Research Institute for Nature and Forest (INBO)

Luc De Bruyn

Species Diversity Group
UA – Evolutionary Ecology

Bats

All 17-19 species on the habitat directive and protected

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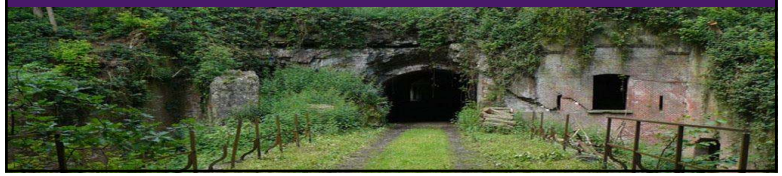
Life history

- 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, …)



Effects of light on commuting/foraging bats

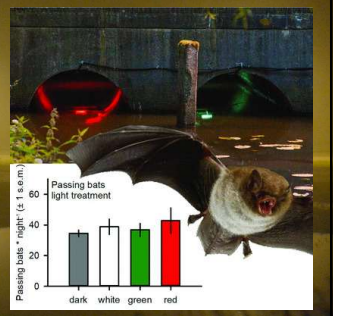
Co-promotor: Daan Dekeukeleire

Effects of light on commuting/foraging bats

Target species: bats that forage over open water

- Common Pipistrelle (Gewone dwergvleermuis, *Pipistrellus pipistrellus*)
- Nathusius' pipistrelle (Ruige dwergvleermuis, *P. nathusii*)
- Daubenton's Bat (Watervleermuis, *Myotis daubentonii*)
- Pond Bat (Meervleermuis, *M. dasycneme*)
- Common Noctule (Rosse vleermuis, *Nyctalus noctula*)

Effects of light on commuting/foraging bats



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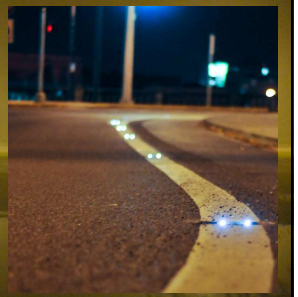
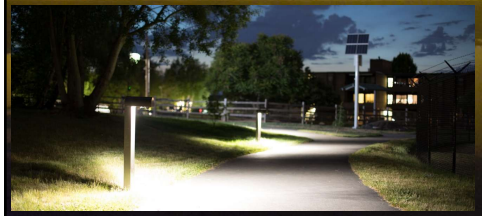
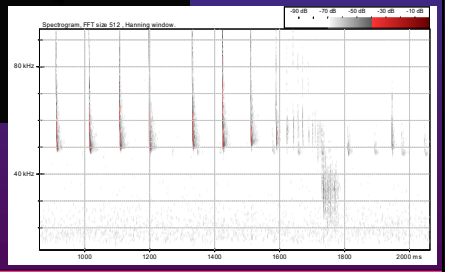




Bat sonar



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Effects of light on commuting/foraging bats

Tasks
- Fieldwork (April-May) - July-October
  - Testing light types
    - Switching on/off
    - Switching locations with control
  - Automatic bat detectors
  - Weather (temperature, rain)
  - Environment: field + maps (GIS)

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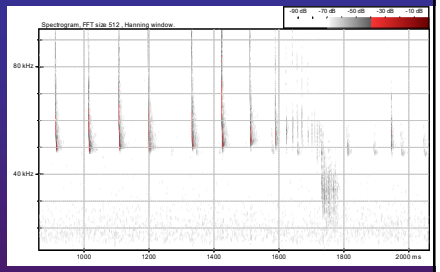
Effects of light on commuting/foraging bats

Tasks
- Desk
  - Identifying recordings
    - Commuting
    - Foraging
  - Data analysis



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Hibernacula use and bat activity patterns

Question:
Why do bats select certain hibernacula?
When and why do they move during the winter?
How can we improve hibernacula?

Co-promotor: Ralph Gyselings

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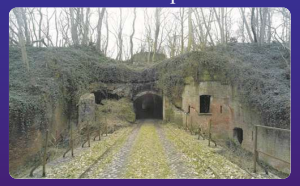
Hibernacula use and bat activity patterns

Tasks
- Fortresses, bunkers, abandoned brick oven

Steendorp



Schoten

Mastenbos

Turnhout

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Hibernacula use and bat activity patterns

Field = Winter (November – March)
- Locating & counting (hibernating) bats
- Infrared bat counters
- Automatic ultrasound bat detectors
- Thermal camera
- Temperature and moisture loggers

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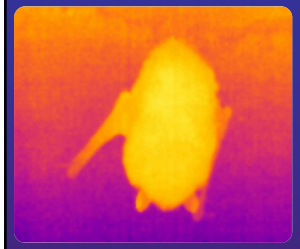
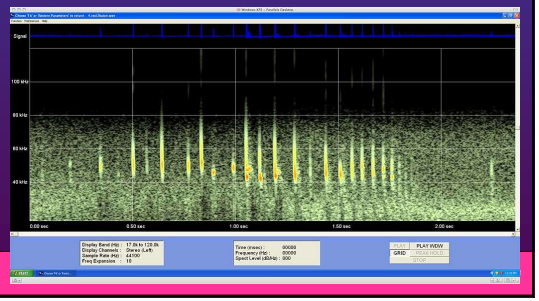


Desk
- Species identification
  - Sonograms
- Thermal photo's
- Data analyses



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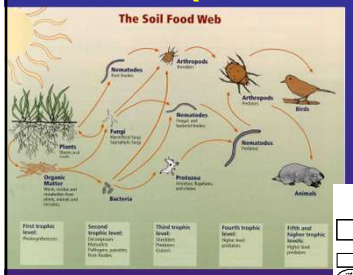
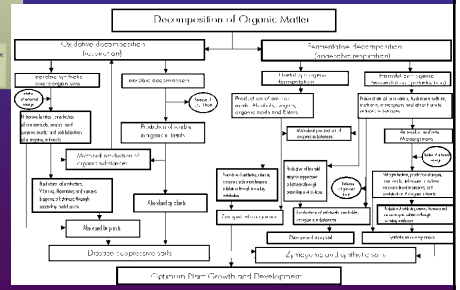
Soil (functional) biodiversity





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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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Farmland agreements

Farmland agreements
- Flower strips
- Controlled mowing

Organic farming
- Organic fertilizers
- Biological pest control
- Crop diversity

What are the effects on soil biodiversity?

Co-promotor: Rik Delhem

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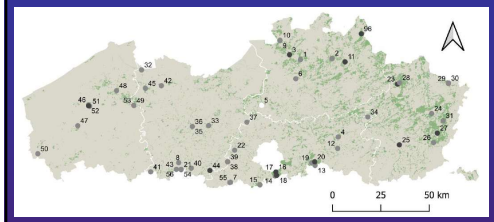
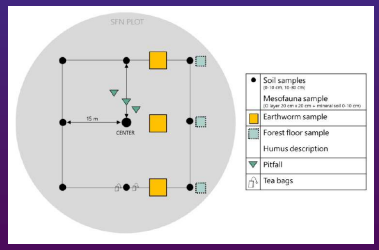
Forest quality, management and forest soil biodiversity

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

Forest quality, management and forest soil biodiversity



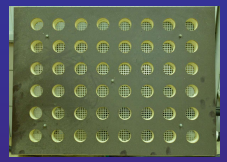


Forest quality, management and forest soil biodiversity

Fieldwork
- Soil & litter samples

Forest quality, management and forest soil biodiversity

Animal extraction
- McFadyen aparatus



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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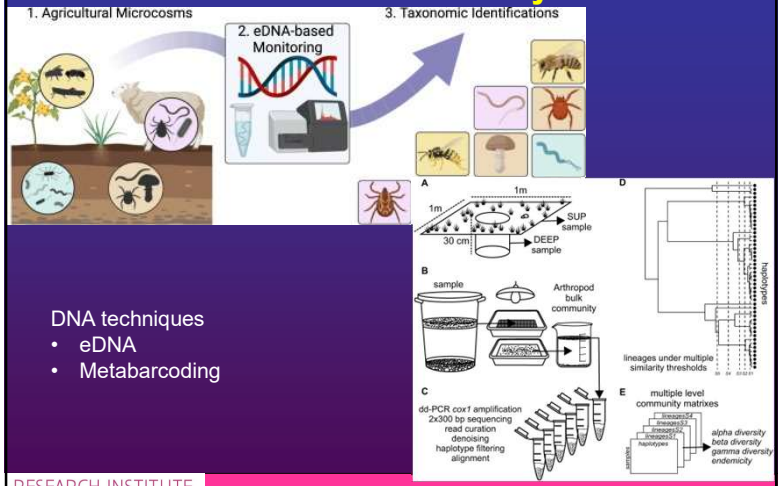
Forest quality, management and forest soil biodiversity



DNA techniques
- eDNA
- Metabarcoding

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The use of diatomaceous earth 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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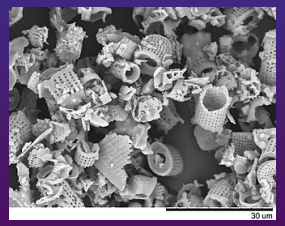
The use of diatomaceous earth to control the Asian hornet (*Vespa velutina*)

Is control with diatomaceous earth possible?

- Fossilized remains of diatoms
- Particle size: 3 mm to < 1 µm
- Blocks trachea, dries out brood?
- Test in lab (2 nests) 100% effective



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The use of diatomaceous earth to control the Asian hornet (*Vespa velutina*)

Fieldwork (May – November)
- Spraying nests
  - Diatomaceous earth
  - Pesticides
  - Control
- Check mortality
- Observations of wasps (Drone)

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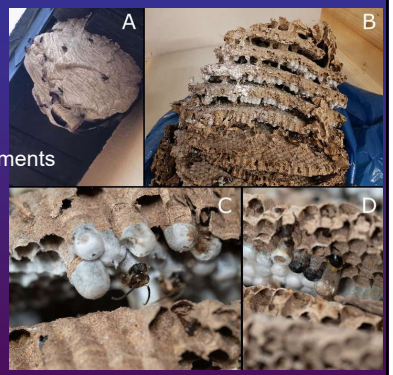
The use of diatomaceous earth to control the Asian hornet (*Vespa velutina*)

Lab work
- Spraying nests
  - Diatomaceous earth
  - Pesticides
  - Control
- Check mortality
- Effect on brood (dessication?)
  - Controlled Survival experiments



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