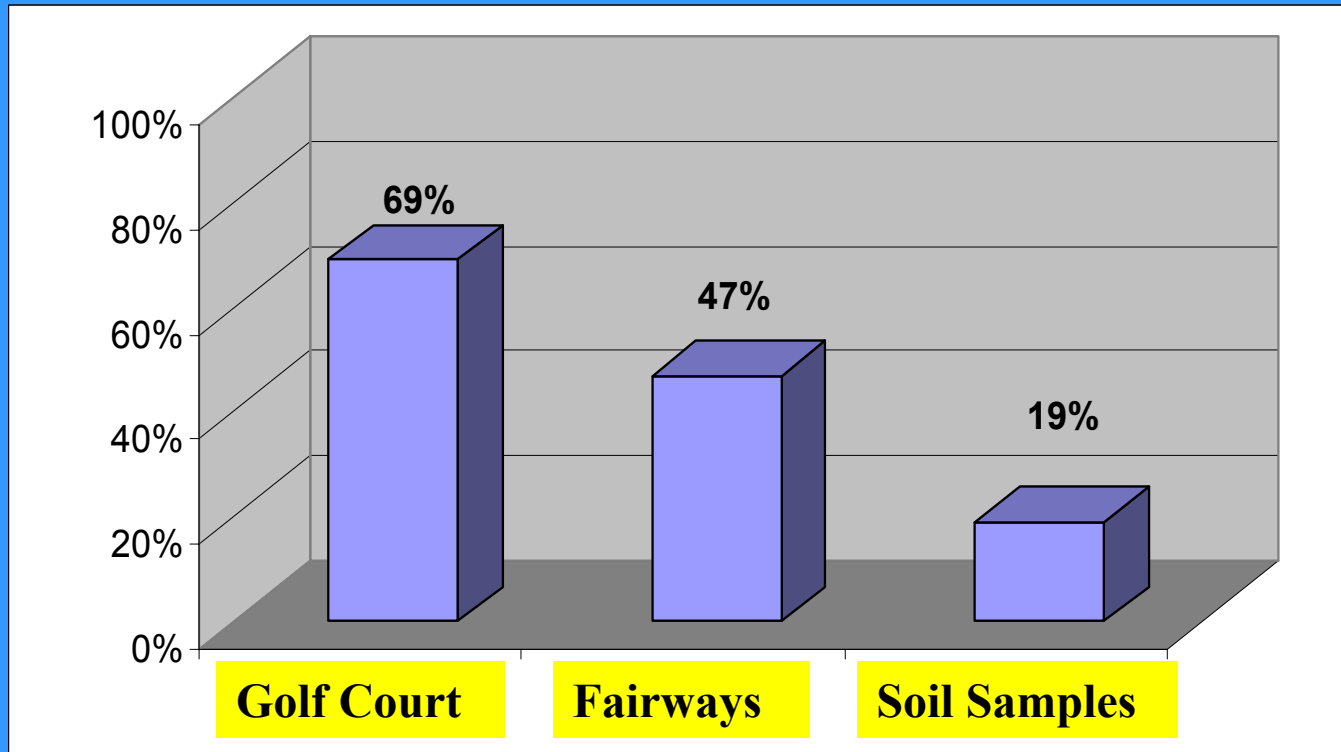
Phyllognathus exagavatus



Amphimallon sostitiale

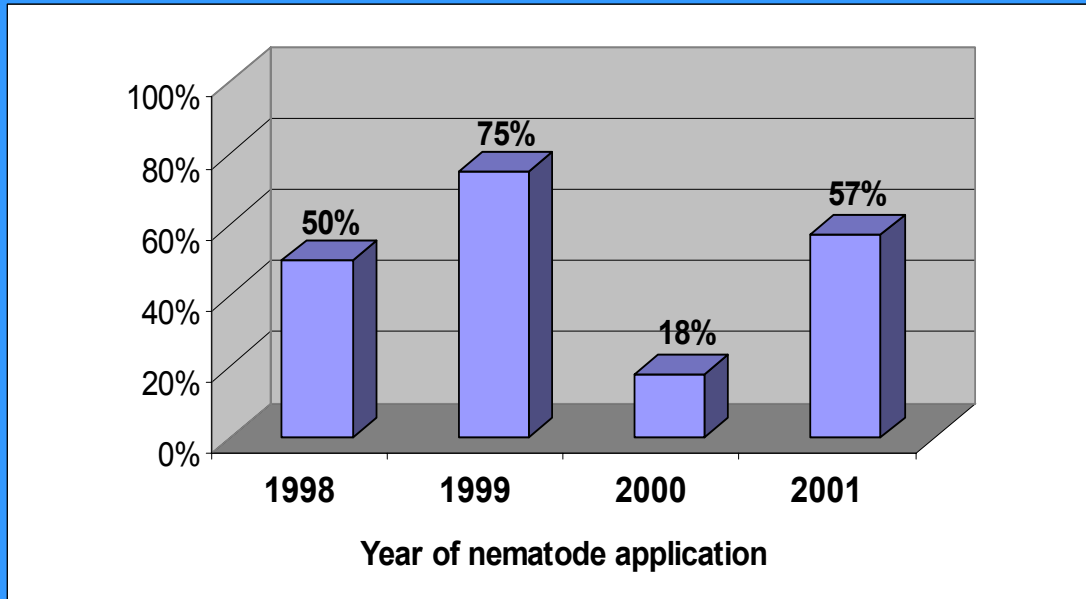
Persistence in Turf - 2002

- **12-50 Samples per fairway**
- **Galleria baiting**



Sustainable effects through successful establishment

% golf courts with establishment



Isolation of *H. bacteriophora* in 2002 from soil samples taken from golf fairways which had applied nema-green

Place	EPN use	N	% + EPN
Burbach	2000, 2001	19, 21, 21, 24	0, 0, 0, 0
Wesel	2001	21,21,20	5, 0, 0
Worpswede	2001	20, 16	30, 7
Warendorf	2001	20, 18	20, 22
Peckeloh	1999 - 2001	20, 23, 12	0, 13, 17
Hatten	1998, 2000	20, 20, 25	0, 0, 56
Hünxerwald	1998, 1999	20, 21	10, 9.5
St. Dionys	2000, 2001	35, 50, 26	0, 24, 4

SUSTAINABILITY

- *H. bacteriophora* is able to establish
- What are the conditions supporting successful establishment:
- Presence of host insects and recycling
- Moisture enabling migration
- Users with knowledge on handling EPN
- Most of this is speculation