

Research Institute for Nature and Forest (INBO)



Luc De Bruyn
Species Conservation Group
UA – Evolutionary Ecology

Bats



All 17-19 species on the habitat directive and protected

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Life history

- Summer
 - Reproduction colony roosts (hollow trees, churches, ...)
 - Foraging areas (ponds, forests, ...)
 - Habitat connectivity, commuting
- Autumn
 - Mating swarms (near hibernacula)
- Winter
 - Hibernation (trees, fortresses, bunkers, ...)
- External effects
 - Environmental conditions (Climate change)
 - Human impact (Habitat destruction, disturbance, light, ...)



Habitat fragmentation and bats

- Bats use different sites to feed, sleep and reproduce -> habitat network
- Habitats are heavily fragmented (in Flanders)
- important effects on bat species




Question:
How does habitat fragmentation affect bat communities and how can we improve the situation

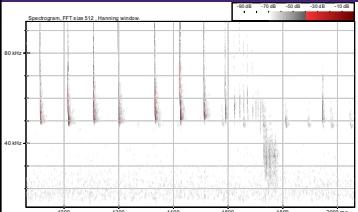
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Habitat fragmentation and bats

Tasks

- Fieldwork (March) April – June (July – September)
 - o Antwerp harbour
 - o Focus on flight paths
- o Automatic bat detectors
 - o Static (full night)

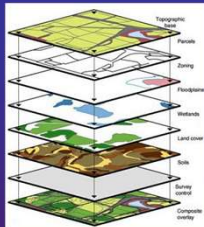
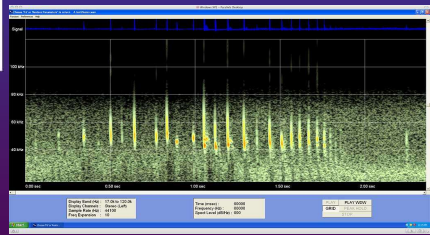



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Habitat fragmentation and bats

- Lab

- o Analyses of sonograms (species identification)
- o Landscape modelling (GIS)
- o Statistical analysis (fragmentation, habitat quality, bat community)

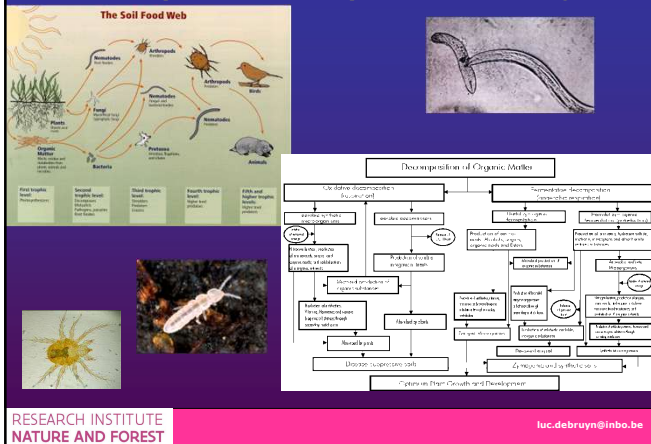



Co-promotor:
Ralf Gysellings

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Soil (functional) biodiversity



Habitat loss and deterioration

- Fragmentation
- Intensification agriculture,
 - artificial fertilizers,
 - pesticides, ...

-> biodiversity loss



What can we do about it?

(Europe's New Green Deal)

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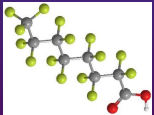
Effects of PFAS on soil communities

PFAS

- Forever chemicals
- Lab (*Folsomia candida*) reproductive impairment, lethal effects
- No studies on soil community structure in nature

Question

- What are the effects on soil biodiversity?



Co-promotor: Rik Delhem



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Forest quality, management and forest soil biodiversity



Questions:

- Which management practices speed up forest soil formation?
- Which management action make/keep forest soils healthy?
 - = high (functional) biodiversity, maintenance of soil functioning, sustainability, ecosystem services

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Forest quality, management and forest soil biodiversity

Fieldwork

- Soil & litter samples



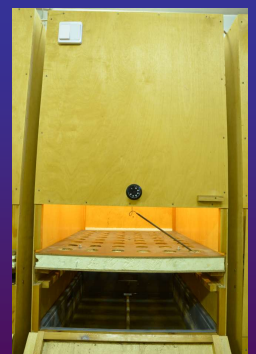
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Forest quality, management and forest soil biodiversity

Animal extraction

- McFadyen apparatus



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Forest quality, management and forest soil biodiversity



Lab work

- Arthropods – Collembola
 - Identification
 - Functional grouping
- Management
- Soil chemical composition
- Vegetation changes

Co-promotor: Rik Delhem

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Soil diversity and eDNA (optional extra)

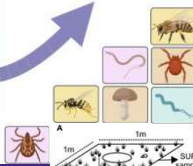
1. Agricultural Microcosms



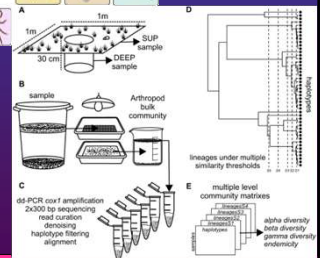
2. eDNA-based Monitoring



3. Taxonomic Identifications



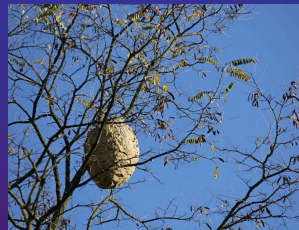
- DNA techniques
- eDNA
 - Metabarcoding



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The use entomopathogenic fungi to control the Asian hornet (*Vespa velutina*)



- Invasive alien species
- Feeds on (honey)bees, (syrphid) flies, social wasps
- Control:
 - Spring trapping
 - Pesticides containing permethrin

Supervisor: Kathleen Verstraete (Prov. Antwerpen)

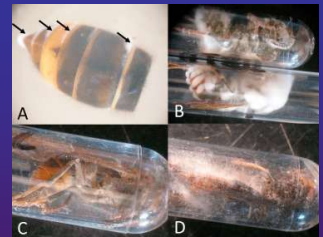
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The use entomopathogenic fungi to control the Asian hornet (*Vespa velutina*)

Entomopathogenic fungi

- *Beauveria*, *Metharizium* sp.
- LD₅₀ = ± 6 days
- Transmitted from wasp to wasp



Question

- Does it work in nature?
- Trojan horse ?

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The use entomopathogenic fungi to control the Asian hornet (*Vespa velutina*)

Fieldwork

- Campus Vesta, Ranst, (June) July – October
- Trojan horse in field cages, Embryo and secondary nests (Nest effects)
- Direct effects in boxes (individual effects)

- Check mortality
- Behavioural observations



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