

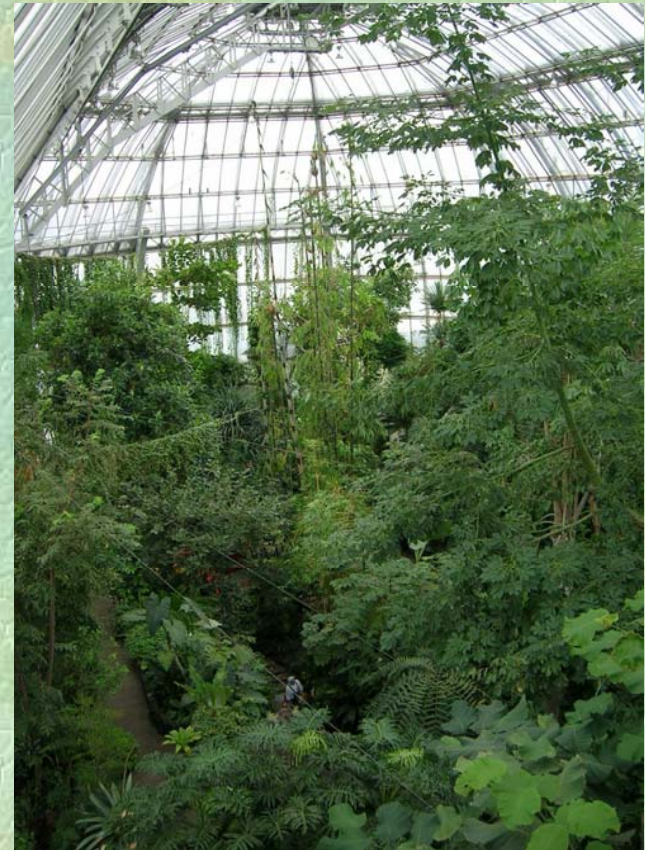
Cockroach control with entomopathogenic nematodes

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Berlin

Cockroaches in amenity-greenhouses

Botanical gardens, Zoological gardens
Tropical Water-Wonder-Worlds



Where they hide





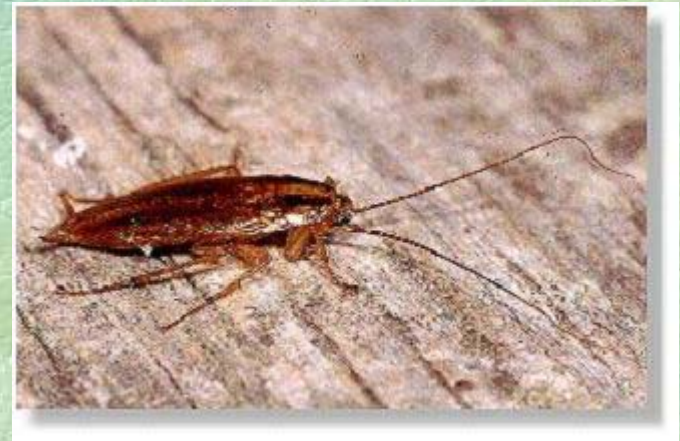
Periplaneta australasiae



Periplaneta americana



Pygmoscelus surinamensis (Nympe)



Blattella germanica

Periplaneta australasiae



- Up to 13 Nymph-stages, with optimal conditions approx. 5 nymph stages
- Total developmental time 6 - 12 months



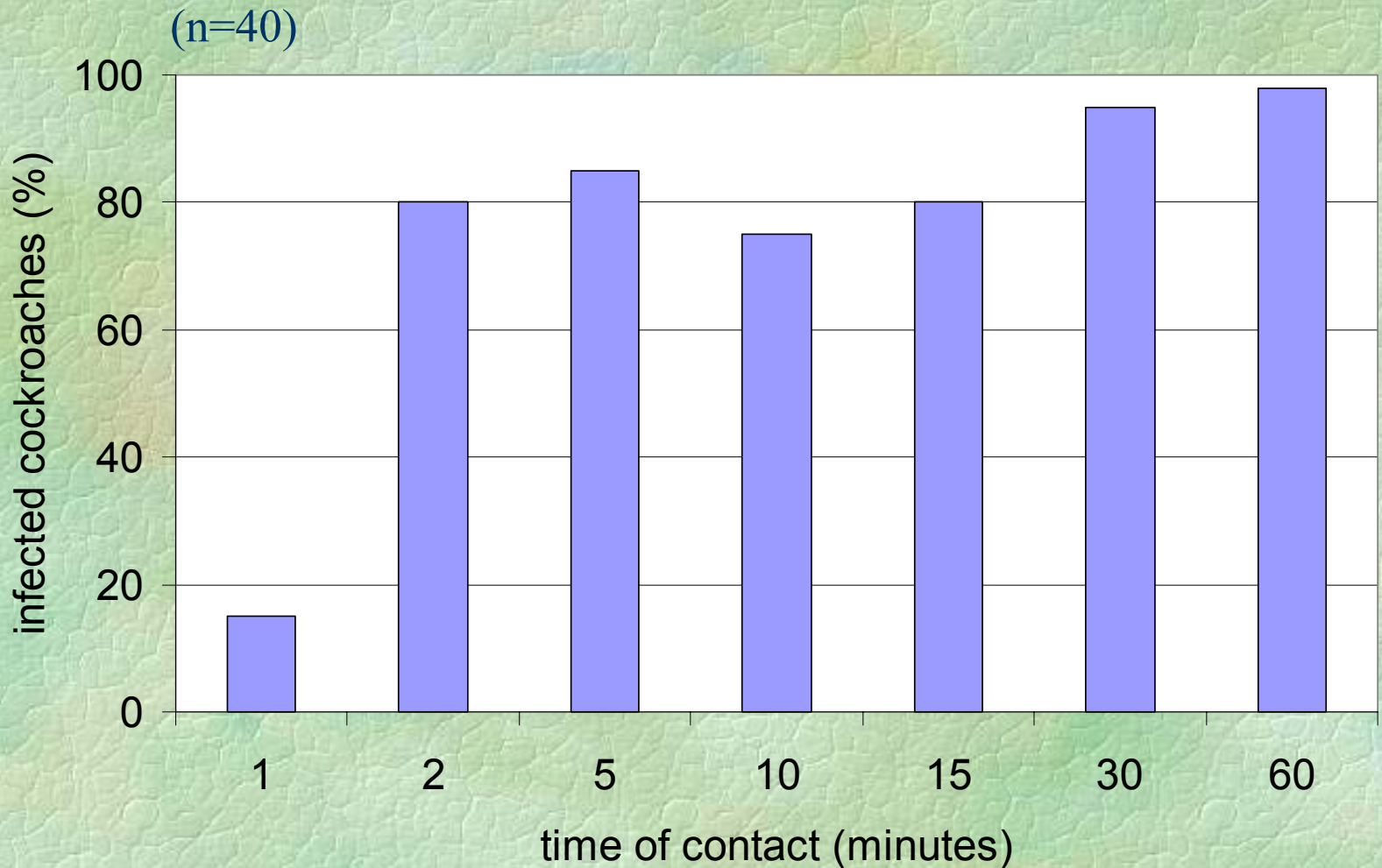
Live span of adult: 6 months

Production of 20 - 30 ootheca with 26 eggs each

Development of nematode bait station

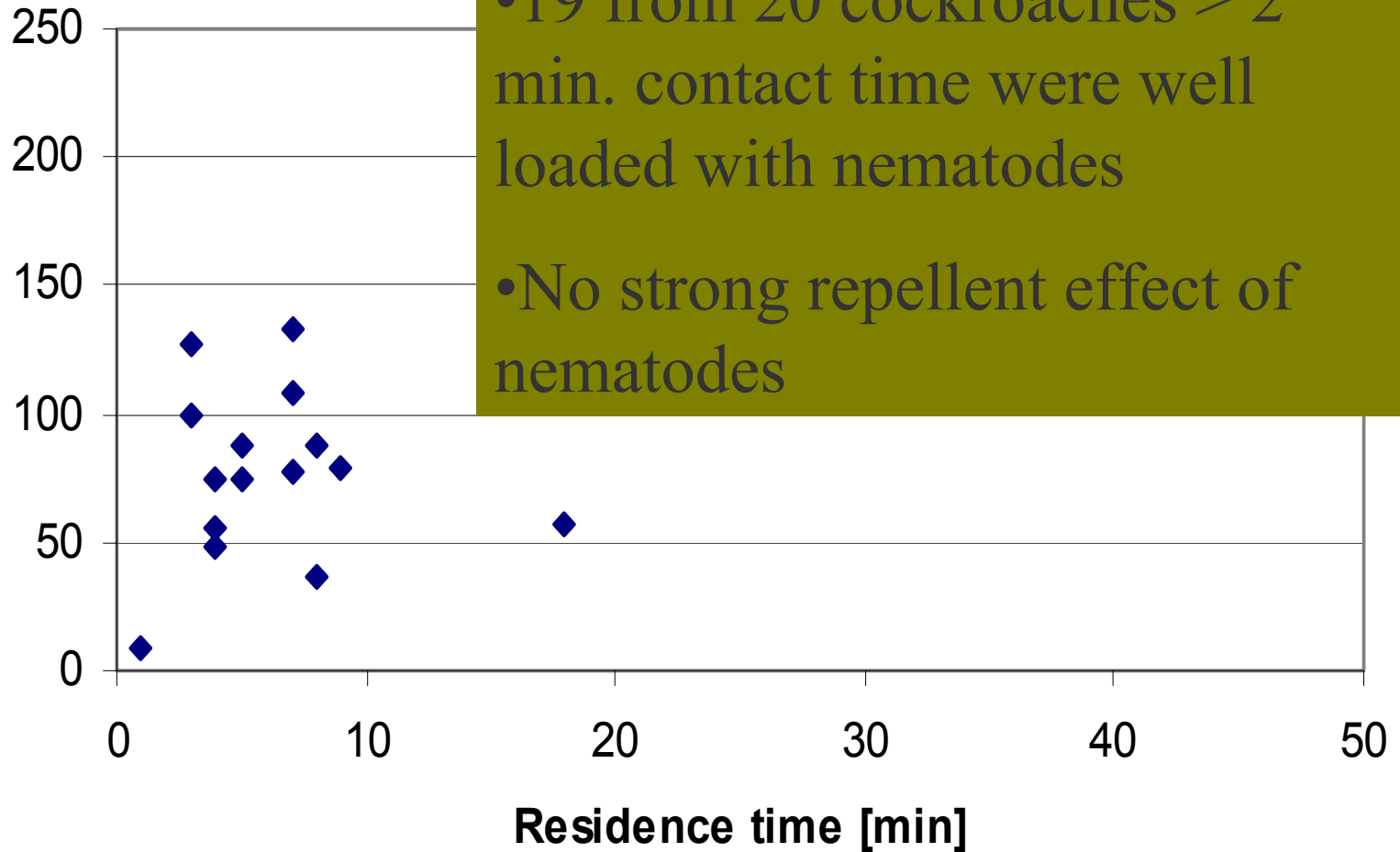
- Establishment of critical contact time
Steinernema carpocapsae and cockroaches
- Detecting main invasion site of nematodes
- Screening of different attractants and bait substances
- Testing different bait stations
- Horizontal transmission
- Field trials in greenhouse

Forced contact of cockroaches with nematodes



Cockroaches visiting bait stations voluntary

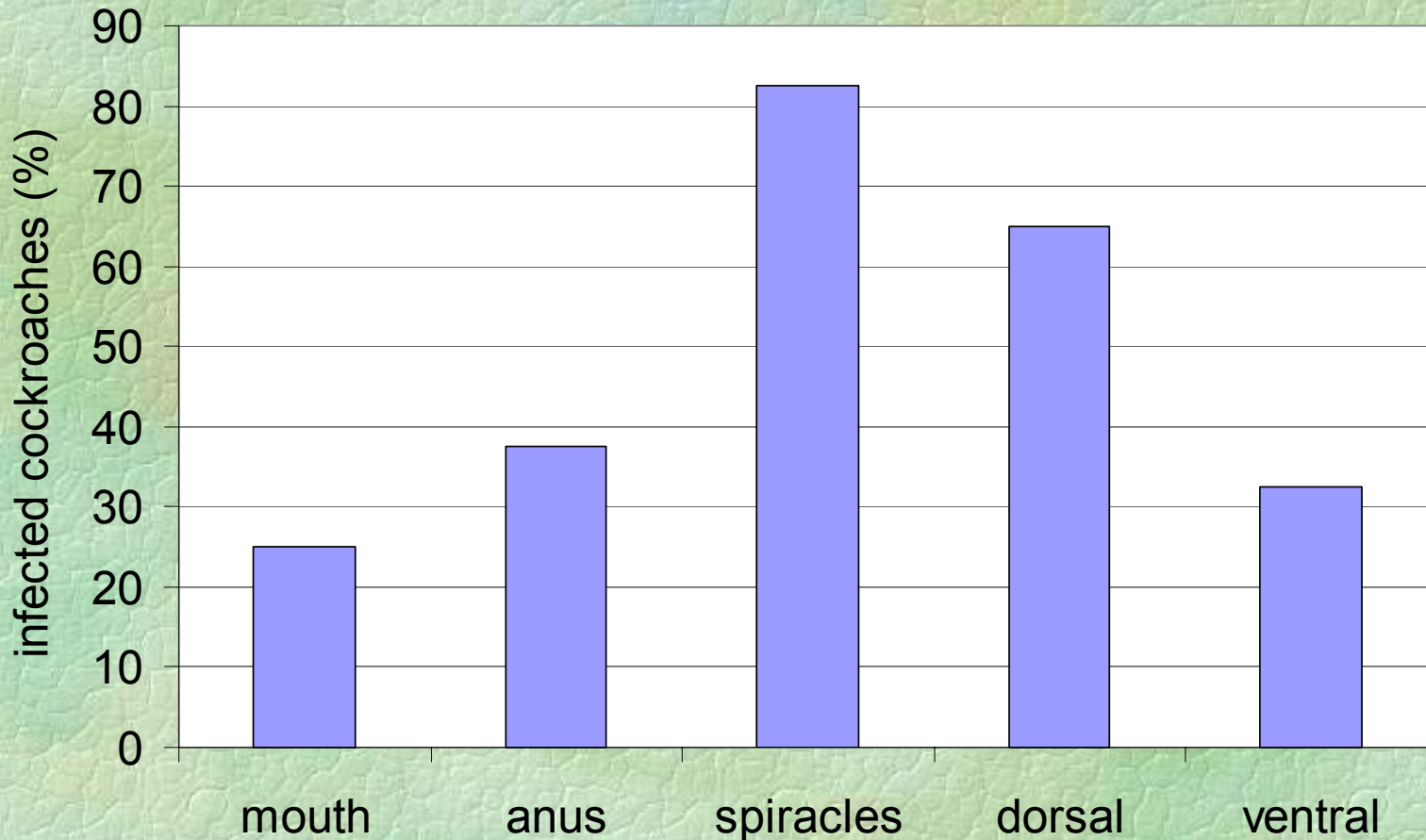
Number of *S. carpocapsae* on
cockroach



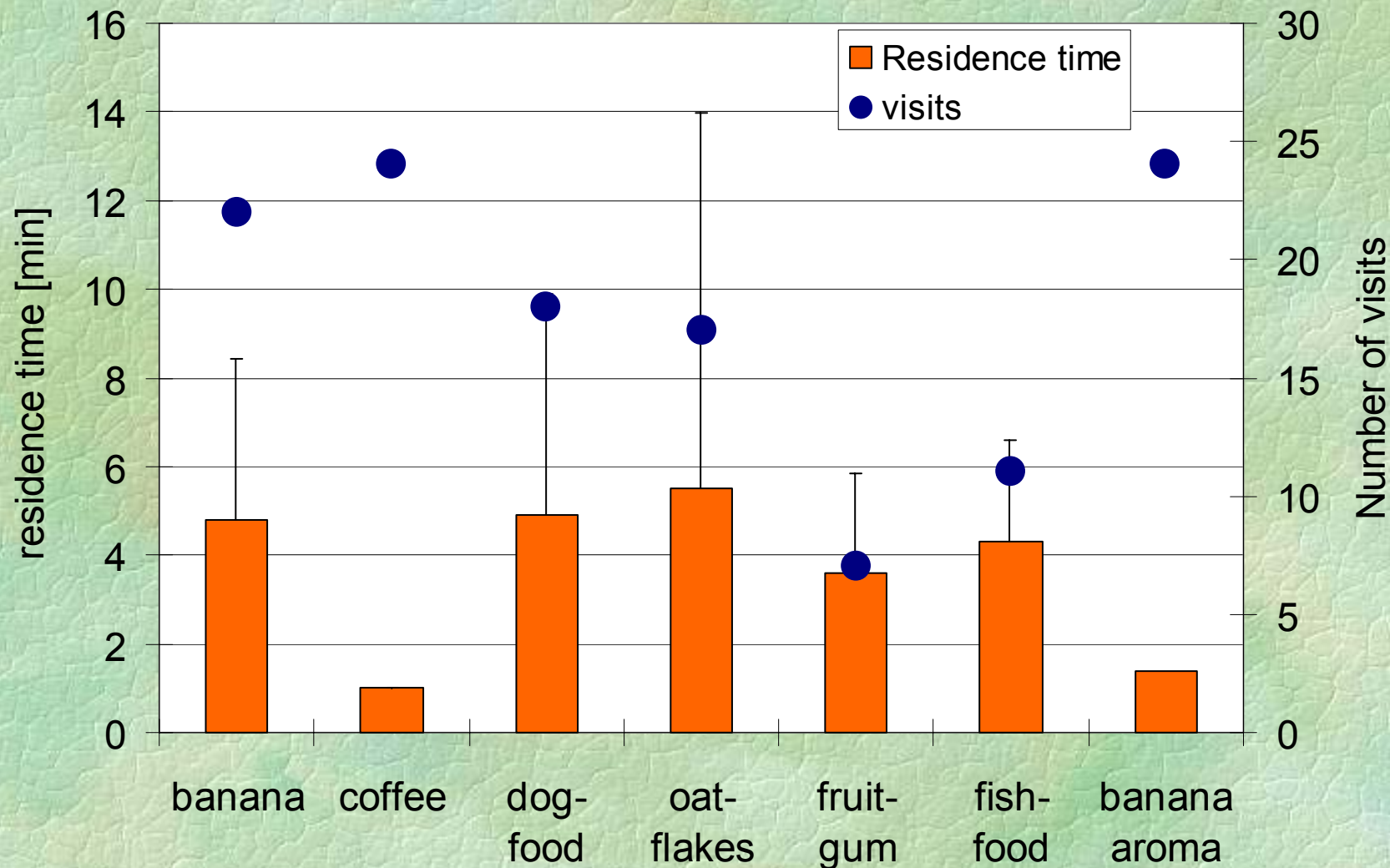
Where do nematodes invade ?

Application with brush on specific sites, approx.

1000 nematodes/cockroach



Attractivity of luring substances



Bait stations tested



Small Petri dish



Big box with nematode containing lid



Felt-tube

Bait stations (continued)



Single track



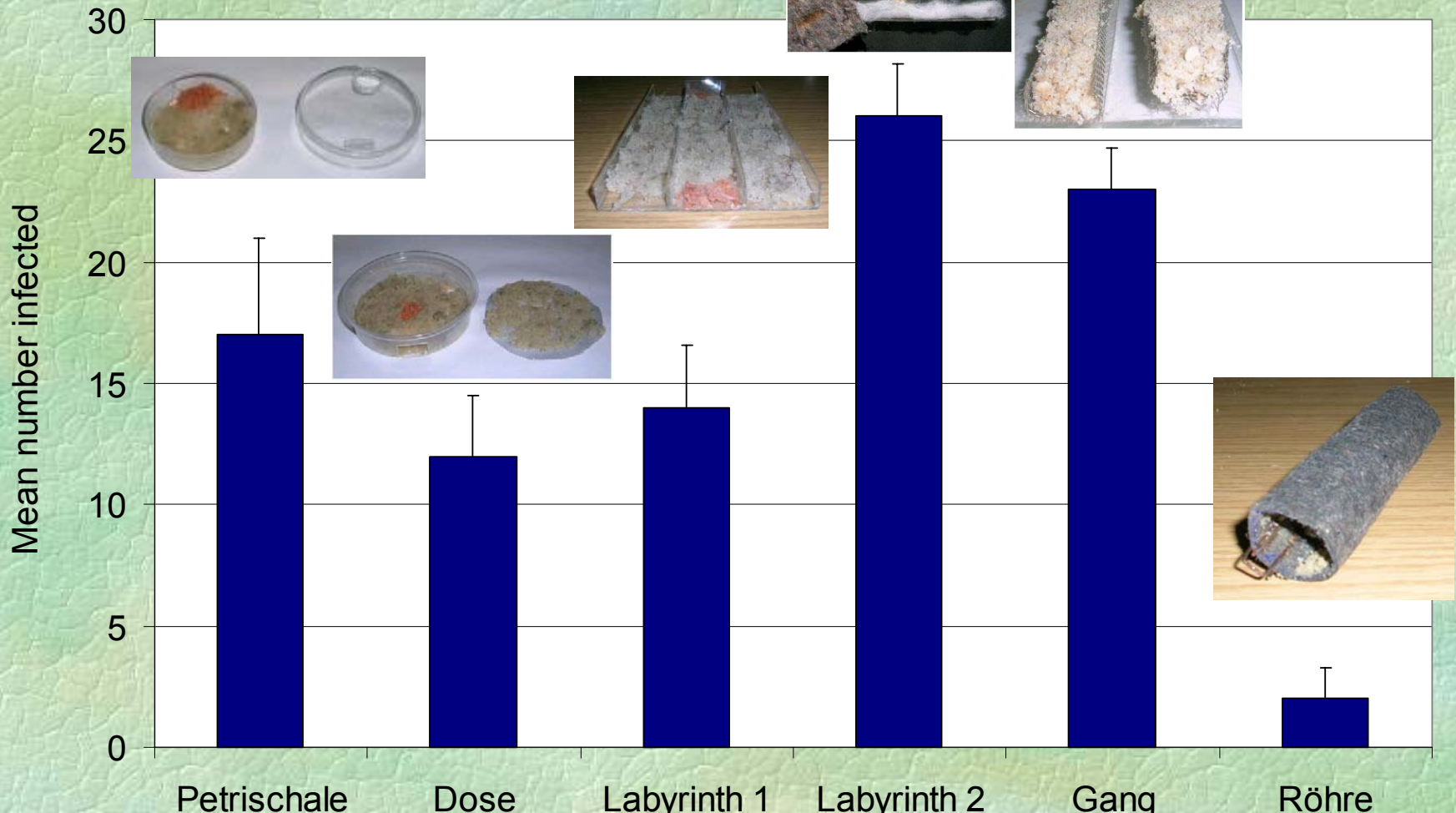
Labyrinth 1 (nematodes from bottom and top)



Labyrinth 2 (nematodes laterally)

Bait stations tested in big arenas

(5 x 30 cockroaches)



Horizontal transmission

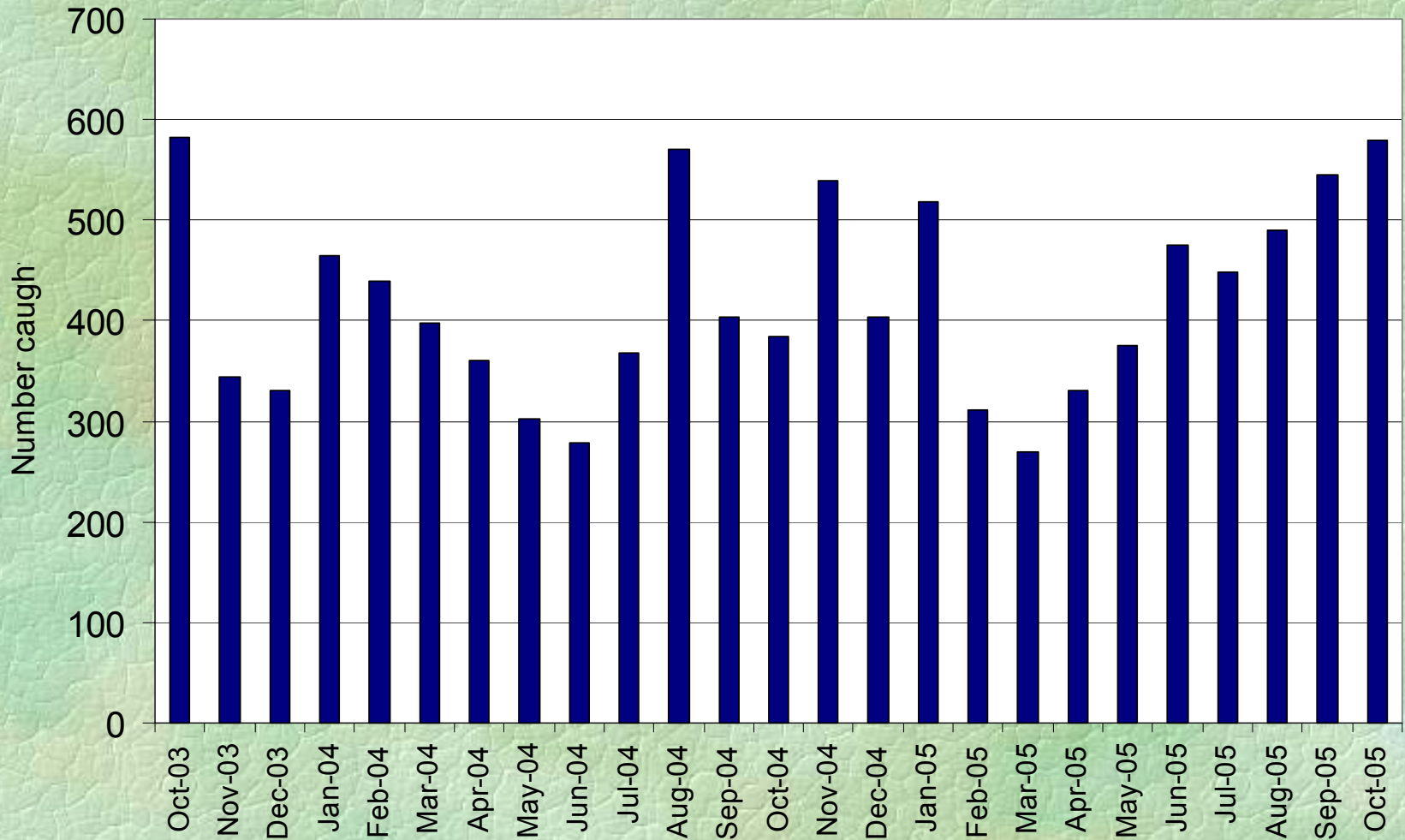
(n=25)

	With soil - 1 day p.i. -	With soil - 6 days p.i. -	No soil - 1 day p.i. -	No soil - 6 days p.i. -
Dead cockroaches	20	22	2	3
Infected cockroaches	80%	88%	8%	12%

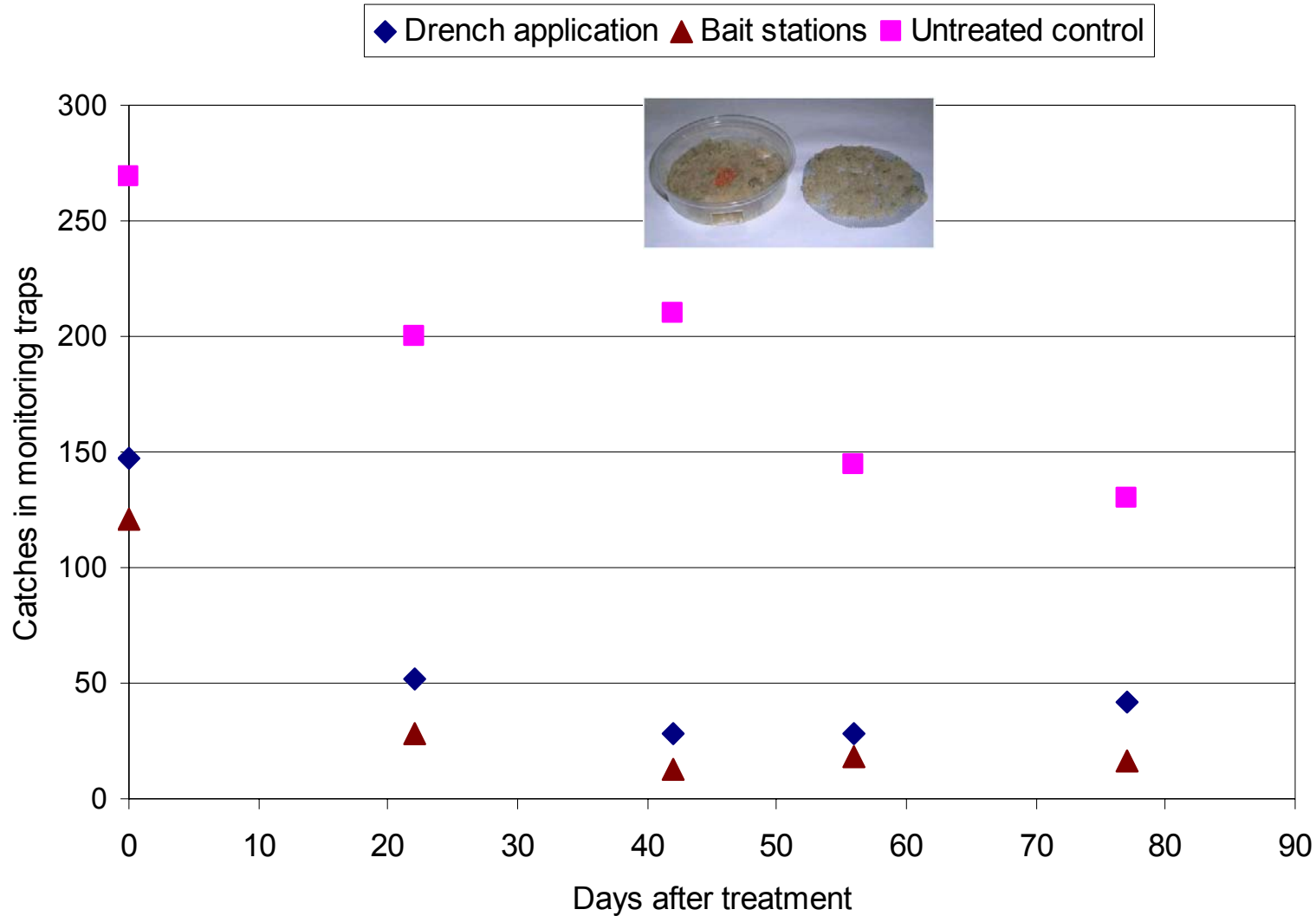
- Re-infection is possible in greenhouses, where nematodes exit the cadaver and enter the moist soil
- No reinfection in environments without soil !

Monitoring traps in the greenhouse

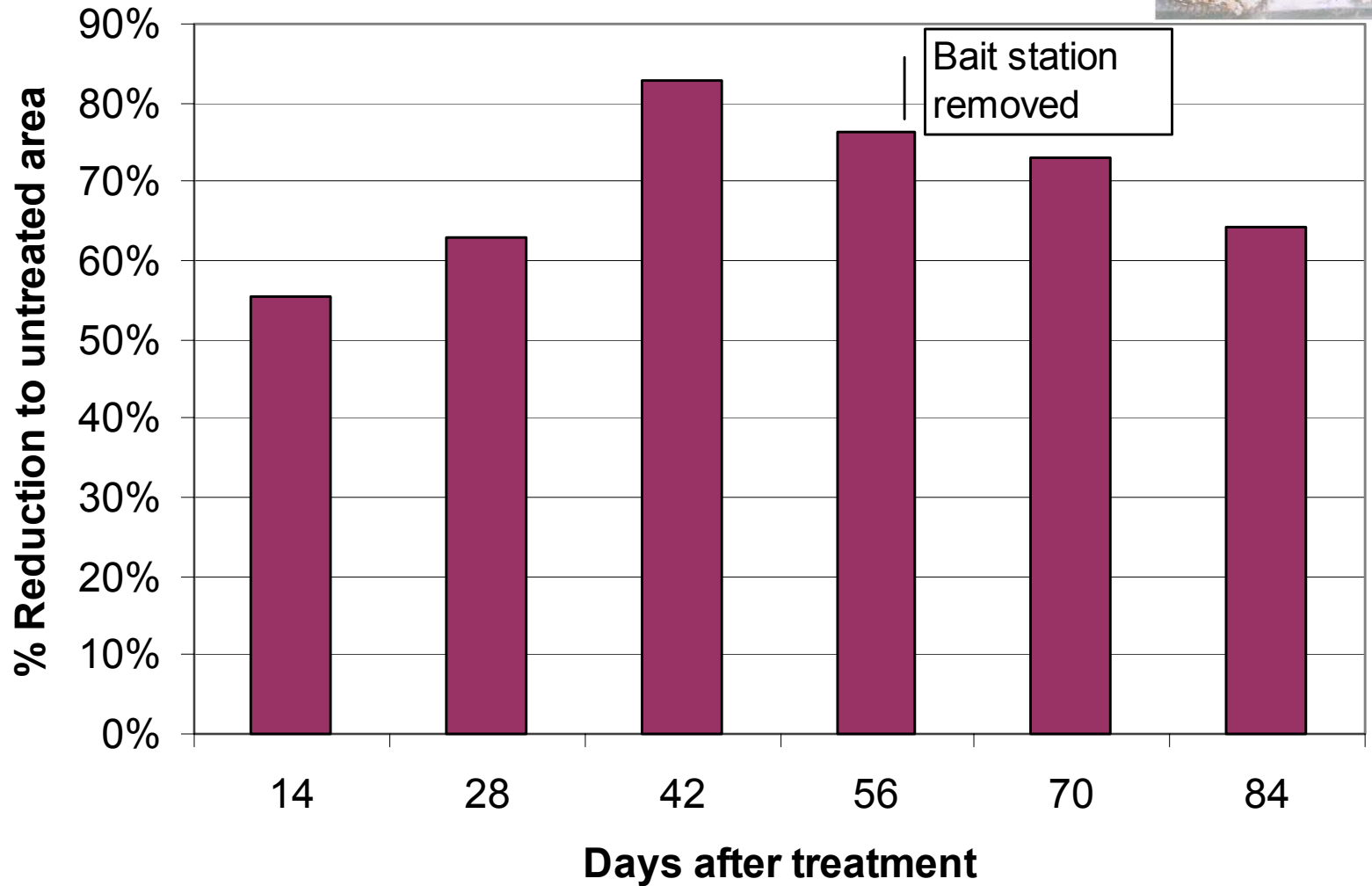
(20 glasses per sample, biweekly, cockroaches destroyed)



Field trial 1, drench and bait



Field trial 2, bait stations



Conclusions

- *Steinernema carpocapsae* works excellent against cockroaches if
 - lateral contact is assured
 - sufficient moisture is maintained
- Ideal method for greenhouses with everyday visitors
- targeted application of nematodes to hiding places will improve efficacy
- Less feasible in appartments, hotels, citchens, bakeries, etc.
- Other species also susceptible
 - *Blatella germanica*
 - *Blatta orientalis*
 - *Pygnoscelus surinamensis*



Thank you !