

Bodem zonder grenzen

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Heteren → Wageningen**



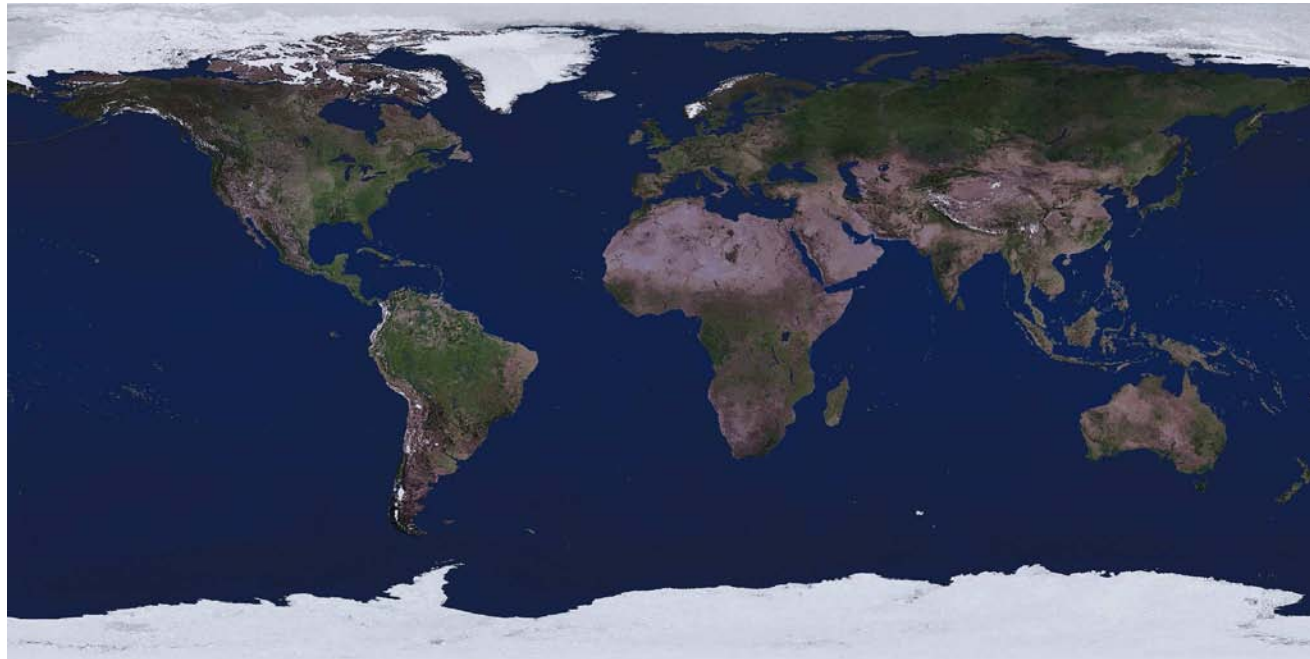


Traditioneel bodemecologisch onderzoek neemt een grote vlucht...

Gil Grissom (William Petersen) on CSI: Crime Scene Investigation.



THE
who's
who



When and where



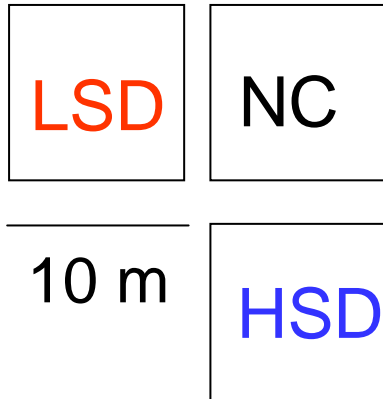
In principe kun je je een leven lang vermaken met een handje vol met grond



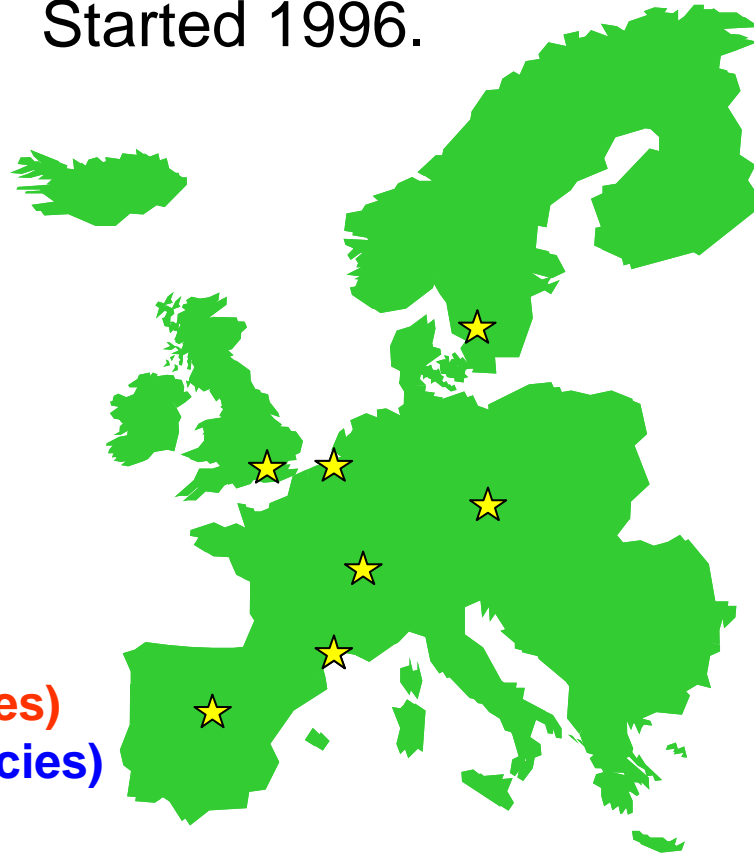
Field experiments across Europe (CLUE / TLinks): how to restore species-rich grassland communities?

Effects of sowing mid succession plant species on biodiversity and ecosystem development.
Started 1996.

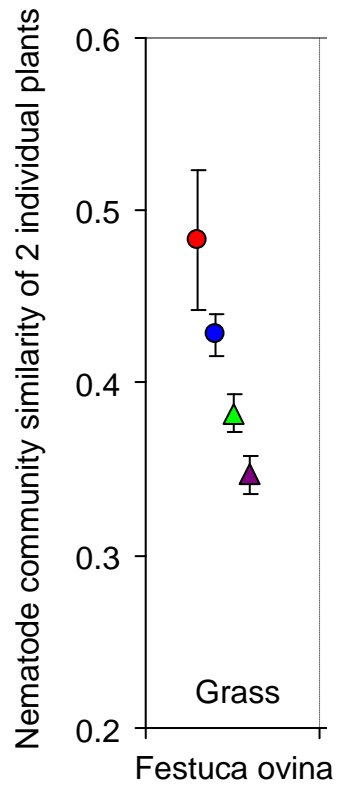
Treatments



LSD = Low sowing diversity (4 species)
HSD = High sowing diversity (15 species)
NC = Natural colonization

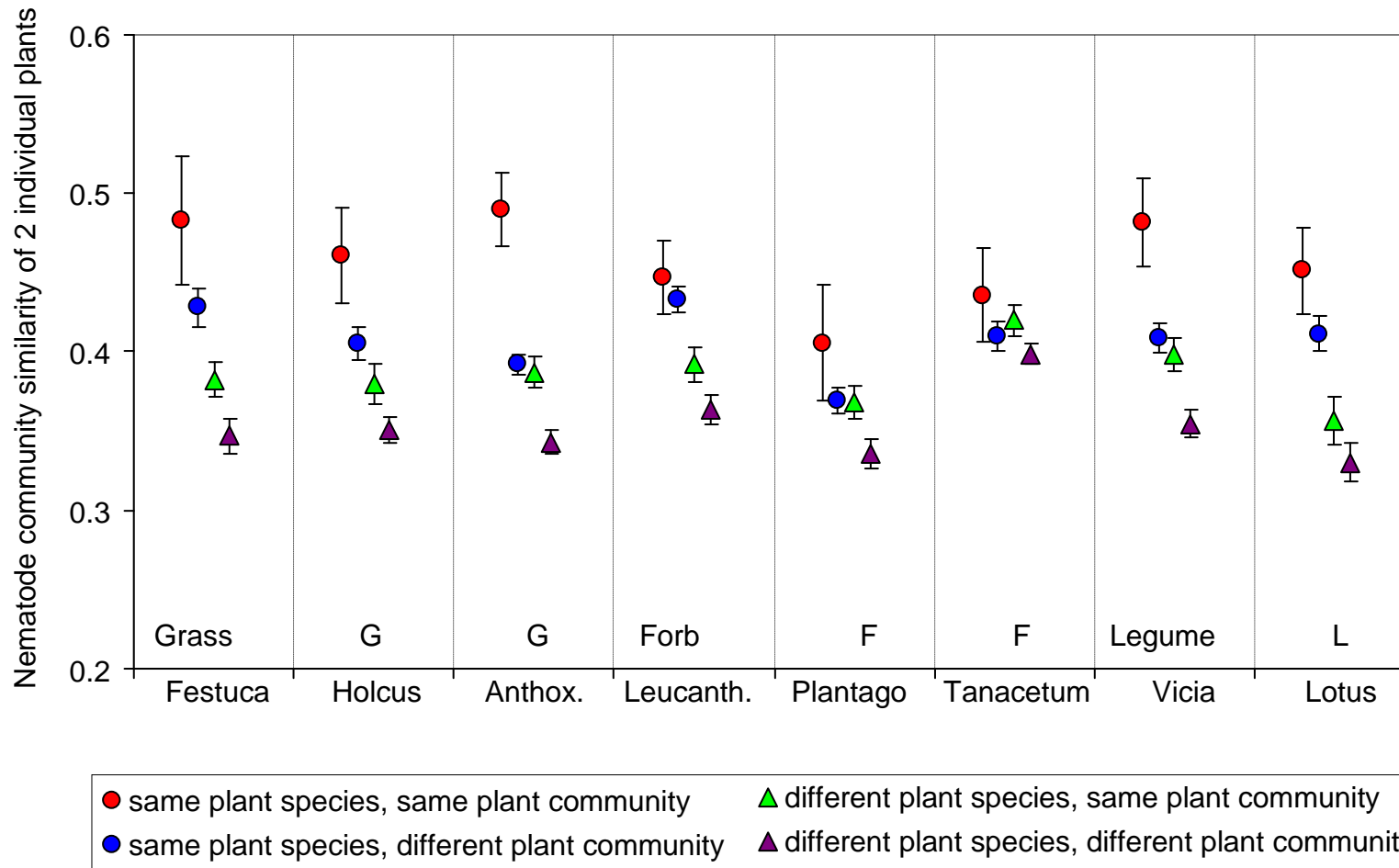


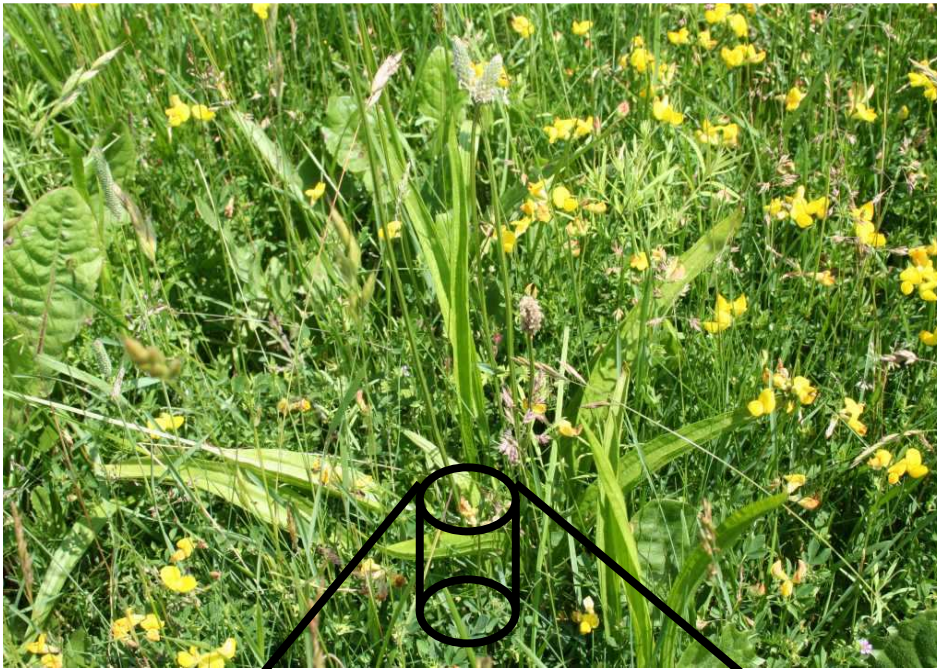
What are the spatial scales soil organisms operate at?



- same plant species, same plant community
- same plant species, different plant community
- ▲ different plant species, same plant community
- ▲ different plant species, different plant community

Nematode community composition is determined by plant species, as well as by where these plant species grow





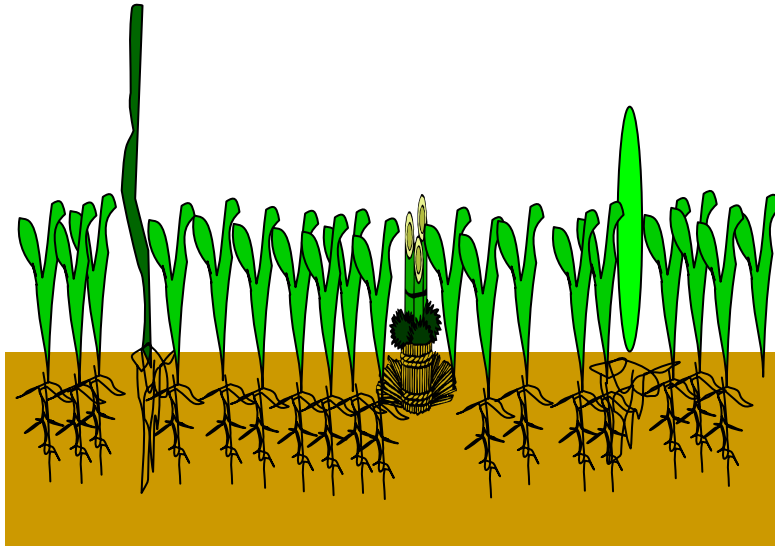
Root zone soil core



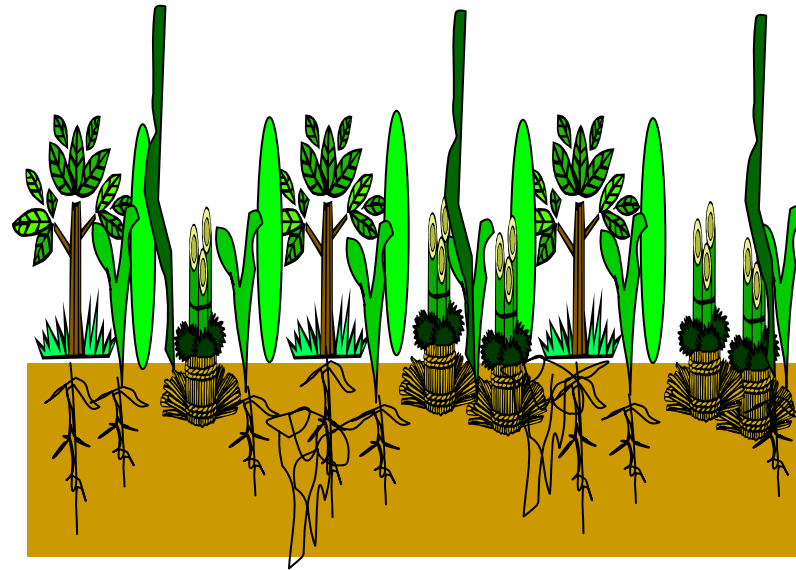
Taxon diversity
soil food web
plant species-specific

Food web model
no difference
in functioning

- Soil biota



+ Soil biota



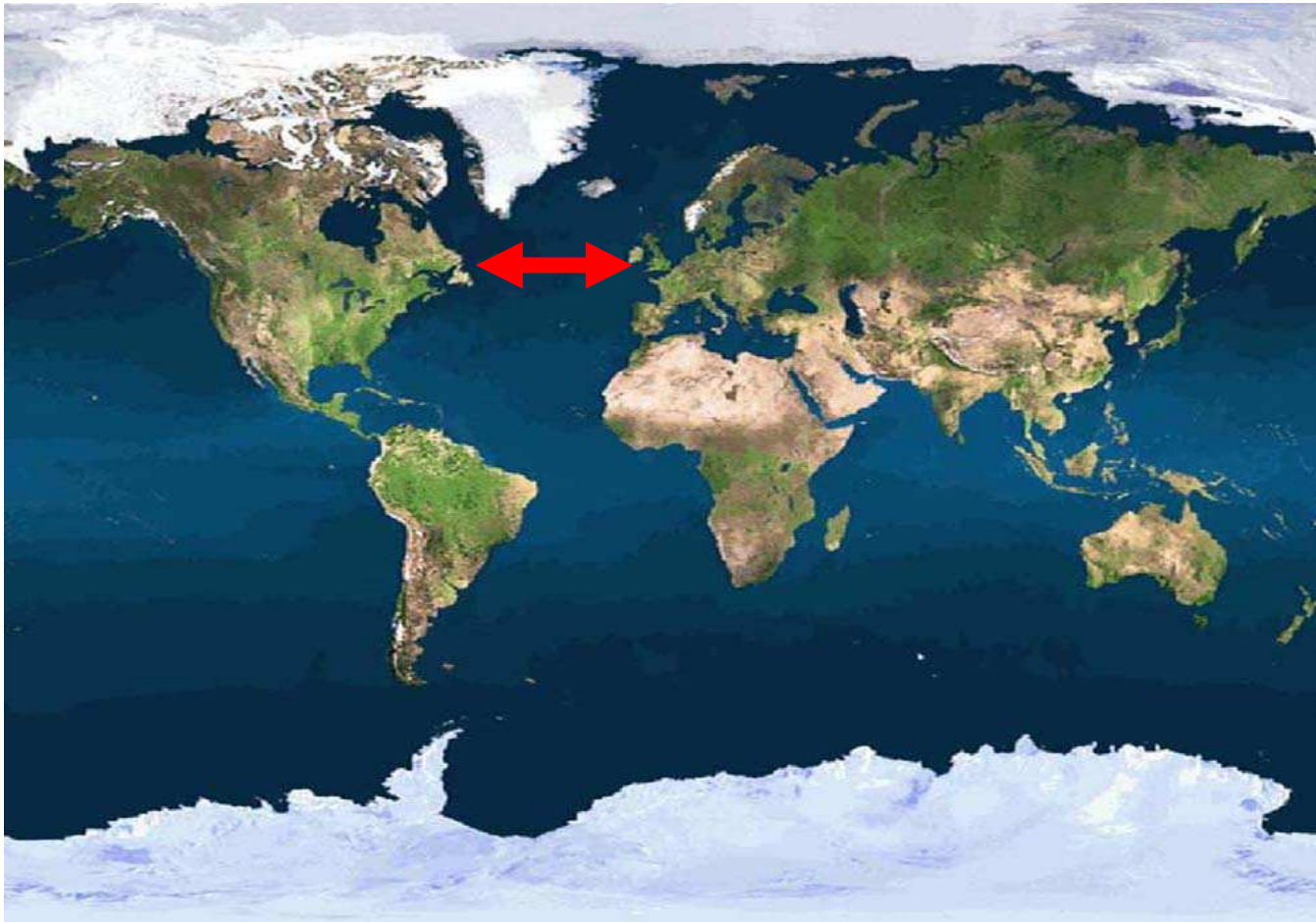
Effects of root pathogens, root herbivores and symbionts on plant biodiversity: relatively little contribution of these soil biota to soil biomass, but profound effects on plant community composition.



Lourens Baas Becking (1930's):
"Everything is everywhere, but the environment selects"

Cross-continental biological invasions

- \pm 25000 introduced species
- Costs $>$ 35 billion US\$ / year
- \pm 12000 introduced species
- Costs: appr 30 billion Euro/yr



Biological invasions: Invasiveness of *Prunus serotina*



Europe

Black Cherry (*Prunus serotina*) is an early successional tree species from Northern and Central America currently invading NW European forests after being introduced



USA

Results greenhouse experiments
with *Prunus serotina* in the U.S.
(native range) and in the Netherlands
(exotic range).

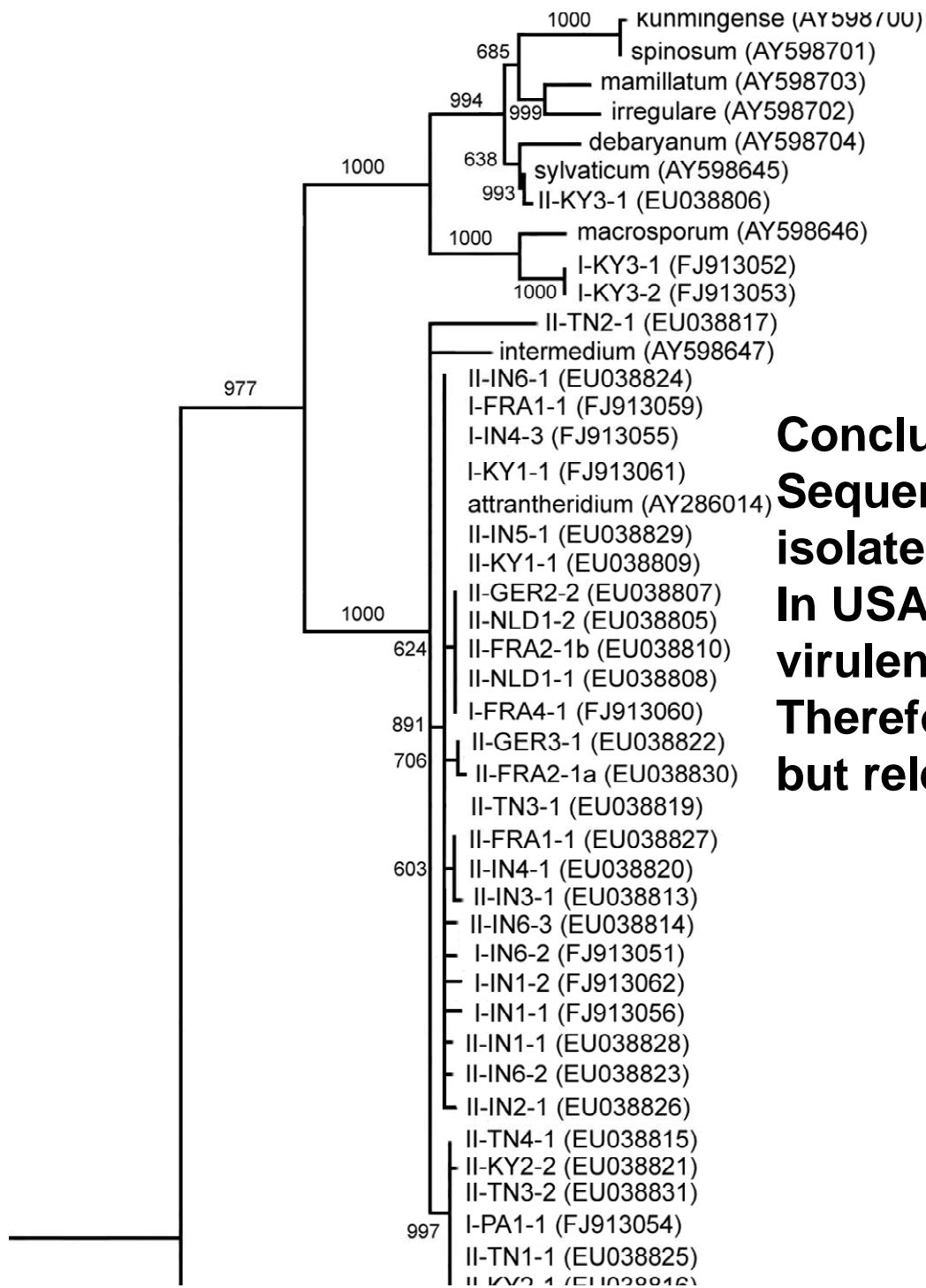


Seedling mortality
in soil in greenhouse

NL	USA
-	+
-	-

Packer and Clay Nature 2000

Reinhart et al. 2003 Ecology Letters



Conclusion:
Sequencing and testing of *Pythium* isolates showed:
In USA *P. attrantheridium* was more virulent than in Europe.
Therefore, no escape from enemies, but release from virulent enemy strains

Range shifts or new invasions by climate change?

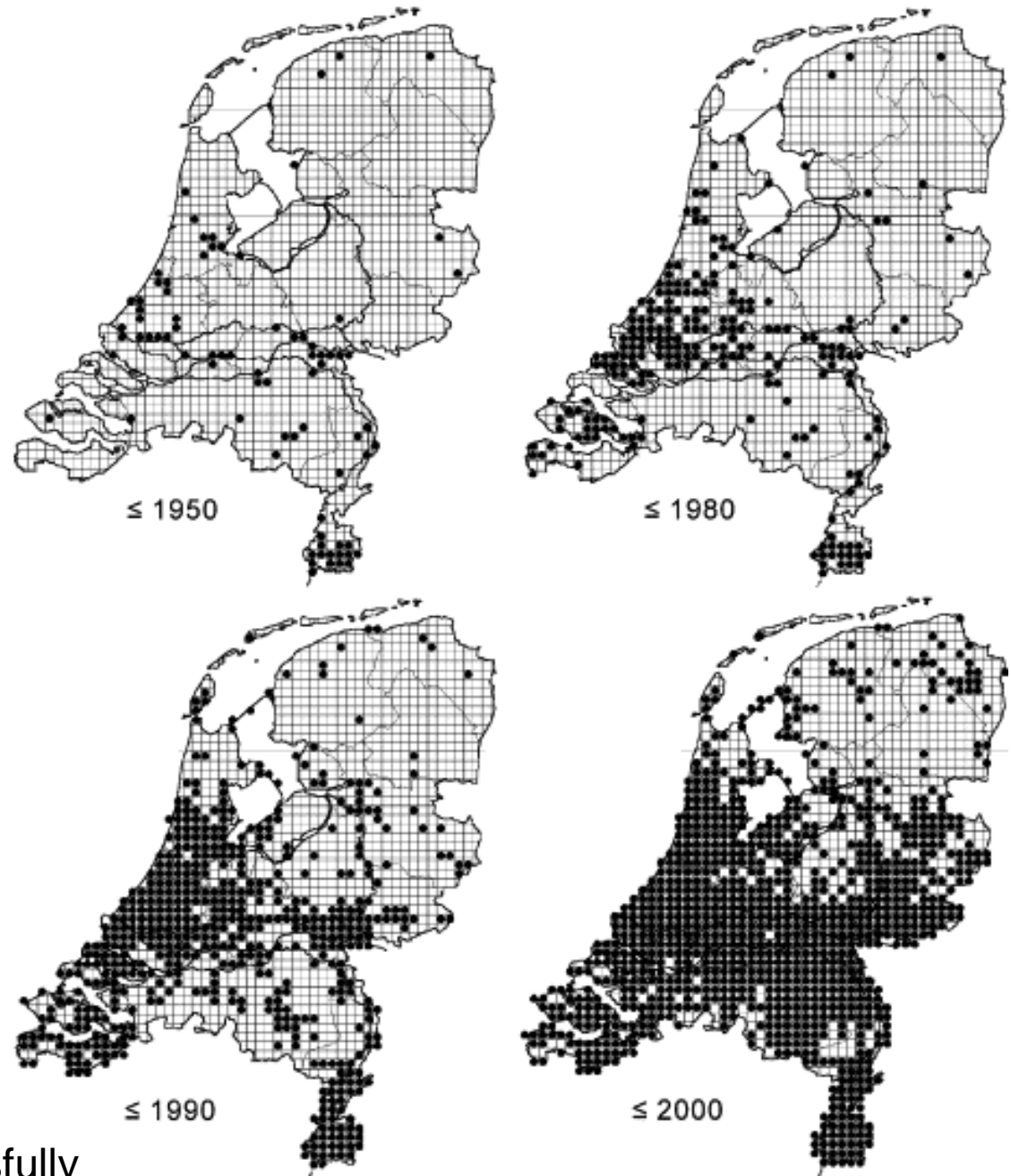


- 50 % of recently established plant species in the Netherlands from warm climate region
- Same pattern also for lichens, mosses, insects and aquatic/marine species



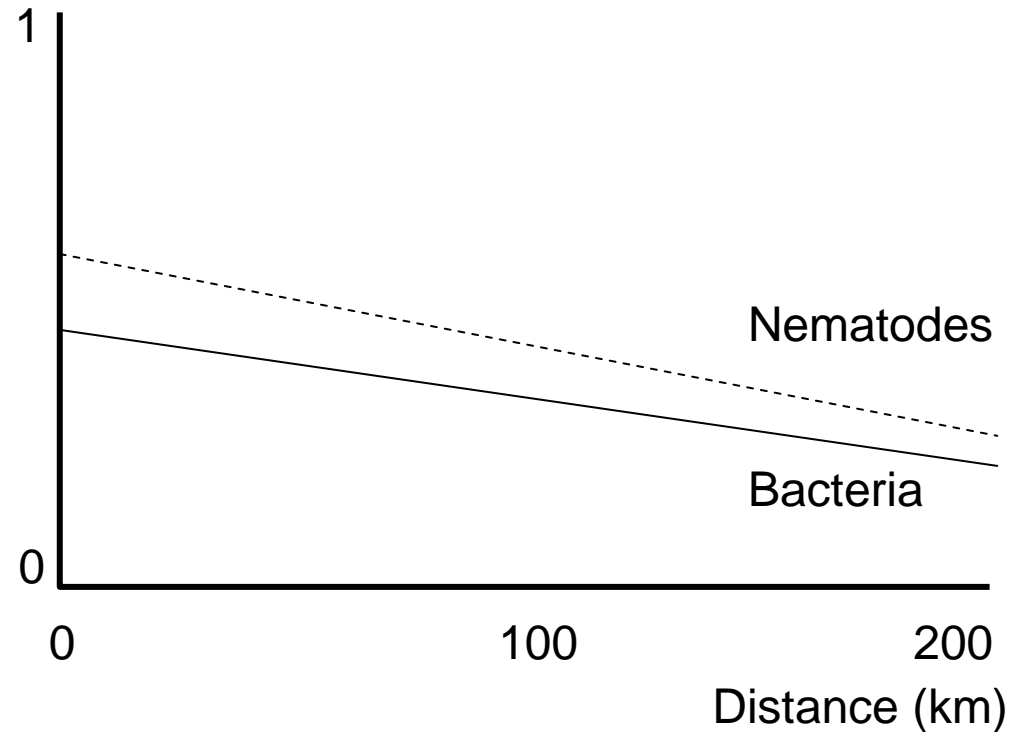
Lactuca serriola

Quite some species move successfully to higher latitudes and altitudes



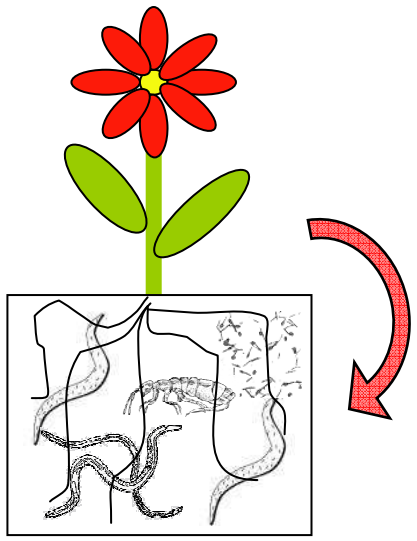


Jaccard
similarity
index

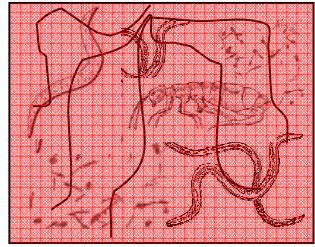


Chalk grasslands in southern UK: nematode and bacteria similarity decline with distance (source: the EU-TLinks project). Soil-borne enemy release by range shift possible?

Plant species A

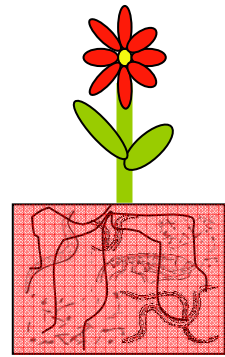
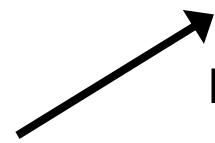


Soil community X



Soil community A

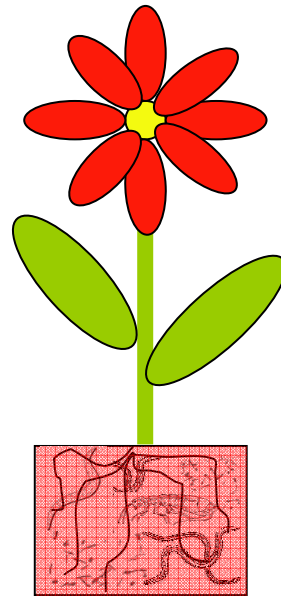
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Bad guys > Good guys

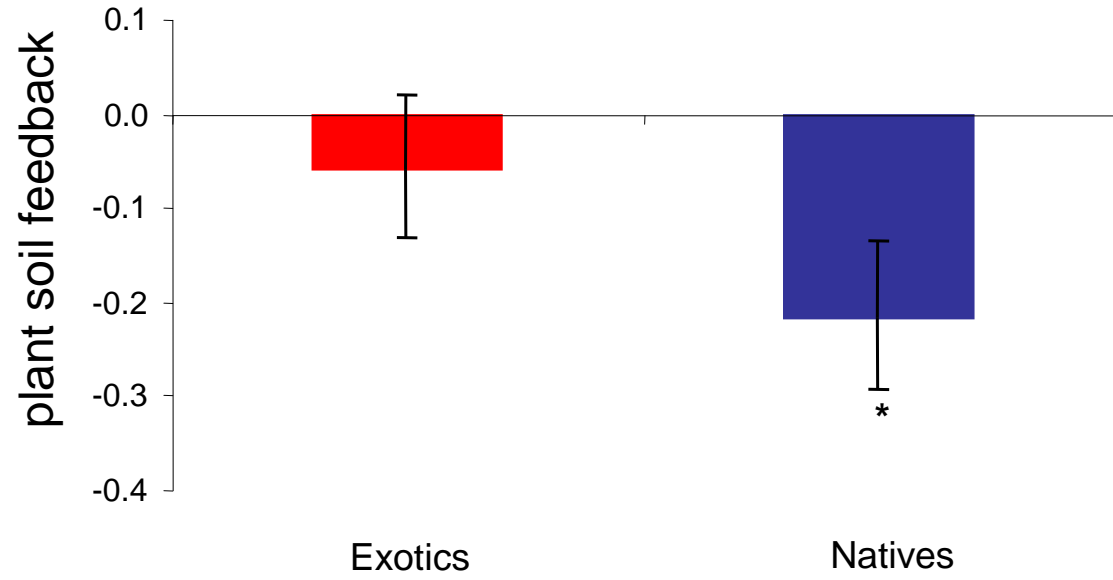


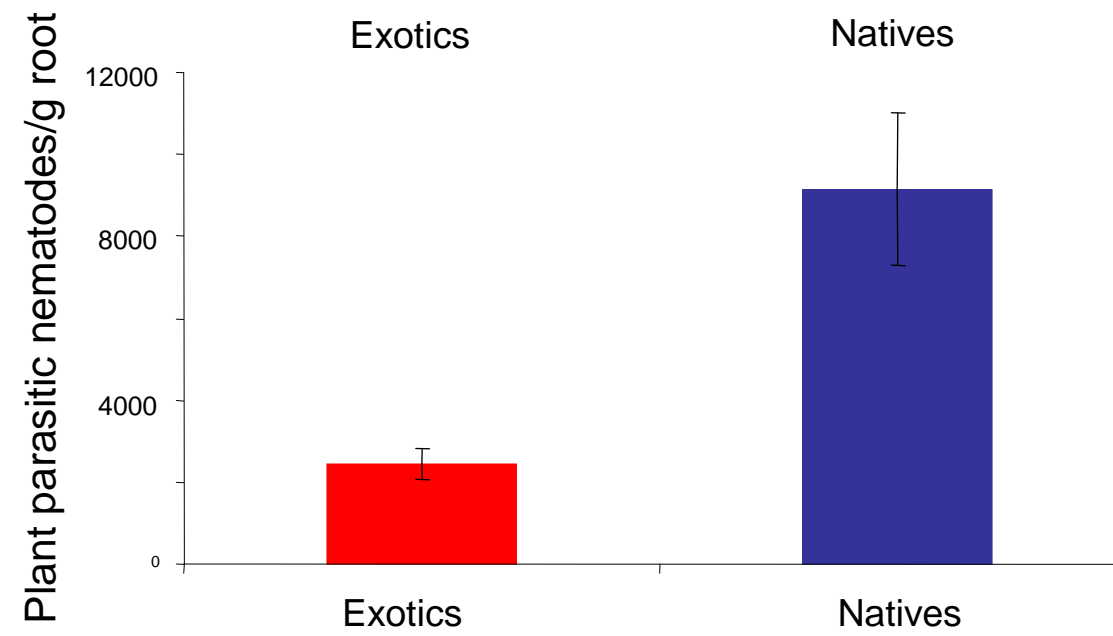
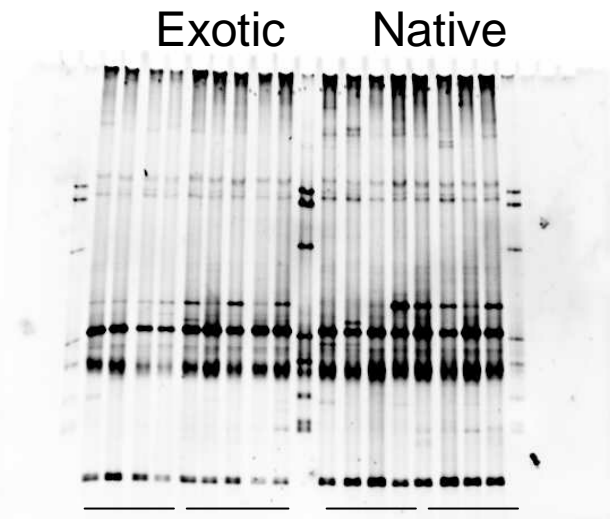
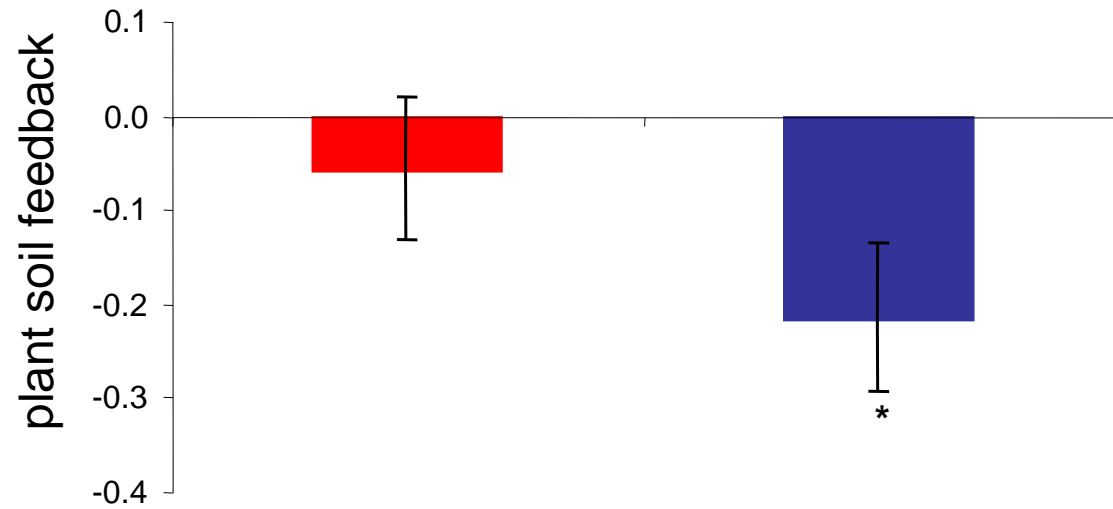
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Good guys > Bad guys

Plant-soil feedback experiments with range expanding exotic and related native plant species

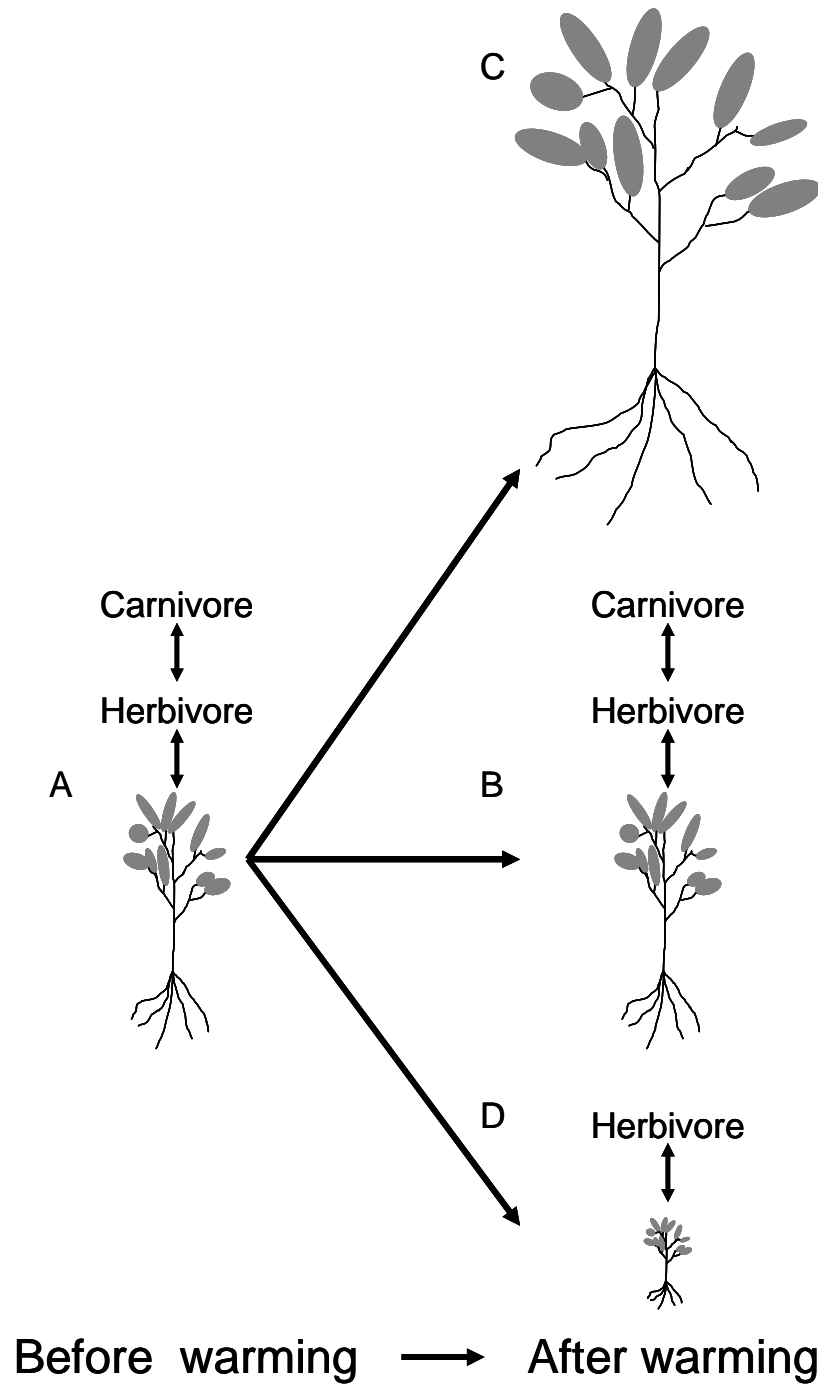




own = foreign own ≠ foreign

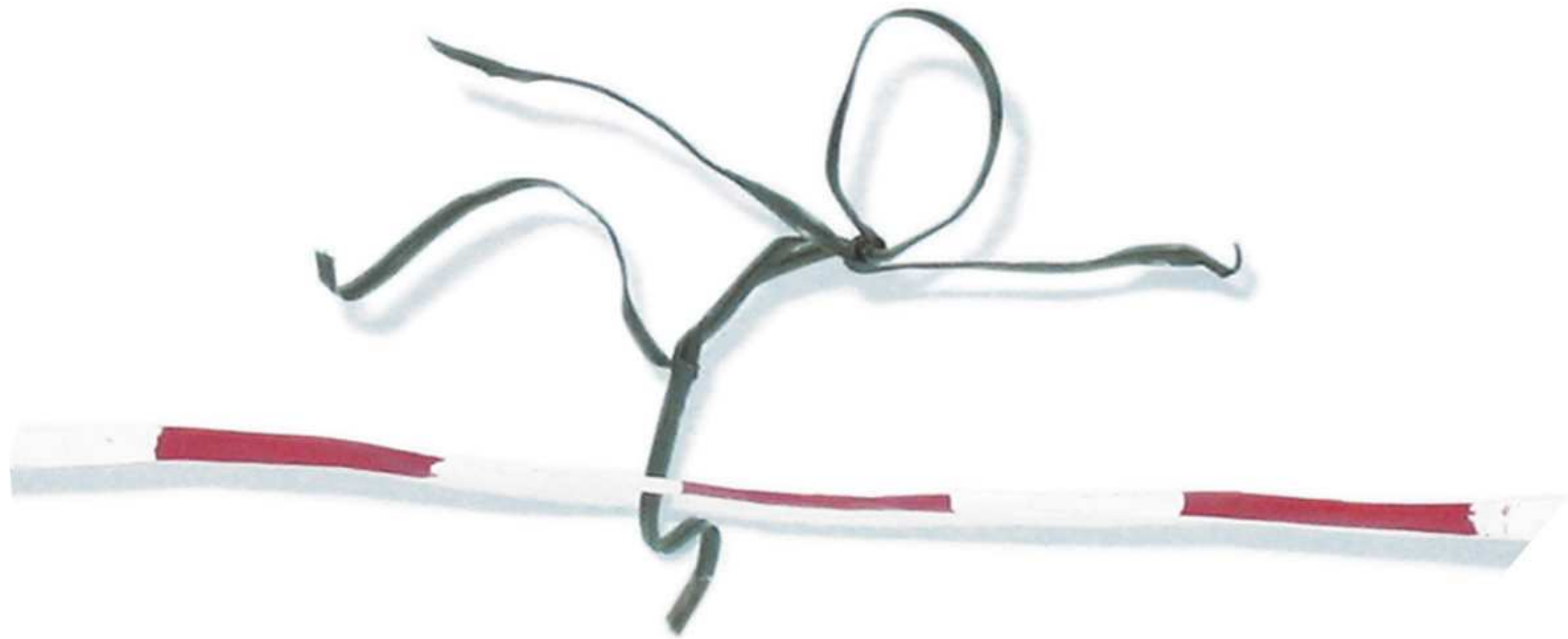
Exotic plants are inert for rhizosphere fungi and have less root-feeding nematodes

Morriën, Engelkes et al. in prep.



Three scenario's for climate warming.

(aboveground herbivores and carnivores also stand for belowground multitrophic communities.)



Bodem: naar een grenzeloze toekomst